WELL-BEING IN ORGANIZATIONS

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WELL-BEING IN ORGANIZATIONS

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Daily Challenge/Hindrance Demands and Cognitive Wellbeing: A Multilevel Moderated Mediation Model

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Based on the challenge-hindrance stressor model, this study explored the mechanism of how challenge/hindrance demands affect cognitive wellbeing on a daily basis. Specifically, we examined the mediating effect of work–family enrichment on the relationship between challenge/hindrance demands and cognitive wellbeing. In addition, we tested the moderating effect of overqualification on the relationship between challenge/hindrance demands and work–family enrichment on a daily basis. Finally, we examined the moderated mediation effect of perceived overqualification in a multilevel model. To capture changes in work–family enrichment and cognitive wellbeing that individuals perceived daily, the experience sampling method was adopted to test our theoretical models. A total of 99 participants from China were involved in this investigation. The results showed that daily challenge demands had a significant positive effect on daily cognitive wellbeing, and daily hindrance demands had a significant negative effect on wellbeing. In addition, daily work–family enrichment mediated the positive relationship between daily challenge demands and daily cognitive wellbeing. Moreover, perceived overqualification moderated the relationship between daily challenge demands and daily cognitive wellbeing in the multilevel model. Finally, a significant moderated mediating effect of this overqualification on the indirect effect of daily work–family enrichment on the relationship between daily challenge demands and daily cognitive wellbeing was observed.

Keywords: challenge demands, hindrance demands, work–family enrichment, perceived overqualification, cognitive wellbeing, diary study

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INTRODUCTION

Subjective wellbeing refers to an individual's subjective perception of happiness and represents the overall evaluation of an individual on his/her work and family life (Luhmann et al., 2012b). This wellbeing encompasses affective wellbeing and cognitive component wellbeing. Cognitive wellbeing is an important dimension of employee wellbeing as it is used to describe an individual's global life satisfaction, which permeates his/her work and family life (Dierendonck, 2004; Horn et al., 2004). Existing studies indicate that employees' job demands have a negative correlation with their cognitive wellbeing (Anja et al., 2010; Demerouti and Bakker, 2011; Lamb and Kwok, 2016). However, other studies argue the opposite, noting that increased job demands can help improve an employee's cognitive wellbeing (Anja et al., 2010; Klassen and Chiu, 2010). Although

existing research is able to confirm that job demands play a significant role in affecting cognitive wellbeing, consistent conclusions have yet to be reached. The inconsistency here is a reminder of the necessity of distinguishing between different types of job demands, namely "benign" job demands and "malignant" ones. Specifically, job demands should be classified as one of two demands, challenge or hindrance, both of which have different effects on employees' cognitive wellbeing (Cavanaugh et al., 2000).

Existing research on the mechanism of job demands affecting employees' cognitive wellbeing focuses mainly on the work domain itself (LePine et al., 2005). Such studies do not integrate work and family domains. Despite the division seen in research, the two important social subsystems, namely, work and family, are inseparable; interaction between work and family can directly impact employees' cognitive wellbeing (Voydanoff, 2005; Li et al., 2015). Based on the conservation of resources (COR) theory (Hobfoll, 1989), the outcome of a stressful event depends on whether the event results in a net gain or loss of resources (Cavanaugh et al., 2000). In line with this point, the pressures felt by employees in the workplace will inevitably affect their family life, whether positively or negatively. Numerous studies have confirmed that job demands may act as antecedent variables affecting work–family enrichment (Voydanoff, 2005; Wayne et al., 2007). However, the mechanism of how different types of job demands affect cognitive wellbeing requires further examination. Thus, it is necessary to undertake research confirming the importance of work–family enrichment in the process mechanism of transformation from employees' hindrance and challenge demands to their cognitive wellbeing.

Moreover, the characteristics of employees' personal perceptions can affect their cognitive wellbeing, among which overqualification plays a crucial role (Verhaest and Omey, 2006; Liu and Wang, 2012; Zheng et al., 2015). In terms of the theory underpinning this assumption, LePine et al. (2005) pointed out an individuals differentiated characteristics would result in different reactions to job demands. Regardless of challenge or hindrance demands, there remains an issue as to whether an individual has the ability and qualification to cope with the demands of a job. In other words, employees with different levels of perceived qualifications will express different responses to challenge and hindrance demands. As a result, one could consider the question, "what kind of person is more likely to overcome challenges of challenge or hindrance demands?". Those who perceive their own academic knowledge, skills and experience as exceeding the requirement for his/her particular position (Chen et al., 2017) are able to more easily cope with challenge or hindrance demands. Conversely, employees with low levels of perceived overqualification will struggle with job demands. It is commonly understood that different individuals possess varying levels of perceived qualification in the workplace. Some employees may think their abilities are far beyond the demands for the job, while others will believe that their abilities are merely suitable for the position or that their abilities do not meet the job requirements (Chu and Wang, 2019). Such appraisals of one's ability and position held will not only affect an employee's work performance (Liang et al., 2019), but also have implications for the employee's family life as matters spillover from work to family life (Hu et al., 2015). Ultimately, an employee's cognitive wellbeing could be affected (Johnson et al., 2002). Thus, it becomes crucial to consider the moderating effect from the perception of overqualification at the individual level as it relates to the relationships between daily job demands, work–family enrichment, and employees' cognitive wellbeing.

Most research on wellbeing uses only cross–sectional data (Diao et al., 2019), thus potentially overlooking fluctuations in job demands and employees' wellbeing on a daily basis. Zhang et al. (2017) suggested that researchers should consider daily variations when examining the effect of job demands on employees' attitudes and behaviors, because factors such as unexpected stressors encountered during workdays (Ilies et al., 2007; Rodell and Judge, 2009), emotional events in the workplace (Dimotakis et al., 2011), and work strategies and cognition (Judge et al., 2009) can result in fluctuations in employees' wellbeing. Therefore, building dynamic models while also considering individual differences and intraindividual fluctuations is necessary (Koopmann et al., 2016).

This study is based on the challenge-hindrance stressor model and the COR theory and aims to analyze the ways in which challenge and hindrance demands affect employees' wellbeing on a daily basis (this research model is shown in **Figure 1**). First, this study explores the predictive effect of employees' daily challenge and hindrance demands on their occupational health, specifically on cognitive wellbeing. This aspect of the study is in response to existing research recommendations advocating the distinction between the two types of job demands (O'Brien and Beehr, 2019). Moreover, this study attempts to prove that challenge demands differ fundamentally from various hindrance demands (LePine et al., 2005). Second, daily work-family enrichment is introduced as a mediator. From the perspective of cross–border role participation, this study attempts to uncover the links between the two types of job demands and employees' cognitive wellbeing. At the same time, this study seeks to enrich the literature on the two types of job demands as antecedent variables of work–family enrichment. Third, the employment of perceived overqualification as a moderating variable enables this study to explore various conditions from the individual differences to establish relationships between the two types of job demands, work–family enrichment, and employees' cognitive wellbeing based on personality traits. Finally, this study utilizes the diary

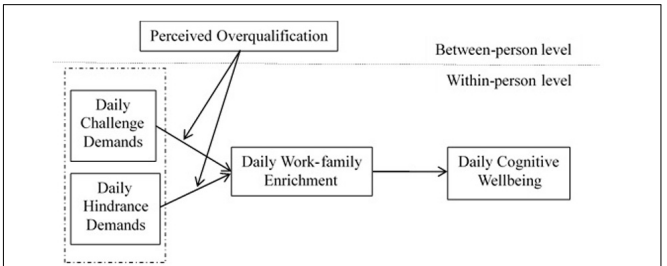

FIGURE 1 | Theoretical research model.

study method as a framework for considering the impact of variable changes, grasping the fluctuation trends of individuals, and reducing common method variance. Such an approach may better explain the effects of the variables and address the shortcomings of past empirical analyses.

THEORY AND HYPOTHESES

Challenge/Hindrance Demands and Cognitive Wellbeing

Challenge demands refer to employee job requirements that enable them to acquire new knowledge and result in the promotion of personal growth. Such requirements may include time pressure and increased work responsibilities. Challenge demands derive from specific daily work situations and are important external fluctuating predictors of employees' cognitive wellbeing (Ilies et al., 2007; Rodell and Judge, 2009). According to the challenge hindrance stressor model, overcoming challenges means a potential net gain of resources. Thus daily challenge demands can prompt employees to devote increased energy to their work as a means of achieving their set work goals (LePine et al., 2005) and improving their satisfaction toward their daily cognitive abilities for the acquisition of greater resources. Second, these types of job demands can promote employees' sense of control over their work, thereby enhancing the cognitive performance quality of their daily tasks. Finally, such demands can influence employee's positive perception of their cognitive and intellectual abilities (Wu, 2000). This study maintains that daily challenge demands can significantly improve employees' daily cognitive wellbeing.

Hypothesis 1: Daily challenge demands are positively related to daily cognitive wellbeing.

By contrast, hindrance demands refer to stressful and threateningly negative job requirements, including organizational politics, ambiguous roles, and conflict demands in the workplace. These qualities can potentially hinder personal career development and the achievement of work goals (Korunka et al., 2009; Anja et al., 2010). According to the challenge hindrance stressor model, employees consume vast amounts of emotional and cognitive resources when dealing with daily hindrance demands, thereby leading to work burnout (Prem et al., 2017). Moreover, role ambiguity and complex tasks generated by hindrance demands can result in a low sense of self–efficacy among employees in their daily work (e.g., information processing and/or decision making). Such loss in resources can weaken the individual's sense of job competence (Huang and Peng, 2015). At the same time, employees tend to experience negative emotions when they lack control over their work (Song et al., 2011). Therefore, this study suggests that daily hindrance demands significantly reduce employees' daily cognitive wellbeing.

Hypothesis 2: Daily hindrance demands are negatively related to daily cognitive wellbeing.

Mediating Role of Work–Family Enrichment

Work–family enrichment emphasizes individuals' contributions to the development of a social system (e.g., family or work) from their investment in that social system (e.g., work or family), including work–family enrichment and its opposite, family–work enrichment (Voydanoff, 2005; Tang et al., 2007; Wayne et al., 2007; Lin et al., 2013; Li et al., 2015). Existing research demonstrates that work–family enrichment is influenced by resource–based variables and job demands (Voydanoff, 2005; Wayne et al., 2007). Engaging in challenge demands can stimulate employees' positive motivations, internal motivations, and sense of autonomy as well as accomplishment. Furthermore, it may help them better fulfill their family roles with positive emotions. At the same time, acquired skills can directly aid employees in solving family–related problems (Wayne et al., 2007; Anja et al., 2010; Yu and Zhang, 2018). Based on these findings, we believe that employees' daily challenge demands can promote their daily work–family enrichment.

In contrast to what may be referred to as "benign" challenge demands, hindrance demands can negatively affect the balance between different cross–border roles and trigger negative emotions among employees. Thus, hindrance demands can ultimately lead to a rise in avoidance behaviors and dismission (Selye, 1956; Anja et al., 2010) and exert a negative impact on work–family enrichment.

Hypothesis 3: Daily challenge demands are positively related to daily work–family enrichment.

Hypothesis 4: Daily hindrance demands are negatively related to daily work–family enrichment.

Daily work–family enrichment can significantly improve employees' daily cognitive wellbeing. As a subcategory of work wellbeing, cognitive wellbeing reflects the quality of employees' cognitive effectiveness in the workplace and individuals' perceptions of their perceptual behaviors (Dierendonck, 2004; Horn et al., 2004; Huang, 2014). According to Wayne et al. (2007), work–family enrichment can improve performance across work and family systems. When employees realize that their daily work will benefit not only their career advancement, but also their family happiness, they will experience increased positive emotions, self–efficacy, and work identification (van Steenbergen et al., 2007; Allis and O'Driscoll, 2008; Li et al., 2015). It is believed that these factors will positively affect an individual's daily cognitive wellbeing.

Hypothesis 5: Daily work–family enrichment is positively related to daily cognitive wellbeing.

Hypothesis 6: Daily work–family enrichment mediates the relationship between daily challenge demands and daily cognitive wellbeing.

Hypothesis 7: Daily work–family enrichment mediates the relationship between daily hindrance demands and daily cognitive wellbeing.

Moderating Role of Perceived Overqualification

Perceived overqualification refers to an individual's perception that his/her academic knowledge, skills, and experiences are higher than those required for his/her position (Verhaest and Omey, 2006; Liu and Wang, 2012; Liu et al., 2015). Differences in employees' perceived overqualification are expected to moderate the relationship between daily job demands (challenge demands and hindrance demands) and daily work–family enrichment.

Individuals with a high perceived overqualification generally show signs of high self–efficacy, high self–control, and high self–esteem. Such individuals tend to hold the belief that an increase in the tasks they take will correlate with additional work-related resources. Subsequently, they are willing to work hard to fulfill challenge demands (Luksyte et al., 2011; Maynard and Parfyonova, 2013). Such positive work experiences can enhance the positive effect of daily challenge demands on the individual's daily work–family enrichment.

By contrast, employees with a low perceived overqualification can be characterized by the way in which their internal motivation to seek challenging work actively is insufficient; such employees can be noted for their belief that their personal abilities and skills simply match their position (Liu et al., 2015). When faced with challenge demands, this kind of employee is less confident about their abilities and may fear that failure to meet high challenging demands will result in resource loss. What is worse, with limited time and energy, they have less energy to devote to their family. Thus, we hypothesize that perceived overqualification strengthens the positive impact of daily challenge demands on daily work–family enrichment.

> *Hypothesis 8: Perceived overqualification moderates the relationship between daily challenge demands and daily work–family enrichment; thus, the relationship between the two elements will be strong in individuals with a high perception of overqualification.*

The results differ with regards to daily hindrance demands. For employees possessing a high perceived overqualification, their perception of their abilities can make up for their boredom and aversion to emotional experiences that impede daily hindrance job demands (Erdogan and Bauer, 2009; Luksyte et al., 2011; Chu and Wang, 2019). Furthermore, their perception of the potential loss of work-related resources and its negative spillover effect on family domain will increase the balance between the energy and time they allocate to their work and family. This will also reduce the negative impact of the workplace on their family life (Verhaest and Omey, 2006; Liu and Wang, 2012). In addition, the negative impact between daily hindrance demands and daily work–family enrichment will also be reduced.

However, employees with a low perceived overqualification believe that their abilities match their jobs and that additional, complicated, and trivial hindrance demands entail extra energy and time consumption (Evans et al., 2009). With limited individual resources, they struggle to balance work and family. Moreover, it may result in an aversion to unstructured and routine work (Erdogan and Bauer, 2009; Luksyte et al., 2011), which in turn can increase the negative correlation between daily job demands and work–family enrichment.

> *Hypothesis 9: Perceived overqualification moderates the relationship between daily hindrance demands and work–family enrichment; thus, the relationship between the two elements will be strong in individuals with a low perception of overqualification.*

Moderated Mediating Effect

Based on the above inferences, this study discusses the moderating effect of perceived overqualification on the mediating effects of daily work–family enrichment. When faced with daily challenge demands, employees with a high perception of overqualification can strengthen the conversion of daily challenge demands to daily cognitive wellbeing through daily work–family enrichment. Daily high challenge demands will enable employees with an increased perception of overqualification to experience positive moods during their daily work because of the potential net gain of resources that accompanies processing challenging tasks. To such an individual, these types of tasks are believed to provide them with new opportunities to acquire new skills and knowledge and overcome boredom and aversion to perceived overqualification in their present work. In addition, positive emotions from coping with work challenges will likely increase work–family enrichment and cognitive wellbeing. Meanwhile, daily low challenge demands have overt connection to learning and development opportunities that can increase resources, thus they tend to handle the tasks in an ordinary manner calmly. In such contexts, low challenge demands exist as well as a low overflow effect from employees' work to their family life. In the context of low perceived overqualification, employees cannot cope with challenges posed by high challenge demands, thereby reducing their daily work–family enrichment and further decreasing their daily cognitive wellbeing.

Similarly, for daily hindrance demands, individuals with a high perceived overqualification are less likely to experience their negative effect through daily work–family enrichment and will also have a reduced negative effect on their daily cognitive. Specifically, having a high level of perceived overqualification will give individuals sufficient energy to deal with complex transactional work and weaken negative emotional experiences. However, low hindrance demands mean less complicated and tedious routine tasks, low negative psychological experiences among employees, and a low possibility of development opportunities being blocked. Such situations are less prevalent in employees with a high perception of overqualification; thus, negative effects on work–family enrichment and further effects on cognitive wellbeing are reduced. For employees with low perceived overqualification, complex routine tasks and negative work experiences from high hindrance demands are magnified; the fear of resource loss in turn can intensify negative effects on work–family enrichment and cognitive wellbeing.

Hypothesis 10: Perceived overqualification moderately mediates the relationships between daily challenge demands, daily work–family enrichment, and daily cognitive wellbeing.

Hypothesis 11: Perceived overqualification moderately mediates the relationships between daily hindrance demands, daily work–family enrichment, and daily cognitive wellbeing.

The theoretical research model is presented in **Figure 1**.

MATERIALS AND METHODS

Participants and Procedures

To capture daily work–family enrichment and changes in cognitive wellbeing, we employed the diary study method to test the theoretical model. People from China with a specific work background and working an average of 40 h a week were selected as the objects of this study. We released questionnaires through social media to encourage interested employees to participate in and share the questionnaire information. All the subjects volunteered to participate in this questionnaire survey, and we provided gifts worth approximately 100 yuan to them as compensation for completing the survey. In terms of sample selection, we strictly controlled for the working background of the subjects, all of whom are full-time employees who work an average of 40 h per week. Prior to data collection, the researchers of the project first trained participants and explained the purpose of the study and the data collection procedures. After the beginning of the survey, two researchers with this project issued questionnaires to the subjects at 16:00 every day. Participants were then reminded to complete the questions before 22:00 at 20:00 and were also asked to give feedback to the researchers after completing the questionnaire. These measures were taken in order to ensure that the subjects could complete the questionnaire on time. The participants' fields of occupation included higher education (colleges and universities), finance, manufacturing, electronic networks, and other various industries. Most employees in these industries confront challenging work requirements and hindrance job requirements. Compared with other industries, most of these positions have certain entry requirements for education, knowledge, experience, and abilities, consistent with the definition of perceived overqualification. Data for this study were collected over a period of 12 working days. Of the 105 questionnaires collected, 99 were valid, with 1,074 valid data points. Among the 99 participants, 42.20% were male, with an average age of 33.11 years and an average job tenure of 7.29 years. Moreover, 76.00% of the participants were married, and 60.90% had a university degree.

Measures

The scales used in this study are all 5-point Likert scales, which are assigned 1-5 points from "strongly disagree" to "strongly agree." Because the scale used is in English, we strictly follow the "back-translated" procedure in order to ensure the accuracy of Chinese scale expression.

Daily Challenge/Hindrance Demands

Daily challenge/hindrance demands were measured by the Rodell and Judge (2009) eight-item scale. A sample item from the daily challenge demands is, "I need high–level skills to finish the job today," and a sample item from the daily hindrance demands is, "I need to go through all kinds of red tape to complete the work today." A five–point Likert scale was used for scoring. The coefficient alpha of daily challenge demands was 0.82–0.91. This was due to data being collected over 12 days of daily challenge demands. The mean value (M) of the coefficient alpha of the daily challenge demands was 0.86. The coefficient alpha of daily hindrance demands was 0.75–0.86, and the mean value (M) was 0.80.

Daily Work–Family Enrichment

Daily work–family enrichment was measured using the four–item measure of Wayne et al. (2004) on a five–point scale. A sample item from the scale is, "What I do at work helps me deal with personal and practical issues in my family life today." The coefficient of the scale was 0.87–0.94, with a mean value of 0.89.

Daily Cognitive Wellbeing

Horn et al. (2004) posited that cognitive wellbeing is an important dimension of work wellbeing and thus developed a relative scale to measure cognitive wellbeing. Based on that initial research, Huang (2014) further developed a cognitive wellbeing scale for use with Chinese samples. Therefore, daily cognitive wellbeing was operationalized as an instantaneous dimension of cognitive wellbeing. The measure included five items scored on a five–point scale. A sample item from the scale is, "I can easily focus myself today." The reliability of the scale was 0.91–0.92, with a mean value of 0.91.

Perceived Overqualification

Perceived overqualification was measured using a scale developed by Maynard et al. (2006). The scale measured perception of education, knowledge, experience, and excess ability and considered these as a unified whole, containing nine items scored on a full five–point scale. The Chinese translation used in this study was obtained from Yang (2014). The coefficient alpha of the scale was 0.76.

Control Variables

Given that work–family enrichment and cognitive wellbeing may be affected by age, gender, education level, and job tenure (Lapierre et al., 2017), these four factors were controlled in the model.

Analysis

The data were multilevel and nested; thus, we used Mplus 6.11 (Muthén and Asparouhov, 2011) to conduct multilevel path analysis. The data were relatively complete, with a low

missing rate. Therefore, SPSS was adopted to process the missing values.

RESULTS

Multilevel Confirmatory Factor Analysis (MCFA)

We referred to Sonnentag et al. (2012) to test the MCFA method. First, we used MCFA to merge the variables gradually and examine changes in fitting degrees to test the discriminant validity of the model. The fitting indices of the five–factor model were satisfactory: $\chi^2 = 346.21$, $df = 135$, CFI = 0.96, and RMSEA = 0.04. The fitting indices of the model in the MCFA are shown in **Table 1**.

Descriptive Statistical Analysis

In this study, perceived overqualification was at the between–person level, whereas challenge demands/hindrance demands, work–family enrichment, and cognitive wellbeing were at the within–person level. The control variables (i.e., age, gender, education level, and job tenure) were included in the model as between–person–level variables. The descriptive statistics and correlation coefficient matrix of each variable are presented in **Table 2**.

Before testing the hypotheses, we examined the variations in daily work–family enrichment and daily cognitive wellbeing across levels. **Table 3** shows that within–person variance in work–family enrichment was 0.30, accounting for 45% of the total variance, and between–person variance was 0.37, accounting for 55% of the total variance. Within–person variance in cognitive wellbeing was 0.27, accounting for 57% of the total variance, and between–person variance was 0.20, accounting for 43% of the total variance. Overall, although the amount of within-person variance was smaller than the amount of between-person variance for work-family enrichment, the above results These results indicated that significant variance at the between-person level for these variables (James, 1982). Thus, using a multilevel model was appropriate.

Hypothesis Testing

We employed the multilevel structural equation modeling approach to test the between– and within–person effects between the variables (Preacher et al., 2010). At the within–person level, challenge demands had a positive effect on employees' cognitive wellbeing, whereas hindrance demands had a negative effect on employees' cognitive wellbeing. The results seen in **Table 4** show that daily challenge demands at the within–person level are able to positively predict employees' daily cognitive wellbeing ($\gamma = 0.19$, $p < 0.01$), and daily hindrance demands at the within–person level negatively predict employees' daily cognitive wellbeing ($\gamma = -0.14$, $p < 0.05$), both of these factors were consistent with Hypotheses 1 and 2.

TABLE 1 | Multilevel Confirmatory Factor Analysis.

Model	χ^2	*df*	SRMR	RMSEA	CFI	TLI	AIC
Five factors model a	346.21	135	0.04	0.04	0.96	0.95	41145.92
Four factors model b	1039.15	143	0.09	0.08	0.83	0.80	42173.13
Three factors model c	2381.65	245	0.17	0.09	0.67	0.62	42247.87
Two factors model d	3941.52	246	0.17	0.12	0.42	0.35	44340.76
One factors model e	6937.71	437	0.31	0.12	0.00	−0.12	46158.58

a = challenge demands; hindrance demands; perceived overqualification; work-family enrichment; cognitive wellbeing;
b = challenge demands + hindrance demands; perceived overqualification; work-family enrichment; cognitive wellbeing;
c = challenge demands + hindrance demands + perceived overqualification; work-family enrichment; cognitive wellbeing;
d = challenge demands + hindrance demands + perceived overqualification; work-family enrichment + cognitive wellbeing;
e = challenge demands + hindrance demands + perceived overqualification + work-family enrichment + cognitive wellbeing.

TABLE 2 | Descriptive Statistics and Correlations at both Between- and Within- Person Levels.

	M	SD	1	2	3	4	5	6	7	8	9
1. Gender	1.57	0.49	1	−0.04	0.01	−0.09**	−0.09**	0.03	−0.13**	−0.20**	0.07*
2. Age	33.11	7.15	−0.04	1	−0.15**	0.86**	−0.02	−0.07*	0.11**	0.20**	−0.12**
3. Educational level	4.33	1.10	0.01	−0.15**	1	−0.11**	−0.07*	−0.03	0.11**	0.02	0.08**
4. Job tenure	7.29	7.41	−0.09**	0.86**	−0.11**	1	0.01	−0.00	0.08*	0.16**	−0.00
5. Challenge demands	3.07	0.61	−0.12**	−0.03	−0.09**	0.01	1	0.46**	0.15**	0.16**	−0.02
6. Hindrance demands	3.36	0.91	0.05	−0.10**	−0.04	−0.00	0.54**	1	−0.11**	−0.04	0.11**
7. Work-family enrichment	3.65	0.69	−0.16**	0.14**	0.14**	0.10**	0.22**	−0.17**	1	0.35**	−0.07*
8. Cognitive wellbeing	3.31	0.84	−0.29**	0.29**	0.03	0.23**	0.13**	−0.20**	0.48**	1	−0.06*
9. Perceived overqualification	2.72	0.77	0.07*	−0.12**	0.08**	−0.00	−0.03	0.16**	−0.10**	−0.09**	1

Correlations below the diagonal are at the between-person level (N = 99); correlations above the diagonal are at the within-person level (N = 1074).
**p < 0.05, **p < 0.01, ***p < 0.001.*

TABLE 3 | Variance Components of the Null Model.

Variables	Within-person variances(e^2)	Between-person variances(r^2)	Percentage of between-person variances
Work-family enrichment	0.30**	0.37**	55%
Cognitive wellbeing	0.27**	0.20**	43%

e^2 is the within-person variances in a variable; and r^2 is the between-variances in the variable. The percentage of between-person variances was computed as $r^2/(e^2+r^2)$.
$^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$, N = 1074.

Hypotheses 3 and 4 tested the effects between daily challenge and hindrance demands and work–family enrichment at the within–person level. The results in **Table 4** indicate that daily challenge demands significantly predicted daily work–family enrichment ($\gamma = 0.26$, $p < 0.01$), with a 95% confidence interval of [0.02, 0.39], excluding 0. However, daily hindrance demands negatively predicted work–family enrichment at the within–person level ($\gamma = -0.25$, $p < 0.01$), with a 95% confidence interval of [–0.44, –0.10], excluding 0. Thus, these is support for Hypotheses 3 and 4.

At the within–person level, work–family enrichment was determined to have a positive effect on employees' cognitive wellbeing. The results in **Table 4** illustrate that daily work–family enrichment was positively correlated with employees' daily cognitive wellbeing ($\gamma = 0.29$, $p < 0.001$), with a 95% confidence interval of [0.18, 0.41], excluding 0. Thus, Hypothesis 5 was supported.

Hypotheses 6 and 7 tested the mediating role of daily work–family enrichment. According to **Table 4**, daily challenge demands positively correlate with daily work–family enrichment ($\gamma = 0.26$, $p < 0.01$). Daily work–family enrichment positively correlates with daily cognitive wellbeing ($\gamma = 0.29$, $p < 0.001$), with a significant indirect effect ($\gamma = 0.05$, $p < 0.05$) and a 95% confidence interval of [0.02, 0.08], excluding 0. Thus, Hypothesis 6 is verifiable. Similarly, in **Table 4**, daily hindrance demands were negatively correlated with daily work–family enrichment ($\gamma = -0.25$, $p < 0.001$), with an insignificant indirect effect ($\gamma = -0.02$, n.s.) and a 95% confidence interval of [−0.05, 0.02] within 0. Thus, Hypothesis 7 was not verified.

Hypothesis 8 and 9 tested the moderating role of perceived overqualification (at the between–person level) on the relationship between daily challenge/hindrance demands on daily work-family enrichment (at the within-person level). The results seen in **Figure 2** indicate that perceived overqualification positively moderated the relationship between daily challenge demands and daily work–family enrichment, with an interaction effect ($\gamma = 0.28$, $p < 0.01$). This result suggests that under a high level of perceived overqualification, the relationship between daily challenge demands and daily work–family enrichment was strong ($\gamma = 0.32$, $p < 0.001$), whereas under a low level of perceived overqualification, this relationship was not significant ($\gamma = 0.05$, n.s.). Thus, Hypothesis 8 was supported. The interactive effect of daily challenge demands and daily work–family enrichment is presented in **Figure 3**. Similarly, **Figure 2** showed that perceived overqualification did not moderate the relationship between daily hindrance demands and daily work-family enrichment, with an insignificant interaction effect ($\gamma = 0.09$, n.s.) and a 95% confidence interval of [−0.04, 0.21] within 0. Thus, Hypothesis 9 was not verified.

Hypothesis 10 and 11 stated that perceived overqualification (at the between–person level) could moderate the relationships between daily challenge/hindrance demands (within–person level), daily work–family enrichment (within–person level), and daily cognitive wellbeing (within–person level). The results in **Table 5** show the significant conditional indirect effects of perceived overqualification, specifically, at the between–person level on daily challenge demands and at the within–person level on work–family enrichment and cognitive wellbeing. The difference between high and low perceived overqualification was significant ($d = 0.03$, $p < 0.05$), with a 95% confidence interval of [0.00, 0.06], excluding 0. Thus, Hypothesis 10 was supported. However, no significant moderating effect was observed on hindrance demands, work–family enrichment, and cognitive wellbeing. Furthermore, a significant difference was observed between

TABLE 4 | Multilevel Structural Equation Model of Direct Effect and Indirect Effect.

	Outcome					
	Daily work-family enrichment			Daily cognitive wellbeing		
	γ	SE	95%CI	γ	SE	95%CI
Direct effect						
Daily challenge demands	0.26**	0.07	[0.02,0.39]	0.19**	0.06	[0.07,0.31]
Daily hindrance demands	−0.25**	0.08	[−0.44, −0.10]	−0.14*	0.06	[−0.25, −0.02]
Daily work-family enrichment				0.29***	0.06	[0.18,0.41]
Indirect effect						
Daily challenge demands(through DWFE)				0.05**	0.02	[0.02, 0.08]
Daily hindrance demands(through DWFE)				−0.02	0.02	[−0.05,0.02]

$^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$, N=1074.
CI, confidence interval; DWFE, daily work-family enrichment.

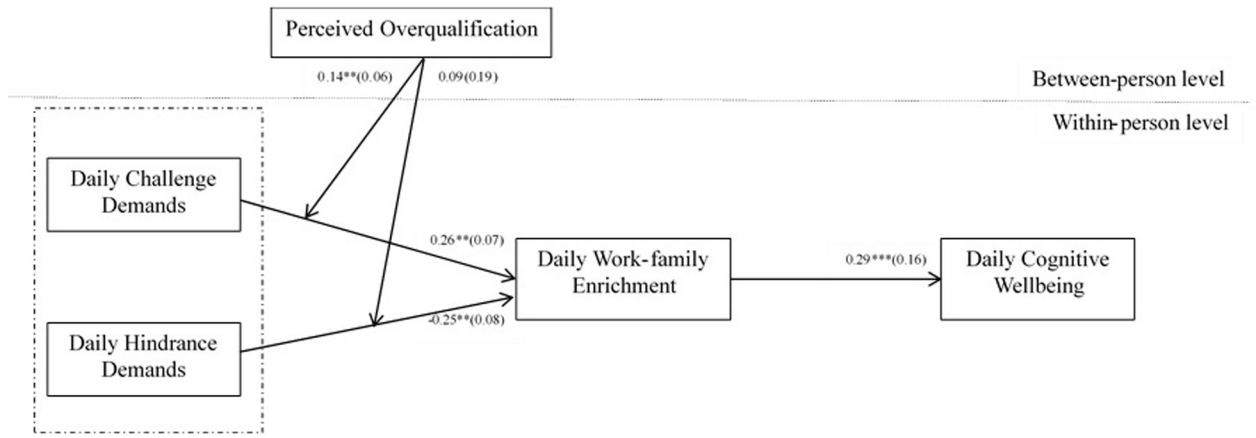

FIGURE 2 | Results of multilevel path analysis. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

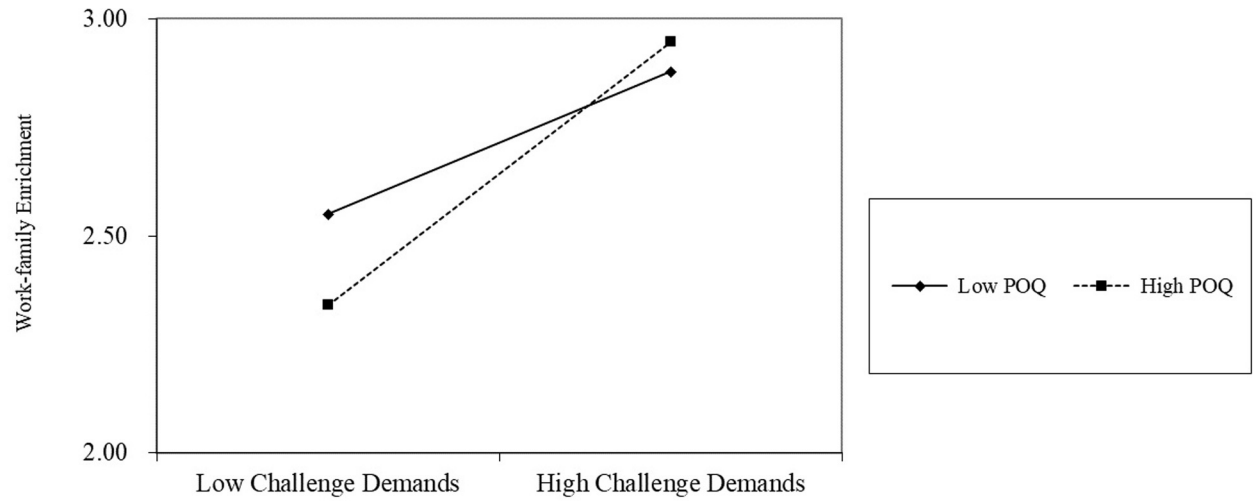

FIGURE 3 | The moderating effect of perceived overqualification on the relationship between challenge demand and work-family enrichment at the within-person level.

TABLE 5 | Moderated Mediating Model.

Predictors	Mediator: Daily work-family enrichment			
	Moderators	Indirect effect	95% Lower	95% Upper
Daily challenge demands	High POQ	0.03	0.00	0.05
	Low POQ	0.00	−0.02	0.01
	Differences	0.03	0.00	0.06
Daily hindrance demands	High POQ	0.00	−0.03	0.02
	Low POQ	−0.02	−0.04	0.00
	Differences	0.02	−0.01	0.05

POQ, perceived overqualification.

the two groups (d = 0.02, n.s.), with a 95% confidence interval of [−0.01, 0.05] within 0. Thus, Hypothesis 11 was not supported.

DISCUSSION

Based on the challenge-hindrance stressor model, we used the diary research method to examine how the two types of job demands (i.e., challenge/hindrance demands) affect employees' cognitive wellbeing while also giving consideration to the effect of work–family enrichment. Moreover, this study explores the moderating effect of overqualification on the relationships between employees' daily challenge and hindrance demands, daily work–family enrichment, and daily cognitive wellbeing.

Theoretical Contribution

The present study contributes to the existing literature as outlined below. First, this study further replenishes the research on challenge-hindrance stressor model by examining how two types of demand, namely challenge demands/hindrance demands, affect employee's wellbeing. Existing research has

concluded that work demand negatively influences employee's work-family enrichment and well-being (e.g., Shimada et al., 2010; Proost et al., 2010). However, examining the effects of challenge demands and hindrance demands on employee's work-family enrichment and cognitive well-being simultaneously is a more comprehensive approach. Although work demand places pressure on an employee, a challenge demand presents itself as a "good stressor" that allows for an employee to gain benefits from dealing with said challenge. The benefits may come in the form of personal growth or useful experiences in coping with work tasks. Regarding work demand as a whole to be negative runs the risk of engaging in overgeneralization. The research results presented here provide evidence that hindrance demand differs from challenge demand in nature. A hindrance demand is negatively related to work-family enrichment and cognitive well-being; however, challenge demand positively correlates with work-family enrichment and cognitive well-being.

Secondly, from the perspective of cross work-family interface, this study further refines the influencing mechanism of the hindrance/challenge demands on employees' cognitive well-being. In addition, prior studies have demonstrated that work-family enrichment is a predictor of occupational wellbeing (Tang et al., 2014). However, occupational wellbeing is conceptualized in general, including psychological wellbeing and subjective wellbeing. Specially, subjective wellbeing consists of affective wellbeing and cognitive wellbeing (Luhmann et al., 2012a). Schimmack (2008) pointed out that affective wellbeing and cognitive wellbeing have different predictors in which domain (work domain or family domain) satisfaction has a stronger prediction on cognitive wellbeing than affective wellbeing. Compared to other type of wellbeing, cognitive wellbeing is more related to the perception of work-family interface. Therefore, studying the mediating role of work-family enrichment in bridging hindrance/challenging needs and cognitive well-being in the field of research on work-family relationship represents a more targeted approach. The conclusion of this study shows that daily work-family enrichment mediates the relationship between daily challenging demands and cognitive well-being. However, contrary to expectations, the mediating effects of work-family enrichment in the relationship between hindrance demand and cognitive well-being were not significant. The reason for this finding may stem from work–family enrichment involving employees' positive perceptions of work and family relationships, thereby transmitting the effect of positive work demands on employees' cognitive wellbeing. The meta–analysis results of Lapierre et al. (2017) indicated that "resource–providing contexts" have greater effects on work–family enrichment than "resource–depleting contexts." The work presented here verifies the research conclusion of Lapierre et al. (2017) that work–family enrichment as a positive individual perception can easily mediate the relationship between resource–supply job demands (i.e., challenge demands) and cognitive wellbeing compared with that between resource–consuming job demands (i.e., hindrance demands) and cognitive wellbeing.

Thirdly, previous studies have explored the moderating effect of work resources on the relationship between challenge/hindrance demands on employee's well-being (Tadić et al., 2015), but there remains room to consider its moderating effect between different work demands and cognitive well-being from the perspective of individual characteristics differences of employees. Starting with the question of who is more likely to overcome the challenges posed by challenging/hindrance work demands, we examined the moderating mediation effect of overqualification on the relationship among daily challenging/hindrance work demands, daily work-family enrichment and daily cognitive well-being. The results show that the relationship between daily challenge demands and daily work-family enrichment, and the indirect effect of daily challenging work demands on daily cognitive well-being through daily work-family enrichment were stronger in employees with a higher level of over-qualification. However, the moderating mediation effect of overqualification on the relationship among daily hindrance work demands, daily work-family enrichment and daily cognitive well-being were not significant. These results remind us that for employees with strong perceptions of overqualification, challenge demands could make up for the their inadaptation of overqualification. However, as a "negative" work demand, hindrance demands could decrease employee's work-family enrichment and cognitive well-being, regardless of the employee being overqualified.

Fourth, this study uses the diary research method to collect data to reveal the dynamic mechanism of daily fluctuations in job demands on daily cognitive wellbeing. As a research method, cross–sectional data research is highly suitable for studying the effect of major events but inadequate for capturing the pressures of daily life (i.e., job needs; Zhang et al., 2017). Therefore, in response to the suggestions put forth by Helms and Demo (2005) to examine daily and dynamically fluctuating work pressures, this study noted that the two types of job demands will exhibit daily dynamic fluctuations in an individual and thus used the diary research method (Ohly and Fritz, 2010; Song et al., 2011). Since the requirements for challenging/hindrance work are determined by specific tasks and procedures in the work area each day, the work tasks will likely have a high demand for challenging/hindrance work on one day and a low demand for challenging/hindrance work on another (Butler et al., 2005).

Practical Implications

First, enterprises should improve upon job design, increase challenging tasks and challenge motivations, reduce hindrance tasks, and provide work protection to prevent unnecessary resource consumption. At the same time, managers should also maintain an awareness that the range of demands for challenging work is a kind of pressure for employees, which negatively affects their attitudes and behaviors. Therefore, the question of how to maintain the demand for challenging work at a reasonable level is also a problem that managers need to consider.

Second, overqualification is a double–edged sword, as it can entail not only high performance but also high turnover rates, low job satisfaction and work commitment, and organizational citizenship behavior among employees. Thus, reasonable staff arrangements and matching posts for employees also play a crucial role in improving staff wellbeing. One of the purposes of human resource management is to fully mobilize the enthusiasm of employees and enhance their potential to create greater value for the enterprise, even beyond their respective job

roles. Generally, a better match between the employee and the position allows for better outcomes for both the organization and employees themselves. Consistent with this point, matching posts for employees also plays a crucial role in improving staff wellbeing. Thus, managers should give thought to strengthening the rationality of staff arrangements. Also, regular feedback for an employee's performance, and employee potential testing and development are necessary to increasing an employee's position-person fit. Although, it is important to assign "challenging" but appropriate tasks to employees, seeking feedback on an employee's perception of their own overqualification is also critical. For example, in terms of recruitment and probation period, managers should make a comprehensive consideration regarding personal characteristics and work ability to select the most suitable applicants as opposed to simply the most capable ones. Subsequently they may allocate employees to a more suitable position dynamically, according to his/her present experience and ability. In essence, the most appropriate employee is the best employee.

Limitations and Future Direction

This study still faces the following limitations that require further improvement for the purposes of future research. First, all questionnaires in this study adopt self-evaluation, which is prone to common method deviation. Although this study has proved that the possible common method deviation is not serious according to the statistical results, such situations should still be avoided in future studies. In addition, daily variables are measured by a single point measurement. However, a multiple point measuring method would be more accurate, such as a measurement of challenge demand/hindrance during work time and measuring work-family enrichment and cognitive well-being during family time. We suggest that future research adopt a more rigorous research design to examine factors in the workplace for employee attitude and behavior in the field of family domain.

Second, this research mainly discusses the effects of two different types of job demand on employee's work-family enrichment and cognitive well-being; however, this study suggests that challenging demand may have an effect on work-family enrichment through different channels. For example, challenging demand can improve staff work-family enrichment by an employee's internal motivation, yet it could also have a negative impact by causing employee burnout in the course of coping with a challenge. We also encourage future studies to further test the mechanism of how challenge demand affects work family enrichment under the guidance of different theories. Besides, we only include cognitive wellbeing in our model, whereas there are other types of wellbeing (i.e., affective wellbeing, psychological wellbeing). Although cognitive wellbeing is more closely related to work-family interface satisfaction (Schimmack, 2008), work-family enrichment includes cognitive and affective effects. Future studies could focus on different dimensions of wellbeing and explore its predictors cross work and family domains.

Third, the samples of this study are all from China, but there remains a lack of consideration for Chinese-specific situation variables, such as leadership, membership and traditional Chinese culture. Thus, future studies may wish to further consider whether employees react differently in coping with challenge demand and hindrance demand in different cultural backgrounds. Such an investigation could yield promising results for management practitioners to manage cross-cultural differences. In addition, the targets' job roles are also essential to their experience of perceived overqualification. Thus, future studies could consider the targets' work background in a more comprehensive and nuanced way.

CONCLUSION

The findings of current research shed light on how and when job demands influenced on employees' cognitive wellbeing. Based on the challenge-hindrance stressor model, we demonstrated the opposite effects of challenge/hindrance demands on employees' cognitive wellbeing through work-family enrichment. Furthermore, our findings suggested that individuals with perceived overqualification could cope with challenge demands better. Moreover, our results revealed it was necessary to employ the diary study to observe the daily fluctuation of job demands, work-family enrichment, and cognitive wellbeing, advancing current research by incorporating finer granularity. To sum up, balancing the work and family domains is an important issue for wellbeing. Meanwhile, we should focus on the individual difference in response.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

HC contributed to the conception of the study and wrote the manuscript. HW performed the data analyses and wrote the manuscript. MY contributed to analysis and manuscript preparation. SX performed the data collection and helped the analyses part. All authors contributed to the article and approved the submitted version.

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Team Emotional Intelligence: Emotional Processes as a Link Between Managers and Workers

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Research has shown that transformational leaders are able, through emotional contagion mechanisms, to transmit their emotions and boost positive feelings among their followers. Although research on leadership and team processes have shown a positive relation between transformational leadership and workers' well-being, there is a lack of studies examining the "black box" of this association. The present study aimed to assess the mediation effect of team emotional intelligence (TEI) of the management team on the relationship between management's transformational behaviors and employees' responses. Data were gathered from two sources: 1,566 managers grouped into 188 teams pertaining to a total of 90 firms, and 4,564 workers from the same 90 firms. The results showed that management team TEI and the emotional state of "passion" among employees had a full mediation effect on the relationship between management teams' transformational leadership and employees' cohesion. Implications of these results are discussed.

Keywords: team emotional intelligence, leadership, positive emotions, cohesion, passion

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INTRODUCTION

Organizational scholars have long been interested in well-being at work and the associated positive attitudes and experiences of leaders and employees. Therefore, the literature on the antecedents and consequences of happiness and well-being at work is rapidly developing (Fisher, 2010). Regarding antecedents, the role of leadership seems especially relevant (García-Buades et al., 2020); leadership is defined as a process of social influence through which a leader influences subordinates' feelings, perceptions, and behaviors (Pirola-Merlo et al., 2002). Some investigations in this field have shown that leaders improve employees' performance and motivate them to make achievements beyond the leader's expectations and organizational obligations (Edú-Valsania et al., 2016).

Although recent meta-analytic studies have linked leadership style to performance at different levels of analysis, that is to say, the individual, the team, and the organization (e.g., Tseng and Levy, 2018), knowledge is still lacking regarding the effect of leadership style at the organizational level. Although few studies have explored the effect of leadership style at organizational level, transformational leadership has been identified as an effective behavior related to a different organizational and to work-unit outcomes and employee well-being (for a review see, García-Buades et al., 2020). However, one meta-analysis of research in this field showed that there are

important potential mediators of the outcomes of transformational leadership that need to be examined (Wang et al., 2011), with the individual and group affective dimensions being important sources of variability.

Overall, these studies highlight the need for further investigation of leadership styles and affective dimensions from a multilevel perspective. Multilevel research has demonstrated that a given variable examined at the individual level is often not comparable to the same variable at a higher level of analysis (Ashkanasy, 2003; Ashkanasy and Dorris, 2017). Ashkanasy (2003) proposed the multilevel model of emotion in organizations and stated that studying emotional processes only at the individual level could lead to an incomplete understanding of how different variables may influence performance. The present study aims to contribute to this growing area of research by considering both the effect of management teams' leadership style on organizations (Roh et al., 2019) and the potential mediation effects of emotional dimensions located at different levels of analysis.

The ubiquity of emotion in teams, and its influence on team processes, is widely acknowledged (Menges and Kilduff, 2015). For example, it has been shown that, shared positive moods through work units might influence their team's motivational (e.g., team goal commitment), attitudinal (e.g., team satisfaction), and behavioral (e.g., proactive behaviors) processes (García-Buades et al., 2020). One of the emotional constructs that has been identified as an influence source of variability in different variables related to group behavior is team emotional intelligence (TEI). Druskat and Wolff (2001) define TEI as *'the ability of a group to develop a set of norms that manage emotional processes'* (Druskat and Wolff, 2001, p. 133). This set of norms or expected behaviors is generated through subjective emotional experiences that group members share, and it will define their subsequent emotional experiences (Wolff et al., 2006).

In this research, we used the definition given by Aritzeta et al. (2020, p. 2) for TEI, who defined it as "the ability of a team to pay attention to the feelings of teammates, to understand the emotions felt in the team, and to use positive thinking to repair negative moods in the team." Therefore, it must be mentioned that TEI, in our case, is not synonymous with the aggregated emotional intelligence of individual team members. Rather, it refers to the ability generated by the team as a whole to pay attention to, to be clear about, and to regulate the emotions felt within the team. This definition of TEI is based on the theoretical model initially proposed by Mayer and Salovey (1997), and, in the field of work and organizational psychology, has been one of the most widely-used models for measuring individual perceived EI (for a review see: Kotsou et al., 2018). In the article published by Aritzeta et al. (2020) they measured TEI using a "team reference model" and not aggregating individual responses. In their process of creating the TEI measure (the T-TMMS described below), they used the "consensus-based change-of reference" strategy, following Chan's (1998) theory of group-level composition models. This strategy supports the idea that a group-level characteristic can be examined by changing the reference from the individual to the group level; that is to say, by changing the framework of the tapped characteristic from the individual to the group level. Additionally, the within-group agreement should be ensured by means of the James intercoder reliability index (James et al., 1993). The reference framework for responding to items was changed from the individual self-evaluation (e.g., "I pay a great deal of attention to my feelings") to the perception of team/group experience (e.g., "In this team, we are able to describe our feelings"). Thus, it is a direct group level measure that measures the degree to which, on average, leaders or workers belonging to a stable team perceive that their team attends to feelings and values them, is clear, rather than confused, about feelings, and adopts positive thinking to repair negative group moods.

If we consider the team to be an entity in itself, then its performance depends less on the individual characteristics of team members than on the structures and patterns of behavior they generate within a specific team (Ashkanasy, 2003; Elfenbein, 2006), in other words, on the TEI. To put it another way, each team has a singular nature that derives from the experiences, learning, norms, and ways of functioning that define it; this idiosyncratic quality of teams may be defined in terms of team-level variables such as emotional climate (Peñalver et al., 2017) and TEI (Lee and Wong, 2019).

Within the literature on TEI, various theories have been used in an attempt to explain how group emotional processes may affect individuals. Based on the notion of emotional contagion (Barsade, 2002) and affective events theory (AET; Weiss and Cropanzano, 1996; Weiss, 2002) it has been proposed that the extent to which teams engage in interpersonal emotional processes could influence not only a team's effectiveness but also — through trickle-down effects — employees' individual affect and behaviors (Tse et al., 2018). Although team emotional intelligence can be expected to influence intrateam conflict (i.e., task conflict and relationship conflict) and team effectiveness (i.e., team performance, innovation, and cohesion), team emotional intelligence has been largely unexplored (Lee and Wong, 2019).

The results of the review by Diener et al. (2020) show that positive emotions influence key variables within organizations, leading, for instance, to increased creativity, commitment, and effectiveness, not only of the team but also of its members (Diener et al., 2020). A positive emotional climate within teams has been associated with a more positive view of the future (George, 2011) and better group cohesion, since members feel a stronger commitment to the group's objectives (Peñalver et al., 2017). Cohesion is a multidimensional construct consisting of interpersonal attraction, commitment to task, and group pride that keeps members together (Mullen and Copper, 1994). Social resources, such as cohesion, promote socially-integrated groups that are coordinated and committed to group goals (Beal et al., 2003).

In light of the above, the present paper analyzes the mediation effect of the management team's TEI on the relationship between that team's transformational behaviors and employees' positive emotions and cohesion. Our goal in doing so is to respond to calls for a multilevel study of EI and to develop a research model that simultaneously analyzes the multilevel influence of TEI (Ashkanasy, 2003; Troth et al., 2017) and leader-member

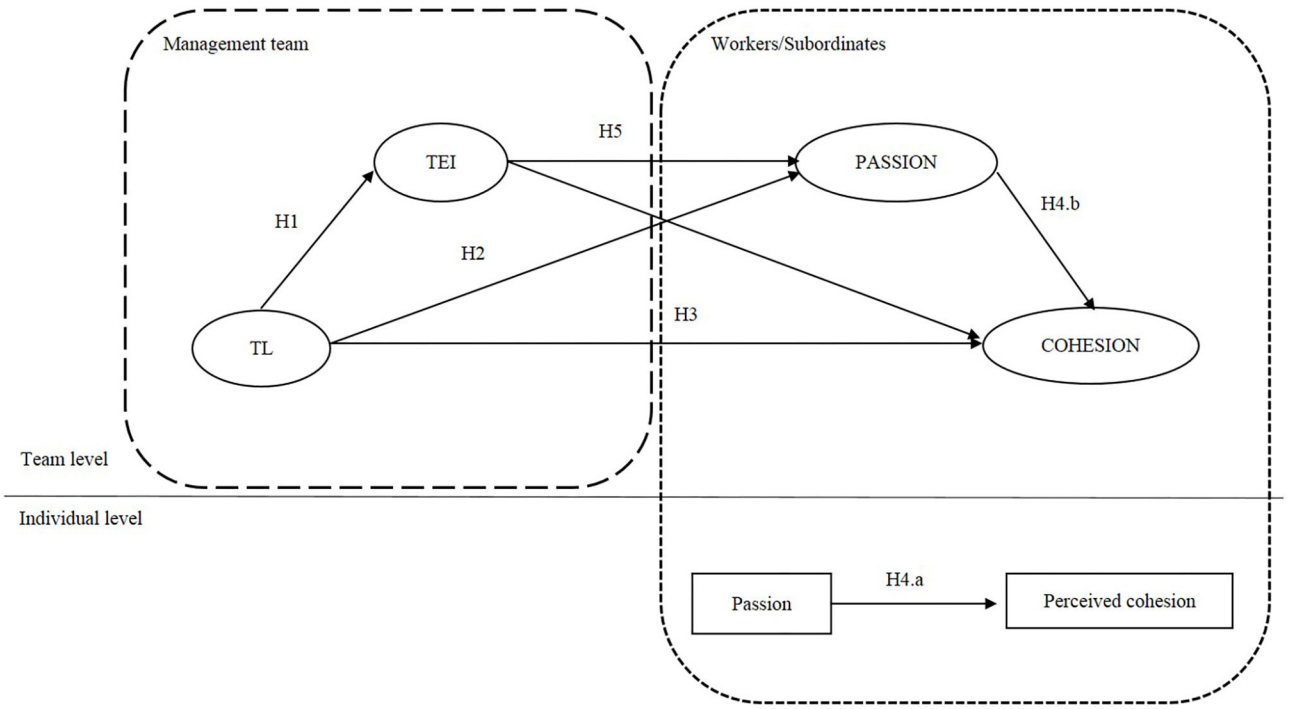

FIGURE 1 | Proposed model. TL, Transformational leadership; TEI, Team emotional intelligence; H1-H5, Hypotheses 1-5.

exchange (Tse et al., 2018). Our proposed model is shown in **Figure 1**.

HYPOTHESIS DEVELOPMENT

In this section we will describe the theoretical development of the hypothesized model shown in **Figure 1**. We begin by considering intragroup processes, such as the relationship between transformational leadership and TEI in managerial groups, and then consider the relationship between management teams and followers by analyzing the mediation effect of positive emotions and TEI.

Transformational Leadership and TEI

Transformational leadership is one of the most widely studied leadership styles in the field of organizational research (Avolio et al., 2009). At the organizational level, it has been shown that transformational leaders influence organizational performance by means of their direct leadership of the top management team. More specifically, by increasing team cohesion, motivation, and goal congruence within the top management team, transformational leaders increase the levels of organizational performance (Colbert et al., 2008).

This leadership style is based on four primary behaviors: inspirational motivation, idealized influence, intellectual stimulation, and individualized consideration (Bass, 1985). In other words, transformational leaders are able to: (1) project a charismatic vision that is believed in by group members, (2) inspire group members to perform above normal standards, (3) provide intellectual stimulation for group members, and (4) look after the emotional needs of group members. Tse et al. (2008) found that leaders help to the quality of team members' exchanges, and that this process was facilitated in teams defined by a positive affective climate.

Some studies have shown a relationship between transformational leadership and emotional intelligence mediating the association between emotional intelligence and counterproductive work, and the relationship between emotional intelligence and organizational commitment (Foster and Roche, 2014; Hussein and Yesiltas, 2020). Also, a recent research work showed that leaders' transformational leadership had a significant effect on employee engagement for the mediating role of emotional intelligence (Milhem et al., 2019).

At the team level, the relationship between transformational leadership and TEI has been demonstrated in a recent study by Lopez-Zafra et al. (2017). Accordingly, when leaders influence the processes, behaviors, norms, and climate within work teams, their individual personality may influence the emerging climate of the team (Stubbs and Wolff, 2008) as well as the ability of the team to manage their emotional states (Aritzeta et al., 2020). Being part of a work team implies a complex combination of information processing and emotional responding that could influence team members' responses, as the same worker may experience different emotional responses to a dramatic event on two different teams, depending, for example, on that team member's leadership style and how it influences individual perceptions of TEI (Ghuman, 2016).

As transformational leaders care about their followers and appeal to them on an emotional level, followers *"have many opportunities to reinforce (vs. douse) each other's commitment to their common cause"* through a process of social influence and emotional contagion (Hatfield et al., 1994; Klein and House, 1995; 192; see also Barsade, 2002). Consequently, transformational leadership behaviors help to generate emotionally competent norms, leading to higher TEI (Lopez-Zafra et al., 2017), influencing the way in which teams members perceive the ability of the team to manage emotions.

Based on the above we hypothesize that:

H1: Transformational leadership of the management team is positively related to its TEI.

The Mediating Effect of TEI and Affect

Employee well-being can be defined as the as the overall quality of an employee's experience of work and performance. The literature in this regard presents three different approaches that refer to the subjective experiences of well-being, the health perspective of well-being and social well-being (Pagán-Castaño et al., 2020). In this research, we will analyze subjective (through passion emotional state) and social (through cohesion) well-being.

A great number of concepts may be construed as belonging to the well-being construct, including job satisfaction, job involvement, affect, organizational commitment, work engagement, cohesion, positive and negative emotions and moods at work (Fisher, 2014).

Carron and Brawley (2000) define cohesion as "*a dynamic process that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs*." (2000: 213).

In fact, leadership and team researchers have demonstrated a positive relation between transformational leadership and cohesion (Lim and Ployhart, 2004; Schaubroeck et al., 2007; Colbert et al., 2008), although it has also been pointed out that there are a number of processes which may mediate this relationship (García-Morales et al., 2008).

One issue that has generated growing interest among researchers in this field is the idea of "trickle-down effects," whereby the perceptions, feelings, attitudes or behaviors of a manager influence the perceptions, feelings, attitudes or behaviors of a supervisor, which in turn influence the perceptions, feelings, attitudes or behaviors of subordinates (e.g., Wo et al., 2019). From this perspective, transformational leadership behaviors may trickle down the organizational hierarchy from leaders to employees and influence employees' well-being (Dvir et al., 2002; Yang et al., 2010).

Therefore, we hypothesize that:

H3: Transformational leadership by the management team will be positively related to employee's group cohesion.

The literature on trickle effects has focused predominantly on cognition-based constructs such as leadership (Mayer et al., 2009) rather than on affective constructs, even though the latter might also have an important effect on the relationship between managers and subordinates. Indeed, recent research suggests that strong emotions may be more likely to be transmitted across different levels of an organizational hierarchy, and thus, in comparison with more cognitive aspects, they would exert more influence on members of the organization (Wo et al., 2019).

In this context the affective events theory (AET; Weiss and Cropanzano, 1996) is a well-known framework used for understanding the emotional relationships between leadership behaviors and team results (Gooty et al., 2010). According to the AET, leaders create affective events which have a positive or negative influence on teams, shaping the intensity and form of their emotional responses, in other words, their emotional state. Many investigations have recognized that leaders are able to increase positive feelings in their followers (George, 2000; Dasborough and Ashkanasy, 2002), which, in turn, affect their work attitudes and behaviors (McColl-Kennedy and Anderson, 2002; Gooty et al., 2010). Within circumflex models of emotions (Russell, 1980; Bruch and Ghoshal, 2003), these strong positive emotions, such as joy and pride, compose the emotional state referred to as "passion."

A number of review articles have highlighted the need to separate the effect of positive and negative emotions so as to examine each of them more clearly (Ashkanasy and Dorris, 2017; Diener et al., 2020). In this respect, it is worth noting that circumflex models of emotions (Russell, 1980) have proved to be useful for explaining the relationship between leadership, affect, and emotions (Van Knippenberg et al., 2008). These models understand that emotions such as anger, sadness, and fear share a common set of basic psychological properties that are defined by two dimensions: quality (pleasure vs. displeasure) and activation (high or low activation). The intersection of quality and activation determines the affective state, which can be referred to as, for example, comfort (pleasure and low activation), resignation (displeasure and low activation), passion (pleasure and high activation) or aggression (displeasure and high activation). Generally speaking, discrete emotions are used to generate one of these dimensions. Drawing on this perspective, and given that research shows that leaders are capable of generating strong positive emotions in their followers (Dasborough and Ashkanasy, 2002), the present study focuses on the emotional state referred to as "passion," which is composed of four discrete emotions, each of which is characterized by a combination of pleasure and high activation: enthusiasm, pride, joy, and excitement.

The review published by (Diener et al., 2020), identified these positive emotions to produce positive changes in cognitions, behavior, affect, and physiology that lead to positive personal and social outcomes. The longitudinal study conducted by Casper et al. (2019) showed that individually, positive affect at work predicts an increase in positive interpersonal work events. In other words, at an individual level, employees who experience positive affect at work might perceive interactions with co-workers in a more positive way and, thus, perceive more cohesion.

We earlier mentioned the notion of emotional contagion, which refers to the processes whereby moods and emotions are transferred from one individual to other individuals (Kelly

and Barsade, 2001). If we assume this logic to the team level, moods shared by team members might also affect their team's motivational, attitudinal, and behavioral processes over specific periods of time (Kelly and Spoor, 2007; George, 2011). Shared positive feelings generally promote social integration and, indirectly, enhance task performance (Knight and Eisenkraft, 2015). Moreover, when members collectively experience positive feelings in team meetings, these pleasant emotions push them to consider pursuing and valuating the importance of team goals, helping them to feel more committed to these goals (Seo et al., 2004) and, therefore, enhancing cohesion.

Given the multilevel influence of emotions and the structure of organizations (Ashkanasy, 2003), the model we propose in this paper aims to analyze the aforementioned variables from the multilevel perspective. More specifically, we seek to consider the individual variability between workers' emotional state of passion and the perception of cohesion that each worker has. In this respect, we hypothesize that:

H2: Transformational leadership by the management team will be positively related to the employee's passion.
H4: Employee passion will mediate the relationship between Transformational leadership and cohesion.
H4b: Group-level passion will be positively related to group cohesion.
H4a: Passion will be positively related to the individual perception of cohesion.

Research suggests that TEI may be a key construct that facilitates a leader's adaptive behavior. Teams with high TEI acquire better organizational understanding, leading to better emotional management not only inside the teams but also when the group deals with individuals and groups beyond the group's boundary (Stubbs and Wolff, 2008). These teams are likely to recognize and respect the emotional expressions of followers (e.g., George, 2000), and they also respond better to their emotions (Chang et al., 2011) and use this information to activate employees' emotion (George, 2000).

Finally, Ashkanasy and Dorris (2017) mentioned that a leader's behavior toward subordinates is observed in team-member relationships, which, in turn, reflect the leader's performance via processes like emotional contagion. Such processes lead to an organizational management response to the leaders. Teams with high TEI take on the role of "emotion manager" in order to establish a positive "affective tone," both for their subordinates' benefit and so as to create positive affective events for them (Pescosolido, 2002).

Based on the above, we hypothesize that the relationship between a management team's transformational leadership, passion, and cohesion will be mediated by TEI through two processes: (1) by developing a better understanding of the team and improving the ways in which leaders respond to followers' needs; and (2) through the emotional contagion of positive emotions and trickle-down effects.

H5: TEI will be positively related to passion at the group level and will mediate the relationship between a management team's transformational leadership and passion.

METHOD

Participants

Data for this study were gathered between 2014 and 2016 from two sources: 1,566 managers grouped into 188 teams pertaining to a total of 90 firms, and 4,564 workers from the same 90 firms, all of which are part of the same corporation in Spain. Each leader team (between 4 and 9 members) manages each work unit that the workers come from. These teams work together every day, making strategical decisions for the organization and managing their work units. The time lag between leaders and employee responses was 1 week.

The data from the 1,566 managers were used only at team level (since we analyze them as a team); therefore, the final sample size for the model was 4,564 workers at the individual level and 188 work units and leader teams at the group level.

The Corporation is distributed across different economic sectors: Industry ($N = 30$; 33.3%), the service sector ($N = 22$; 24.4%), education ($N = 7$; 7.8%), and distribution ($N = 31$; 34.4%). In terms of size, 47.8% ($N = 43$) are small organizations (> 50 workers), 40% ($N = 36$) are medium-size organizations (between 50 and 200 workers), and 12.2% ($N = 11$) are large organizations (more than 200 workers). In the total sample, 38% of participants were female, and the average age was 42 years (SD = 8.68).

Procedure

Prior to collecting any data, we sought permission from the top managers of all the organizations and identified all the work units and manager teams (of each unit) participating in the study. Manager teams answered the questionnaire 1 week before workers did.

The questionnaires were distributed in two ways, with participants being randomly selected to respond either via email or using the paper-and-pencil method (hard copy). The paper-and-pencil administrations took place in large meeting rooms under the supervision of a human resources manager from the employees' firm. All responses (both email and hard copy) were anonymous and Spanish data protection law was complied with throughout. The study has the approval of the ethics committee. There were no differences in questionnaire responses related to the method of administration (online vs. paper-and-pencil).

The data obtained were incorporated into a file for statistical analysis using IBM SPSS 24 and Mplus 7. Data from leader teams were aggregated and merged with workers' data using the organizational work unit as the key variable.

Measures

Individual-Level Measures

Passion

The dimension considered for this construct is derived from Russell's circumflex model of emotion classification (Russell, 1980). The "Passion" dimension (high intensity and pleasure) comprised four discrete emotions: enthusiasm, pride, joy, and excitement (e.g., *"In my work I usually feel enthusiastic"*). The

Cronbach's alpha obtained in the present study was 0.85 [0.85, 0.86] and omega was 0.84 [0.86, 0.86].

Cohesion

Cohesion between workers was assessed using a scale adapted and validated previously by Aritzeta et al. (2020). The measure comprises three items, for example: "*In my department, we usually help each other.*" Confirmatory factor analysis showed a one-factor structure, with acceptable item loadings above 0.40 and acceptable fit. Cronbach's alpha and omega for the scale in the present study were 0.88 [0.87, 0.88] and 0.88 [0.88, 0.88], indicating good reliability.

Group-Level Measures

TEI

Team emotional intelligence was assessed using the Team-Trait Meta Mood Scale (T-TMMS; Aritzeta et al., 2020). The T-TMMS is a self-report questionnaire that measures: (1) the degree to which leaders of the same team consider that their team (reference group) pays attention to and values the feelings of teammates, (2) whether there is clarity rather than confusion about the emotions felt in the team, and (3) whether positive thinking is used to repair negative moods in the team. The Cronbach's alphas and omegas for the three dimensions (three items each) of the T-TMMS were 0.76 [0.73, 0.77] and 0.76 [0.74, 0.79] for Attention, 0.80 [0.79, 0.82], and 0.81 [0.79, 0.83] for Clarity, and 0.89 [0.88, 0.90] and 0.89 [0.88, 0.90] for Repair. The overall Cronbach's alpha and omega for the scale were 0.91 [0.91, 0.92] and 0.92 [0.91, 0.92], respectively.

Transformational Leadership

The scale used to measure group perception of exercised leadership was adapted from two previously published scales, changing the individual reference point to the group reference point (i.e., changing the reference framework from the individual to the group level) For example: "we have a clear understanding of where we want our unit to be in 5 years."

Specifically, we adapted Rafferty and Griffin (2006) scale for the Vision, Positive Leadership, and Supportive Leadership dimensions, and the Organizational Culture Inventory (OCI; Cooke and Lafferty, 1983) for the Goal Emphasis dimension.

Confirmatory factor analysis (CFA) was then conducted to confirm the factor structure of the scale. The model showed a good fit (χ^2df = 227.48, $p = 0.0001$, confirmatory fit index [CFI] = 0.97, Tucker-Lewis index [TLI] = 0.96, root mean square error of approximation [RMSEA] = 0.06, 90%) with adequate factor loadings on four dimensions, thus replicating the structure of the original scale. The Cronbach's alphas for the four dimensions (Vision, Positive Leadership, Supportive Leadership, and Goal Emphasis) were 0.85 [0.85, 0.88], 0.84 [0.83, 0.86], 0.89 [0.86, 0.89], and 0.88 [0.87, 0.89], respectively, and 0.91 [0.91, 0.92] for the total scale. The omegas were 0.87 [0.86, 0.88] for Vision, 0.84 [0.83, 0.86] for Positive Leadership, 0.89 [0.88, 0.90] for Supportive Leadership, 0.88 [0.87, 0.89] for Goal Emphasis, and 0.92 [0.91, 0.92] for the total scale.

RESULTS

Descriptive Statistics and Aggregation Indices

In order to examine whether it was appropriate to aggregate individual responses to team-level constructs, we followed the procedure described by Van Mierlo et al. (2009). This includes an examination of the r*wg index and two intraclass correlation coefficients, ICC1 and 2. The r*wg values are considered as a measure of agreement within the group, ICC1 specifies the proportion of variance in ratings that is due to team membership, and ICC2 specifies the reliability of team mean differences (Klein et al., 2000). Bliese (2000) has stated that ICC1 values exceeding 0.05 can be considered sufficient to warrant aggregation. LeBreton and Senter (2008) suggested that ICC2 values in the range 0.70–0.85 were an appropriate cut-off, and they also recommended that r*wg values be interpreted as follows: between 0.51 and 0.70, moderate agreement; between 0.71 and 0.90, strong agreement; and between 0.91 and 1, very strong agreement.

For cohesion, we obtained values between 0.14 and 0.23 for ICC1, between 0.80 and 0.87 for ICC2, and between 0.69 and 0.70 for r*wg. For the emotional state "passion," the values were 0.16 for ICC1, 0.82 for ICC2, and 0.80 for r*wg. Thus, we consider that the ICC1, ICC2, and r*wg indices justify the aggregation of individual responses.

Descriptive statistics for all variables, including the means, standard deviations, and bivariate correlations between variables, are shown in **Table 1**.

Hypotheses Testing

We tested our hypotheses by means of multilevel structural equation modeling with Mplus. The results are presented in **Figure 2**. The model fit indexes (CFI = 0.96; TLI = 0.93; RMSEA = 0.02; SRMR(W) [standardized root mean square residual for the within-level model] = 0.01; SRMR(B) [standardized root mean square residual for the between-level model] = 0.05) indicated good fit of the analyzed model. The effect of the size of the organizational area was controlled for in the model, and as none of the relationships for this control variable were significant ($\beta_{TEI} = -0.01$, *n.s.*; $\beta_{Passion} = 0.01$, *n.s.*; $\beta_{Cohesion} = 0.01$, *n.s.*) the paths were eliminated in **Figure 2**.

In support of Hypothesis 1, and after controlling for the effect of the area size, transformational leadership was positively related to TEI at the group level ($\beta = 0.77$, $p < 0.01$). Hypothesis 5 was supported as TEI was positively related to passion ($\beta = 0.28$, $p < 0.01$). Hypothesis 4 was also supported, since at the individual level, passion was positively related to perceived cohesion ($\beta = 0.42$, $p < 0.01$), while at the group level, passion was positively related to group cohesion ($\beta = 0.57$, $p < 0.01$).

The overall model proposes that both TEI and the emotional state "passion" mediate the relationship between transformational leadership and cohesion at the group level. No significant effects were found in the direct relationship between transformational leadership of management teams and group cohesion prior to introducing the two mediators, therefore hypothesis 3 was not supported. However, TEI was found to

TABLE 1 | Descriptive statistics and correlations.

Variables	Mean (SD) Individual	Mean (SD) Group	1	2	3	4	
1. Transformational leadership	–	4.60 (0.48)	1	0.62**	0.17*	0.10	Group level (N = 188)
2. TEI	–	4.45 (0.50)	–	1	0.22**	0.17**	
3. Passion	4.25 (1.04)	4.34 (0.50)	–	–	1	48**	
4. Cohesion	4.18 (1.24)	4.27 (0.61)	–	–	0.35**	1	
					Individual level (N = 4,564)		

**$p < 0.01$; *$p < 0.05$

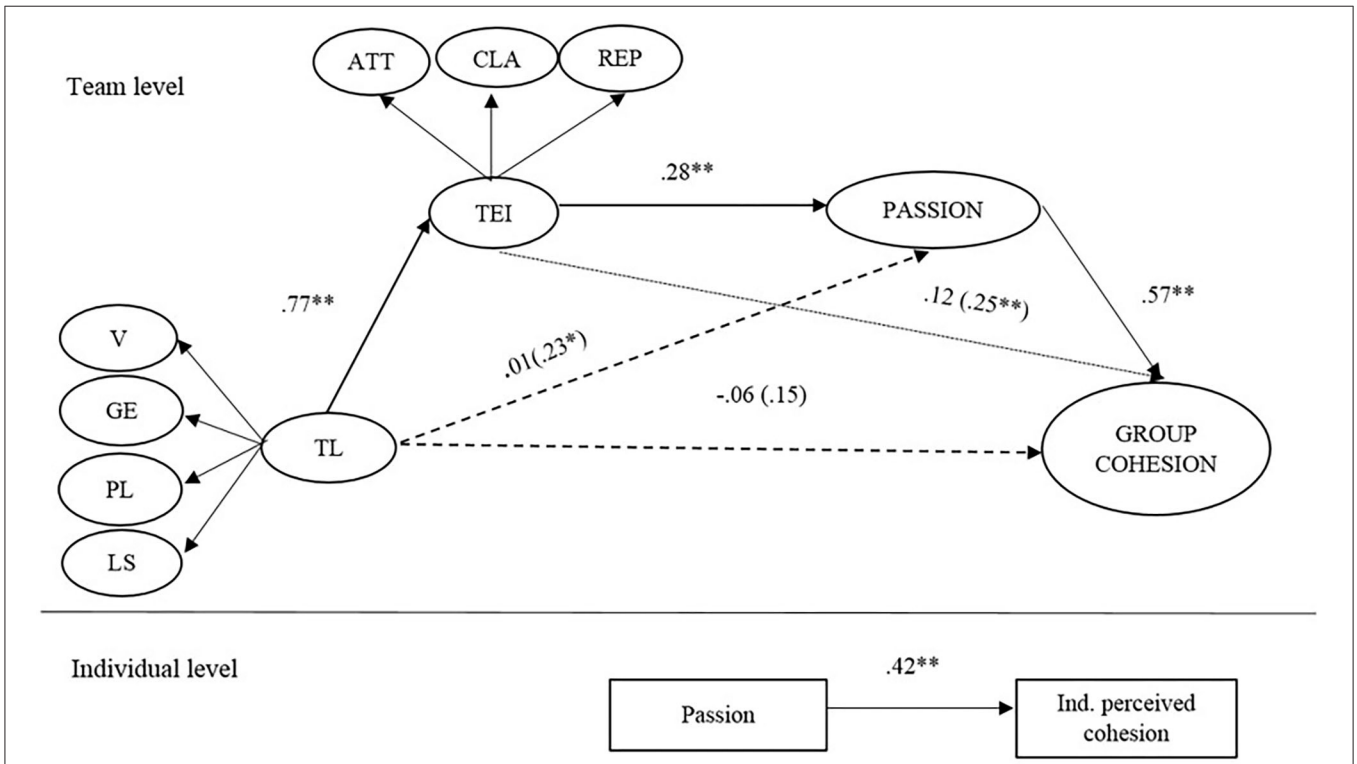

FIGURE 2 | Model results. TL, Transformational leadership; V, Vision; GE, Goal Emphasis; PL, Positive Leadership; SL, Supportive Leadership; TEI, Team emotional intelligence; ATT, Attention; CLA, Clarity; REP, Repair. **$p < 0.01$; *$p < 0.05$.

mediate the relationship between transformational leadership and passion, since the direct effect of transformational leadership on passion changed from significant ($\beta = 0.23$, $p < 0.05$), supporting hypothesis 2, to not significant ($\beta = 0.01$, *n.s.*), indicating a full mediation effect. In addition, passion fully mediated the relationship between TEI and group cohesion (effect before mediation: $\beta = 0.25$, $p < 0.01$; effect after mediation: $\beta = 0.12$, *n.s.*). The indirect effect of transformational leadership through TEI and passion was calculated using the model constraint function of Mplus. The results showed a significant indirect effect of transformational leadership on cohesion (via TEI and passion) (*indirect = 0.11*, $p < 0.01$).

We then compared this model with several alternative models at the team level. The results are presented in **Table 2**. Model 1 is the full mediation model, while in model 2 we added the direct paths from transformational leadership to passion and from TEI to cohesion. Models 3 and 4 were tested to investigate the effects of changing the order of variables. The fit statistics of these models were worse and some paths were non-significant in model 3. Therefore, we conclude that model 1 was the best model for the team level.

DISCUSSION

The present study sought to shed light on the emotional mechanisms that underpin the relationship between the transformational leadership of management teams and cohesion among workers, and also to analyze the role played by TEI in this relationship. Our findings overall are consistent with previous studies suggesting that teams with high levels of TEI are better able to understand the functioning of their organization and what this implies in terms of managing emotions (Stubbs and Wolff, 2008). More specifically, the results provide support for our predictions. First, transformational leadership behaviors are

TABLE 2 | Alternative models.

Model and structure	x^2	*df*	RMSEA	CFI	SRMR
TL→ TEI→ PAS→ COH	17.81	14	0.038	0.99	0.03
TL→ TEI→ PAS→ COH and TL→ PAS and TEI→ COH	16.03	12	0.042	0.99	0.03
TEI→ TL→ PAS→ COH	19.75	14	0.047	0.98	0.04
TL→ TEI→ COH→ PAS	22.44	14	0.057	0.98	0.06

TL, Transformational leadership; TEI, Team emotional intelligence; PAS, Passion; COH, Cohesion.

positively associated with higher levels of TEI in management teams (H1) and higher passion (H2). Second, the TEI of leader teams fully mediates the relationship between transformational leadership behaviors and the positive emotional or affective state of passion of subordinates at the team level (H5). Third, the high-intensity positive emotions we referred to as the affective state of "passion" mediate the relationship between TEI and subordinates' cohesion (H4.b). And fourth, at the individual level, subordinates' passion influences their perception of cohesion (H4.a).

Analysis of our overall model suggests that management teams composed of transformational leaders have higher TEI and generate more positive emotions in their followers, who then experience greater cohesion within the team. Following Druskat and Wolff (2001), we consider that transformational leadership helps to generate emotionally intelligent norms and patterns of behavior which enable the team to work more efficiently. Thus, teams high in TEI are able to generate norms for adequately managing conflicts that arise within the group (Ayoco et al., 2008), which in turn promotes greater cooperation, coordination, and communication among members (Lee and Wong, 2019).

The mediation effects we identified are in line with the results of previous studies suggesting that teams with high TEI are better at recognizing and responding to the emotions and needs of their followers (George, 2000; Chang et al., 2011). Team members' interpersonal relationships may influence employees' individual affect through trickle-down effects and emotional contagion, leading to an organizational management response to the leaders (Tse et al., 2018). In this respect, one might consider that teams high in TEI are able to generate more positive emotions among subordinates, for whom they constitute a positive affective event (Weiss and Cropanzano, 1996; Weiss, 2002).

The present study also proposed that the effect which leaders have on workers' cohesion could be due, in part, to an increase in high-intensity positive emotions. Although the relationship between the emotional state of passion and workers' cohesion has recently been demonstrated (Diener et al., 2020), the mediation effect we found here further highlights the considerable importance that positive emotions may have in the relationship between leaders and subordinates.

Although some previous studies have linked transformational leadership to cohesion (Sahib and Wilderom, 2017), we surprisingly did not find a significant direct effect between these two constructs. This may be because, unlike previous studies, we examined the relationship between the management team and employees from a multilevel perspective. According to Wo et al. (2019), cognition-based constructs such as leadership may be harder to transmit across different levels of an organizational hierarchy than are affect-based constructs, which could explain the lack of a significant effect of transformational leadership on cohesion.

As noted in the introduction, there has been little research on organizational leadership style's effect on workers responses and well-being, and the emotional mechanisms that underpin this relationship. Our study contributes to the literature focused on the organizational level by highlighting the role of emotions in the relationship between management teams' behaviors and employees' cohesion. More specifically, our results show that understanding and managing emotions is a central part of leadership effectiveness. In doing so, the present study contributes to understanding why transformational leadership behaviors affect well-being at work and what the keys to develop an effective leadership are.

Analyzing the aforementioned variables in a single study is important because it contributes to the theoretical domains of group affect and leadership. In this respect, our study sheds light on the question of how and why transformational leadership and TEI may enhance well-being (Colquitt and Zapata-Phelan, 2007). Moreover, although several studies have demonstrated the effect of individual EI on different organizational variables (Miao et al., 2016), only a few studies have analyzed the corresponding group-level construct, that is, TEI. Here we integrated the individual and team level in emotion research (Ashkanasy and Dorris, 2017) by examining emotions and their influence on cohesion from a multilevel perspective. It should also be noted that we considered perceptions from two different sources, namely subordinates and leaders, thus adding to knowledge of leader-member exchange processes (Tse et al., 2018).

Practical Implications

Our findings have a number of implications. First, they highlight the importance of emotions and affectivity at both the individual and team levels, thus underlining why managers need to consider TEI as an important skill when training project teams. In this respect, our results could be used to promote workers' well-being and create emotionally healthier organizations. For instance, activities aimed at increasing leader teams' emotional intelligence would indirectly impact the well-being of workers and, ultimately, of the organization. In this context, recent research on large projects has found that training can improve EI in project team members (Kotsou et al., 2018).

The use of the multilevel theoretical framework, rather than focusing solely on the shared perception of workers, helps to advance on the team-based EI research by defining the relations between TEI and workers' responses. This research challenges and maybe complements the classical view of the relationship between leadership and employees' outcomes, underlining the importance of both team-level and affective variables for these responses. Team emotional intelligence and the affective responses of employees combine to create structural configurations that influence working processes, shaping the linkages between leadership and cohesion.

Finally, it should be mentioned that some researchers (e.g., Ashkanasy, 2003; Troth et al., 2012) have called for the development of models examining the effect of EI on performance at the team level, including identification of the mechanisms through which TEI may impact outcomes at work. The model developed in this study shows how TEI mediates the relationship between leadership and team cohesion. Our findings therefore add to knowledge about team cohesion by providing an explanation of how TEI and passion mediate the association between leadership and cohesion.

Limitations and Future Directions

Our study has certain limitations that need to be considered. First, the results are based on self-report data and it is possible that they are affected by social desirability bias. In addition, even if our data were collected from two different sources, the results still can present common method bias in the relationship we established from the same sources (Transformational leadership to TEI and Passion to Cohesion). Future studies should therefore employ more objective measures to verify the impact of TEI in organizations and avoid common method bias. It would also be useful to examine EI and its relationship to performance in different cultural contexts and different kinds of projects. In this respect, the fact that we examined the hypothesized relationships within a single organizational context limits the generalizability of the findings. A related issue to consider here is that all the organizations included in this study were cooperatives, whose characteristics and functioning differ considerably from other types of company. Future studies should therefore explore the observed relationships in different organizational contexts.

A further limitation to note is that our study does not capture the dynamic nature of EI in the workplace because we did not collect longitudinal or qualitative data. Consequently, conclusions about causality cannot be drawn from our results. In addition, we only considered emotions classified as high-intensity positive emotions, those which have been shown in the literature to have a greater effect. A task for future research would therefore be to investigate the impact of other types of emotion on the process of leadership.

Finally, it is worth mentioning that we did not examine gender differences in transformational leadership, which may be relevant since the leadership teams in our sample were not homogeneous in this respect. About 30% of teams were comprised solely of men, while the remainder had one or more female members; there were no women-only leadership teams. In light of recent findings in this context (Hackett et al., 2018), future studies should examine whether the gender composition of teams may influence the mediation effect observed here.

Despite these limitations, our study provides empirical results and adds to knowledge about the influence of emotions on organizations and effective leadership. More specifically, it highlights the need for organizations to focus not only on promoting transformational leadership styles within their management teams but also on the development of emotional skills such as TEI that can help teams to function better and be capable of recognizing and meeting the needs of workers. In other words, that they achieve effective leadership which enables them to become healthy as well as productive organizations.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Mondragón. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RM together with AA and EM-M were responsible of developing the theoretical foundations of the manuscript (introduction, discussion, and conclusion). AG together with RM and AA were responsible of the methodological part of the manuscript and especially of the statistical analysis. UE was responsible of the process for gathering data and reviewing the manuscript. GS contributed to the theoretical development and review process. All authors contributed to the article and approved the submitted version.

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Job Demands and Job Resources of Academics in Higher Education

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Too many job demands and not enough job resources can negatively influence the well-being of employees. Currently, limited information exists surrounding the job demands and resources as experienced by academic employees in the higher education sector. Therefore, the aim of this study was to identify the job demands and job resources experienced by academic employees using qualitative methods. Semi-structured interviews were conducted with 23 academic employees, using an Interpretative Phenomenological Approach. Thematic analysis, specifically template analysis was used to categorize the themes. Job demands were divided into three categories: quantitative (publication pressure, overburdened with the load, and competing time demands), qualitative (work/home balance, complexity of student support, organizational politics, and lack of mental health support) and organizational demands (using technology-mediated learning and lack of structural resources). Job resources were organized into two categories: organizational (social support) and personal resources (autonomy, meaningful work, and personal support). Participant experiences are highlighted to provide a better understanding of the job demands and job resources encountered. The framework of job demands and job resources gleaned from the study could be used for further research to manage and monitor motivational processes for academic staff, and to reduce strain due to high job demands.

Keywords: job demands, job resources, qualitative, academics, higher education

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INTRODUCTION

South African higher education has undergone a number of transformations since the advent of democracy. Changes in the higher education system and its institutions has been one of the top priorities of the South African government in the post-apartheid era. As such, the Higher Education Sector was identified as a sector in need of review (National Development Plan 2030, 2012). Goals such as increasing and broadening participation, providing equity of access and fair chances of success to all, and decolonisation, as part of the post-1994 transformational efforts (Badat, 2010; Dhanpat et al., 2019), has led to dissatisfaction, on a number of levels, experienced by academics (Pienaar and Bester, 2009). One of the reasons for this dissatisfaction is that although changes and transformations driven by policy might convey the perception that overall progression and betterment is taking place (Van Niekerk and Geertsema, 2009), in actuality these changes have put more pressure on Higher Education Institution (HEI) staff, specifically, academic employees (Dhanpat et al., 2019).

The demands that have been placed on academics, including expanding student numbers resulting in increased academic workload, seem to be a prevailing theme in academic career literature (Theron et al., 2014). These changes are likely to influence employees' work as they

experience specific career dilemmas, namely, increased levels of job dissatisfaction (Phillips and Connell, 2003), intention to leave, breach of psychological contracts, break in employee–employer relationships, decline in commitment and job security, and increased workload (Theron and Dodd, 2011).

Job resources are those elements that assist when job demands become excessive (Demerouti et al., 2001). The Job Demands-Resources (JD-R) model puts forward that resources play an integral part in the prevention health-impairment process, and places employee well-being at the focal point. Thus, the resources of academics that assist them in successfully coping with their job demands, is a motivational process that leads to higher levels of work well-being (Byrne and MacDonagh, 2017).

Job Demands and Resources in Context

For the purpose of this research, the job demands–resources (JD-R) model (Demerouti et al., 2001) will be used as the theoretical framework. Job demands are the physical, psychological, social, or organizational features of a job that need continued cognitive and emotional energy or abilities and are linked with physiological and psychological costs (Demerouti and Bakker, 2011; Bakker et al., 2014). Job resources on the other hand denote the physical, psychological, social, or organizational aspects central to work performance (Rothmann and Jordaan, 2006). These aspects relate to employee experiences of job satisfaction, autonomy, purpose, engagement, and meaningful work, and job performance (Janse van Rensburg et al., 2018).

Job demands can be divided into three categories, namely, quantitative demands, qualitative demands and organizational demands whilst resources can be organized into two categories, namely, organizational resources and personal resources (Schaufeli, 2017). Quantitative demands refer to elements such as the number of tasks and the speed at which it can be accomplished. When quantitative work demands are elevated, work tasks will necessitate more time than what was planned for (Van Veldhoven, 2014). Qualitative demands focuses on the type of skills and/or effort required to complete work tasks. For example, cognitive, emotional or physical skills and/or effort. It refers to the level of difficulty or complexity that is needed to carry out the job (Bowling and Kirkendall, 2012). In addition, organizational demands negatively impact an individual in terms of their work outputs (Bakker et al., 2004), and can be described as those elements that are brought about by aspects in the work environment.

Resources are categorized according to organizational and personal resources. Organizational resources are mostly retrieved from external sources such as a supervisors or co-workers. These resources may include feedback, rewards, job control, participation, job security, and supervisor support (Demerouti et al., 2001). Personal resources focus on the views and judgement of the individual (Hoy, 2004; Barrick et al., 2013), i.e., meaningfulness of work, autonomy, self-efficacy, optimism and organizational-based self-esteem (Xanthopoulou et al., 2009).

Whilst other job stress models, such as the demand-control model (Karasek, 1979) and the effort-reward imbalance model (Siegrist, 1996) also explain the predictive value of job characteristics in employee well-being, the limited set of predictor variables in these models may not be relevant to all occupations (Bakker and Demerouti, 2007). Therefore, the JD-R model was used to guide the exploration of what demands and resources exist in the academic environment.

Demands and Resources in the South African University Setting

Universities in sub-Saharan Africa continue to operate under conditions that are under-resourced, with academic staff experiencing high workloads that negatively affect their well-being and performance (Higher Education South Africa, 2014). Several studies [see for example Rothmann and Jordaan (2006), Barkhuizen and Rothmann (2008), Pienaar and Bester (2009), Bezuidenhout and Cilliers (2010), Barkhuizen et al. (2014a,b), and Van Tonder and Fourie (2015)] reviewed aspects of job demands and resources and their implications in a Southern African higher education setting from a quantitative perspective.

This can be further supplemented by research carried out in other parts of Africa. Reports have indicated that teaching at a university level is a high stress occupation. In Ghana, the main stressor for lecturers was the augmented intake of students with no consideration for expansion of university facilities (Atindanbila, 2011). As a result, lecturer-student ratio results in work overload. Teaching load and professional distress were also rated as the second and third highest sources of tension experienced. Furthermore, academic staff in Egypt indicated that demands such as poor working conditions, limited career development, increased levels of work overload and insufficient resources contributed to difficulties experienced in the academic environment (El-Sayed et al., 2014).

South African academics additionally reported pressure to produce more research outputs, bigger classes and postgraduate supervision loads as sources of strain. Coping with a high volume workload was further exacerbated by the experience of unclear roles and responsibilities (Bezuidenhout and Cilliers, 2010).

Accordingly, it appears that the job demands of academics have escalated, whilst the levels of support and other resources have declined (Barkhuizen et al., 2014a). According to literature, job resources can lead to an engaged workforce, which is a key value proposition for Higher Education institutions that aim to retain talented staff (Barkhuizen et al., 2014a). As job demands for academics are consistently negatively related to work engagement and well-being (Naidoo-Chetty and Du Plessis, 2021), the need for further studies in this area is highlighted. Pon and Lichy (2015) note that there is limited research being done based on the experiences of academic employees in the academic field on job demands and resources, nationally and internationally.

Rationale of the Study and Problem Statement

From investigating the literature on job demands and resources, it is clear that most studies have engaged in quantitative methods. While these studies have made a noteworthy impact, quantitative methods have some restrictions as it is less flexible and exploratory in nature (Queirós et al., 2017). Empirical results

were also obtained based on the researchers' theorizing on the job demands and resources of academics, thus presenting a perceived objective reality of academic demands and resources. One aim of this study was to identify the job demands and resources as experienced by academics by using qualitative methods. This allowed us to capture the subjective feelings of the academic working environment and what is experienced as demands and resources.

A deeper and richer understanding of academic employees' experiences of job demands and job resources, will permit academics to better manage their career demands and resources. Furthermore, it can help organizations to assist employees. When an organization fails to make essential job resources available, there is the possibility that employees will withdraw and disengage, which may lead to burnout (Takawira et al., 2014). However, even though there is clear evidence indicating that establishing engaging work environments is vital, the current climate at higher education institutions is rather somber (Geoffrey and January-Enkali, 2019). These types of problems have been reported as far back as 2006 by Rothmann and Jordaan in the South African higher education system. Aspects such as imbalances and misrepresentation of the system, poorly equipped students, and diminishing government funding, continue to be problems in need of addressing.

Therefore, the current study is guided by the following research question: How do academics make sense of their experiences of job demands and resources in higher education?

MATERIALS AND METHODS

Participants and Setting

All participants were from a selected public University in the Western Cape, South Africa. An invitation e-mail to participate in the interviews was sent to all academic staff by the respective university. When this method produced a low response rate, snowball sampling was utilized to improve the responses. In total, 23 semi-structured interviews were conducted with the majority of the participants being female. In total, there were 18 females and five males. The number of interviews represented an adequate sample size as it allowed analysis to saturation. As per the phenomenological research tradition, the number of the participants can be between two and 25 (Creswell, 2012). Of the interviewees, three were Professors, five were Senior Lecturers, and 15 were Lecturers. Within the research university, academics at all levels are involved with teaching, research, community engagement and supervision of postgraduate students to different degrees. Lecturers (typically early career scholars who do not hold a PhD) carry a greater burden of undergraduate teaching, whilst Professors (established researchers) have more postgraduate supervision responsibility.

The research institution is classified as a historically disadvantaged institution, and has been the vanguard of South Africa's historic change, with a distinctive academic role in helping to build an equitable and dynamic nation. Coming from a history of creative struggle against oppression, discrimination and disadvantage, the university played an important role in helping to build equitable access to education. In 1982, the university formally rejected the apartheid ideology and adopted a declaration of non-racialism. The University also formalized an "open" admissions policy which provided access to a number of African students, as well as an expansion to the curriculum taught to equip students to be successful and employable in the workplace. Now, the university (depending on the ranking being used) ranks within the first tier of Universities in South Africa based on research output.

Data Collection

To understand and describe the job demands and job resources academics experience, the researcher conducted semi-structured online video interviews with each participant. Online video interviews were considered the best method to use at the specific point in time due to the COVID-19 pandemic and the subsequent requirement to socially distance. Moreover, the semi-structured interview is the exemplary method for Interpretive Phenomenological Approach (IPA) as it facilitates rapport and allows the interview to go into novel areas (Smith et al., 2009). Interviews also included sub-questions (probing questions) to further probe for more detailed or "richer" responses from the participants, where it was required. Some of the questions that participants were asked in the interview were the following—"What resources in your work environment play a role in making what you do a success?;" "What are the work challenges that excite you;" "what work challenges makes it difficult for you to do and be your best?;" "What, in your view, are the types of work pressures that you experience in your work?" Furthermore, the interviewer asked participants to assign a score of 1–5 to provide a rating of the intensity of the demand that impacted the academic the most on a day to day basis.

At the beginning of each interview, the interviewer (the first author) built rapport by disclosing that she herself was an academic employee and had her own set of experiences. Thus, the interviewer ensured that she was transparent and reflexive in her thinking (Polit and Beck, 2014) to ensure that her own perceptions did not impact the process by which the data was collected, analyzed and presented. Furthermore, the interviewer explained to participants that the purpose of the interview was to gain insight into the job demands and resources they experienced in their daily working lives. As the interviewer was not from the same department as participants, and did not hold a position of influence in relation to the participants (such as head of department, senior management, human resource professional, etc.), it is unlikely that her employment in the same institution would have discouraged participation and open sharing.

Data Analysis

A phenomenological approach was used in order to obtain an understanding of the phenomenon of job demands and resources. Specifically, the interpretive phenomenological analysis (IPA, Smith, 1996) was used in conjunction with Template analysis to gain insight into how academics made sense of their experiences of demands and resources related to their job roles as academic employees within the Higher Education Sector.

The steps for analyzing IPA data as recommended by Smith and Osborn (2008) was followed. Firstly, the transcript

was read and reread closely, with the left-hand margin being used to annotate what was interesting or significant about the participant's comments. When the entire transcript was annotated, the researcher returned to the beginning of the transcript and documented emerging theme titles. Here the initial notes were transformed into concise phrases, which aimed to capture the essential quality of what was found in the text. The themes moved the response to a slightly higher level of abstraction and invoked more psychological terminology. This transformation of initial notes into themes was continued through the transcripts with the same theme title used when similar themes emerged.

In terms of template analysis, which is a form of thematic analysis, themes were categorized and identified using the IPA method and thus constructed into a template. The template was divided into quantitative, qualitative and organizational demands. Furthermore, resources were divided into personal and organizational resources.

As a further step to the analysis, Participative Ranking Methodology (PRM) was used to determine the most challenging job demands. This is a "mixed methods" approach to data collection, where a group of experienced participants are directed toward generating responses to a detailed question or set of questions. The reason it is considered a "mixed methods" approach is that it draws on both quantitative and qualitative methodologies which assists in producing rich, contextualized data that can be calculated, ranked, and paralleled across or within groups (Ager et al., 2010). Thus, by using data obtained in the qualitative phase, certain themes became prevalent that were relevant to the academic environment. To calculate the average rank for an issue mentioned by academics we added up the ranking number from the group and divided by the number of participants (Ager et al., 2010).

Rigor

Credibility was achieved through the involvement of two researchers who analyzed one written interview independently. Furthermore a codebook was developed together by both researchers using verbatim quotes to provide the study participants a voice along with the researchers' data interpretations, respectively (Polit and Beck, 2010; Halcomb et al., 2013). In case of disagreement on the themes, there was an additional discussion to ensure that both researchers were on the same page. Self-reflection was an important consideration for dependability. Researchers were stimulated to put their own ideas on paper before starting the interviews and the analyses. This created for the researcher a constant awareness about their own background and perspective.

Ethical Considerations

Ethical approval was obtained from the Human and Social Sciences Research Ethics Committee at the Researchers' Institution. Verbal and written consent was obtained from all participants prior to interviews and after verbal and written information about the research goals and methods was provided. Participants were assured that their identity would not be disclosed under any condition. They were free to withdraw from the research process at any time and without any explanation.

RESULTS

The aim of the research was to identify the job demands and job resources experienced by academics in higher education. As mentioned earlier, the responses of the participants were categorized based on job demands (quantitative, qualitative and organizational) and job resources (organizational and personal).

Quantitative Demands

Quantitative demands refer to elements such as the number of tasks and the speed at which it can be accomplished. Therefore, themes in this category carry the notion of volume of work or hours needed to accomplish such work, coupled with the available time within which such tasks should be completed. Three themes were identified as quantitative demands.

Publication Pressure

The first theme that was identified as a quantitative demands was *publication pressure.* In the participative ranking of job demands, publication pressure was ranked as the most prominent. The responses were mostly related to research outputs. Individuals such as P5, P22, and P23 mentioned feeling stressed and tired from the constant need to produce publications. For example:

> "*Teaching does take up the predominant amount of time, which puts pressure on my research. Publishing an article is a long and strenuous process.*" (P5, female, senior lecturer, Faculty of Economic and Management Sciences).
>
> "*Time for research is what remains after teaching and administrative requirements are met. Yet, I feel like the institution puts pressure on me to publish.*" (P22, female, lecturer, Faculty of Arts and Humanities).
>
> *"I have to stress over publishing, in order to get promoted. I have to publish and be running around and going to conferences."* (P6, female, associate professor, Faculty of Natural Sciences).

In support of P5 and 22's comment was the notion that due to additional time spent on teaching and with the new way of technology-based teaching, academics have gotten to the point where time for research appeared to be that remaining after teaching and administrative requirements had been met (Houston et al., 2006, 25). In fact, most of the academics indicated that "*they did not have a lot of time to focus on their research*" (e.g., P12, P17, P18, and P20). This has led to P6 feeling anxious and worried about not being promoted due to a lack of publications.

Other obstacles to overcome were related to research funding. The competitive nature in obtaining funding caused a lot of anxiety and stress, yet, the university still expects outputs. Participants indicate:

> "*You have to apply for funding, you have to apply for leave, you have to prove where you're going, how long you're going, what your outputs are going to be, and then sometimes you even go through this whole admin process and get rejected*" (P5, female, snr lecturer, Faculty of Economic and Management Sciences).

> *"Some years you would get, some years we wouldn't get. It all depends on how the competition is at a certain year and how the economy is doing."* (P6, female, associate professor, Faculty of Natural Sciences)

In South Africa, academics are increasingly pressurized to publish in journals accredited and incentivised by the Department of Higher Education and Training (DHET) in order to be recognized and rewarded for their work (Department of Education, 2015). It can also be noted that Deans and Deputy Vice Chancellors are setting impractical performance management metrics, which include publishing papers in certain journals (Guthrie et al., 2019). Furthermore, these targets are being set in an environment where there is a significant increase in teaching and administration loads (Guthrie et al., 2019).

Kubátová (2019) has noted that publishing forms an integral part of academic work worldwide. A reason for this is that Academic institutions are ranked according to the level of publication in high-impact journals. Research grants are thus awarded to institutions based on their publications. This has also put academics under pressure to produce increasingly higher numbers of research publications as well as research grants, with a particular focus on volume rather than quality (Callaghan, 2016).

Overburdened With the Load

An overwhelming number of participants mentioned being *overburdened with the load* that forms part of their work. Through the participative ranking method, this job demand was placed as second. For instance, participants mentioned:

> "*[C]lass numbers are very big*" (P1, female, lecturer, Faculty of Community and Health Sciences)
> *"You want to help the students and you want to be able to get to those who are falling behind, but because classes are so big, it's often actually difficult to make a difference."* (P23, female, senior lecturer, Faculty of Law).
> "*[T]here is always additional work and the role is not clear at times*" (P13, female, lecturer, Faculty of Dentistry)
> *"I have hundreds of students. If I spent 10 minutes, only 10 minutes marking my students' assignments, I am going to be busy for two and a half months, from eight to five, every day."* (P15, female, lecturer, Faculty of Economic and Management Sciences)
> "*I was literally starting to work four days a week at six o'clock in the morning, and then working a full day. And then, coming home and having home responsibilities, was also quite - it was like a dual thing. I was finding I was on the verge of burnout.*" (P17, female, senior lecturer, Faculty of Dentistry)

P20 has summarized this, as

> *"[W]ork is hectic"*(P20, female, lecturer, Faculty of Arts and Humanities)

As far back as 2008, Barkhuizen and Rothmann indicated that due to a surge in work demands, academics are forced to work long hours. This puts them at risk for physiological, psychological, and behavioral illnesses. For example, Bezuidenhout (2015) found that South African academics' typical work week comprises of being a subject expert, researcher, lifelong learner, tutor, organizer, therapist, and appraiser. Furthermore, South African academics have substantial workload and administrative burdens. This includes governance demands devoid of organizational and managerial support, job uncertainty, and poor remuneration, along with role ambiguity (Poalses and Bezuidenhout, 2018; Du Plessis, 2020).

Competing Time Demands

The third highest ranked job demands was aspects that related to *competing time demands*, thus having to deal with constant conflicting work priorities. Participants indicated the following:

> "*There is an expectation to have certain information on short notice*" (P2, female, lecturer, Faculty of Arts and Humanities)
> "*Endless meetings are a challenge, because they disrupt workflow*" (P8, female, associate professor, Faculty of Economic and Management Sciences)
> "*It doesn't matter what time of the year it is, you are always under lots of pressure to get things done.*" (P7, female, professor, Faculty of Arts and Humanities)

Another frustration is the institution's policies and procedures that academics need to follow in order to get something done. Participants explain:

> "*The bureaucracy that you have to go through in order to, for example, go to a conference. And then sometimes you even go through this whole admin process and you get rejected.*" (P5, female, senior lecturer, Faculty of Economic and Management Sciences)
> *"The sort of paperwork and bureaucracy involved is a real hindrance."* (P22, female, lecturer, Faculty of Arts and Humanities).

This has led to P8 feeling very "*frustrated with the constant red tape.*" In support of this is Rice and Sorcinelli (2002) and Ylijoki (2013) who indicated that universities put an extraordinary amount of pressure on academics whilst having limited time (and financial) resources with which to complete a task.

Furthermore, the additional hours of work that academics tend to put in during their own time is often not reflected in typical workload models. Thus, there is a concern that academic environments will no longer be regarded as a better career option in terms of work-life balance (Dhanpat et al., 2019) but shall instead turn into an environment that is characterized by constant pressure if the movement toward ever increasing productivity (Kinman, 2014) does not level off (Callaghan, 2016).

Qualitative Demands

The themes identified as qualitative demands focus on skills and/or effort required to complete work tasks. In this case it was not about the volume of the work, but rather the complexity of work tasks requiring cognitive, emotional, or physical skills and/or effort.

Balancing of Work and Home Responsibilities

Balancing of work and home responsibilities were also mentioned frequently, and ranked as fourth most taxing job demand. Participant 20 mentioned that "*work extends into family time.*"

In addition, P7 indicated that in order to manage the workload, one has to "*work on weekends*" and this created a "*lack of work-life balance.*"

> *"Remember, I'm a mother, I'm a wife, I'm a student, I'm a lecturer. I feel guilty that I'm not paying attention to my family as I am forever either in meetings or chasing deadlines."* (P4, female, lecturer, Faculty of Economic and Management Sciences)
> *"It needs to be noted somewhere that a workload isn't just your work from nine o'clock till five o'clock. It actually extends into your after hour time as well."* (P11, female, lecturer, Faculty of Community and Health Sciences)
> *"When you leave the office, your work is not done. Although we have flexibility, you find yourself working into the evening, weekends, Saturdays and Sundays."* (P7, female, professor, Faculty of Arts and Humanities)

Although universities might offer comparatively flexible working hours when compared to other industries, there is a large probability that surmounting pressures on academics can lead to them working similar hours and even taking work "home" (Callaghan, 2016).

That is, participating in the work role makes participating in the family role more difficult and vice versa. It can thus be noted that where performance objectives, work hours and duties of employees become unrealistic and extreme—to the point that work incessantly places restrictions on academics' personal lives—they will experience an inability to relax (even after hours) due to the huge amount of pressure they face daily (Parker and Hyett, 2011).

Complexity of Student Support

Diversity amongst students was something that many academics had to deal with. Diversity components mentioned included aspects such as race, sex, culture, religion, age, and language. Although the medium of instruction of the research university is English, most students do not have English as their mother tongue. The diverse student base is a direct result of Higher Education initiatives to ensure equity of access to students. Participants share their experiences:

> "*The challenging aspect in handling a very large class is that the students are diverse. So it becomes more challenging to communicate.*" (P10, male, senior lecturer, Faculty of Natural Sciences).
> *"Language for me is also a challenge."* (P1, female, lecturer, Faculty of Community and Health Sciences).
> "*They* [referring to students] *feel themselves that they are being discriminated against. It is always difficult to gain their trust. I talk to them about developing as South Africans and finding ways to get them to understand one another."* (P2, female, lecturer, Faculty of Arts and Humanities).

The majority of the participants felt that they put a lot of effort into their teaching and learning strategy (P1, P2, P4, P13, P18, and P23). Frustrations experienced by participants include the following:

> *"The students will be demanding, harassing actually, in their e-mails demanding for examination scope."* (P16, male, senior lecturer, Faculty of Law).
> *"What makes it difficult is the social issues, the economic struggles of our students. They miss class because some don't have transport money to come to varsity."* (P2, female, lecturer, Faculty of Arts and Humanities).

While students are encouraged to be responsible for their own learning (Lavhelani et al., 2020), it still remains the responsibility of the academic to ensure a high success rate when it comes to student learning. This causes an undue amount of stress for the academic as the level of student success determines how successful academics are within their roles (Dey et al., 2015).

Organizational Politics

Organizational politics seemed to have impacted most of the academics interviewed. Whilst the volume and time needed to complete the bureaucratic processes featured as a quantitative demand, it became clear that participant also experienced complexity and emotional effort as a result. For instance, there was constant mention of competition amongst staff members. Participants mentioned:

> "*We have leaders that have an agenda. They are not always neutral.*" (P4, female, lecturer, Faculty of Economic and Management Sciences)
> *"When you come into a setting, people make sure they are on the positive team end, meaning that the highest loads would be delegated to the newer novice and younger academics."* (P14, male, lecturer, Faculty of Community and Health Sciences)
> *"Since I am younger that the other academics, I don't have a voice. If I do speak up in a meeting, nothing gets done and it doesn't really get heard."* (P15, female, lecturer, Faculty of Economic and Management Sciences).

Rice and Sorcinelli (2002, p. 104) have put forth similar evidence, whereby junior academics are "awkwardly clasped between local and cosmopolitan pressures, amongst disciplinary colleagues and organizational demands."

Another element that came about was the lack of mentorship received for novice academics. This seemed to have a negative effect for participants, such as:

> *"You are given a task, and you must find your own way."* (P4, female, lecturer, Faculty of Economic and Management Sciences)
> *"I learnt by knocking my head. Although my mentor was there, he was focussed on his own career."* (P6, female, associate professor, Faculty of Natural Sciences)
> *"My experience with my work was very challenging. You don't get mentored into your position. You just get told this is your job and you need to find your way."* (P3, female, lecturer, Faculty of Community and Health Sciences)

Effective mentoring is vital and is needed to share imperative knowledge, abilities and insight with an employee that is new in the workplace. Paris (2013) puts forward that the novice lecturer is normally ready and willing to benefit from such an interchange so as to improve his/her professional journey. Lecturing is a very

demanding and a stressful job, particularly for new lecturers. Therefore, new lecturers often have trouble transitioning into their new roles from learners to teachers or from industry to classroom (Franklin and Molina, 2012). Adizu and Effiong (2020) indicated in their study that the observed benefits of effective mentorship can lead to professional development of the mentee along with progression in pedagogical knowledge.

Lack of Mental Health Support for Academic Staff

The majority of participants indicated that there is a lack of consideration for academic staff's mental well-being (e.g., P3, P4, P6, P8, P13, and P17). This is in addition to the fact that students are put at the forefront with "*their needs being catered to first*" (P3 and 13). Participants explain:

> *"There is no emotional support. Even if it's there, it's not genuine. Maybe I am crazy, but I am expecting a call from my superior asking me "hey, how are you? Are you coping?" You're not getting any of that."* (P4, female, lecturer, Faculty of Economic and Management Sciences).
> *"Sometimes we forget about the staff component, we are doing everything for the student. They need to think about staff wellness and mental health of staff as well."* (P3, female, lecturer, Faculty of Community and Health Sciences)

P11 mentioned that academics have to deal with students' mental/personal problems, which they themselves are not equipped to deal with. This has caused a lot of anxiety, as there is "*limited counseling for the staff members*" dealing with these types of issues.

Thus, it is imperative that HEI's ensure that the mental well-being of staff is prioritized as they rely on the dedicated efforts of all staff members to allow for a successful workplace. Nevertheless, if occupational demands overshadow occupational resources, work tends to be more challenging and stressful, which is preceded by an exhausted, disengaged workforce (Poalses and Bezuidenhout, 2018).

Organizational Demands

Organizational demands are described as those elements that are brought about by aspects or changes in the work environment. These aspects may have a negative impact an individual in terms of their work outputs (Bakker et al., 2004).

Using Technology-Mediated Learning Approaches

A number of academics indicated difficulty in dealing with technology. Especially as it pertains to emergency remote learning due to the COVID-19 pandemic. Academics had to learn to navigate their way "technologically" as this became a requirement.

> *"Technology is a challenge for me. Even iKamva [referring to the online learning management system]."* (P9, female, lecturer, Faculty of Dentistry)
> *"For me, the biggest challenge is this sort of e-learning, and the use of technology and the use of different modes. I always need to phone people and say 'can you help me'. That's like a headache for me."* (P11, female, lecturer, Faculty of Community and Health Sciences)
> "*I like to work on the hard copies and I'm not keen to do everything electronically*." (P2, female, lecturer, Faculty of Arts and Humanities)

The coronavirus SARS-CoV-2 has affected economic and social sectors across the world, including higher education in South Africa. Due to social distancing, various higher education institutions had to ensure that all learning material be placed online in order for students to access it. It has become essential for universities to not only offer theoretical learning but also to provide student with practical training by using technology. Additionally, institutions had to find alternative forms of formative (and most likely summative) ways in which to assess students. Most academic staff at contact universities normally' have limited, if any, knowledge or training in the instruction or delivery of online learning. As a result, academics with teaching responsibilities needed to develop their skills and become familiar with online learning platforms as soon as possible. This also includes a significant increase in administration (Hedding et al., 2020).

Lack of Structural Resources

Furthermore, it was highlighted by participants that certain *resources was required from the work environment* in order for them to be successful in their job roles. This was not always provided by the institution and thus participants indicated using their own resources or "just having to work with what they have." For example:

> *"I have to share my office with a colleague."* (P1, female, lecturer, Faculty of Community and Health Sciences)
> *"I use my personal laptop, rather than my computer at work, because I use specific programs for my course, the PC at work doesn't support this program. And also for say, taking photographs in the archives. I use my own resources."* (P5, female, senior lecturer, Faculty of Economic and Management Sciences)

A healthy environment as discussed by Nordic (2009) in a faculty can be influenced by many factors. Whilst some of these factors are intrinsic, extrinsic factors, including the availability of university resources (Stankovska et al., 2017) were noted as important drivers of a healthy environment.

These types of resources mentioned date as far back as (1989) where Hobföll specifically mentioned that object resources play an important role in the stress experience of individuals (e.g., office space). It is thus evident that an absence of sufficient structural resources to perform the job effectively will cause an increase in the amount of pressure the individual will experience as they are trying to carry out their job tasks in the best possible way (Poalses and Bezuidenhout, 2018).

Organizational Resources

Organizational resources is something that the institution would provide or the academic could use in order to alleviate the demand.

Social Resources

Having *social resources* where you know that you are not alone, was a key variable for most academics. Respondents spoke about having support from various sources. This included peer/social support, support from colleagues and supervisors and administrative support. This was summarized as follows:

> *"I think because we're such a small department, we're quite a close-knit group"* (P5, female, senior lecturer, Faculty of Community and Health Sciences).
> *"Okay, yes, generally it has been wonderful. Amazing actually. So my department supported me immensely"* (P16, male, senior lecturer, Faculty of Law)
> "*There are offices that one can go to now and get advice, like teaching and learning. You can consult and get help with how to structure your course, and how to develop a new curriculum, and how to use the online resources in the teaching. That helps a lot, because you know that you're not alone*" (P6, female, associate professor, Faculty of Natural Sciences).
> "*I think also with the opportunities that are provided by the different DVCs* [deputy vice chancellors]. *For example, the DVC of research when it comes to workshops and writing retreats, the Division of Postgraduate studies, organising all different workshops that are related to conducting research and otherwise, and also the availability of funding to apply for different projects*" (P12, male, lecturer, Faculty of Community and Health sciences)

Managers and supervisors should assist in instilling and upholding an encouraging workplace environment and practices as this influences an employee's job demands and resources (Van den Broeck et al., 2008; Alzyoud et al., 2015; Kotze, 2018). Theron et al. (2014) conducted a study which revealed that academic staff received adequate support from their managers but felt that more emphasis needed to be placed on aspects such as performance management and feedback needed for improvement (Lesenyeho et al., 2018).

Personal Resources

Personal resources were identified as state-like aspects of self that, in part, determine and influence individual's abilities to impact of control their environments (Xanthopoulou et al., 2009). Therefore, it is seen as personal or psychological resources orienting from the individual.

Autonomy

Most participants felt that they had a good measure of control when it came to managing their work. Decision-making freedom and autonomy was experiences were shared throughout interviews. Participants share:

> *"Surprisingly, I have been given quite a good level of control. I was allowed to pick my subjects, as in what I wanted to teach."* (P16, male, senior lecturer, Faculty of Law)
> *"There is a lot of freedom to change things, or to bring about new ideas." (*P11, female, lecturer, Faculty of Community and Health sciences)

Academic freedom matters and it matters a great deal (Nongxa, 2020). It has been noted that the level of autonomy and influence that academics have over their work, signifies a key element which directly impacts the level of job satisfaction (Bentley et al., 2013). In addition, it moderates the harmful effect of other factors, such as high work demands (Fredman and Doughney, 2012). Thus, when autonomy is applied with the right sense of duty and accountability, it will in all likelihood result in academics being able to excel in all relevant areas (Kori, 2016).

Another aspect where participants experienced autonomy was in the flexible work arrangements provided by the institution.

P23 indicated that having "*some level of flexibility*" provided opportunity to take time off to focus on research projects, which was summarized by P18 as a "*good opportunity for growth.*" Others relate:

> *"That helps because I live far from the Faculty so it's much easier for me just to do my research at home*" (P23, female, senior lecturer, Faculty of Law). *"I mean the fact that we can have almost flexible time is a very, very good attribute that I can attest to that we see over the years. Nobody is standing behind me and you have to clock in and clock out now"* (P18, male, lecturer, Faculty of Art and Humanities).

In previous studies, results have indicated that Flexible Working Arrangements (FWA's) prolong employment (Damman and Henkens, 2018), improve work functioning (Amick et al., 2017), and postpones retirement among older workers (Moen et al., 2017). Dropkin et al. (2016) also argues that FWA's provide more comfort (such as being able to work from home), autonomy (having less face-to-face managerial supervision), and control (being able to control one's work hours) and reduces the amount of stress experienced, increases job satisfaction, and improves work–life balance (Vanajan et al., 2019). Furthermore, Bayissa and Zewdie (2010) indicated that prospective growth and career development opportunities, such as being able to further ones education, having job security and job autonomy, are some of the major rewards available to academic staff in higher education institutions.

Meaningful Work

Participants mentioned that they found purpose and meaning in their work. Even though a vast majority indicated that they felt overburdened by their work load, they also indicated that they experienced their jobs as meaningful. Comments such as "*the role brings a level of satisfaction,*" "*wanting to give back to society,*" this being "*their purpose,*" finds the "*role rewarding*" were all phrases used throughout. It can thus be assumed that participants find a deep sense of meaning in the work they do. In more detail, participants shared:

> *"I get, in proportion to the frustrations of working at this institution, I get as much satisfaction from engagement with the students and being a part of their lives*" (P22, female, lecturer, Faculty of Arts and Humanities)
> *"My motivation is giving back to society"* (P10, male, snr lecturer, Faculty of Natural Sciences)
> *"Definitely making a difference. That's it, making a difference, and believing that this is what I was born to do"* (P20, female, lecturer, Faculty of Art and Humanities)

"*I love working with the students, and when you actually see that almost light bulb moment where the students say oh, I get it. This is what you have been speaking about. That is a very rewarding feeling*" (P13, female, lecturer, Faculty of Dentistry)
"And to make a difference because I have that at my disposal" (P21, female, lecturer, Faculty of Natural Sciences)

Even though HEI's are environments currently characterized by high levels of stress and pressure, research suggests that academic work is still seen, in most countries, as a job that brings about high levels of fulfillment (Bentley et al., 2013; Shin and Jung, 2014). This could be due to a number of reasons, including HEI's being workplaces that have positive social characteristics. This can be seen as critical determinants of an academic's level of job satisfaction. This includes aspects such as university atmosphere, sense of community, relationships with colleagues (Lacy and Sheehan, 1997), perceived quality of students (Bentley et al., 2013), effectiveness of administration and technical/administrative support (Rosser, 2004; Bentley et al., 2013), quality of academic leadership (Fredman and Doughney, 2012), or social reputation of academics in society (Shin and Jung, 2014).

Personal Support

Personal support was the final resource highlighted in the study. Chen and Fellenz (2020) found that individual's personal resources at home increased their personal resources at work. For example, participants indicated receiving a good level of support from their spouses. "*And my husband is also, I don't know if he counts as a resource but having his support helps me a lot*" (P23, female, senior lecturer, Faculty of Law)

This assisted in dealing with work stress as mentioned by P4.

"How I cope, I don't know. It's by the grace of God, and also maybe my husband is also helping in that way" (P4, female, lecturer, Economic and Management Science Faculty)

There was also having that "*understanding from family members*" when having to bring work home in addition to having a productive space and enough resources (such as "*internet, printer and a pc*") when working from home.

"Yes, for instance maybe if you are in the workspace, they give you that time to do your work. That is another way of support" (P10, male, senior lecturer, Faculty of Natural Sciences)
"*So I have resources at home that I need in terms of access to internet, computer, space at home to work*" (P17, female, senior lecturer, Faculty of Dentistry)

According to Sonnentag (2017), beneficial work environments in the form of job resources as well as beneficial personal resources is needed in order for work engagement to transpire. In addition, Bakker and Demerouti (2007) and Herbert (2011) have indicated that how the employee perceives and uses their personal resources, such as resilience and optimism and positive self-evaluation, will determine how they control their environment.

DISCUSSION

The aim of the research was to explore how academics make sense of the job demands and resources they encounter in the Higher Education environment. The JD-R model was used as theoretical framework to guide the exploration of what demands and resources exist in the academic environment.

From the results, it can be noted that elements such as having a heavy workload, work pressure and constant research demands resulted in academics feeling anxious and tired. Constantly having to work in such a demanding environment results in low levels of teacher-efficacy, low levels of work engagement and burnout (Han et al., 2020). Furthermore, having a lack of teaching resources impacts academics' work-life balance as most academics indicated that it became difficult to separate home and work responsibilities. Thus, institutions need to ensure that the retention and career fulfillment of academic staff (Ng'ethe et al., 2012), along with academic well-being, be made a priority (Janse van Rensburg et al., 2018).

As Leibowitz et al. (2017) show, teaching in a poorly resourced context with a large staff-student ratio of largely under-prepared undergraduate students creates different demands on academic staff members. As evident in the theme *complexity of student support*, academics in this South African university not only needed to focus on their teaching, but also on the socio-economic and psychological needs of students. Hence the need for academic development support programmes at universities is highlighted. However, the level of support and other resources have declined (Barkhuizen et al., 2014a). As such, academics draw on their personal resources, such as meaningful work and making a difference in the lives of students, to buffer the effect of the demands. The majority of the respondents found great meaning in their roles as academics. Moreover, their main reason for staying in academia was because they knew they were able to make a difference for students as well in a broader context i.e., communities.

Out of the 22 participants that was interviewed, the majority of the participants indicated that the demand experienced as most challenging is *publication pressure*. Second to this, participants indicated that being *overburdened with the load* was quite demanding. C*ompeting time demands*, as third highest ranked job demand, spoke directly to the amount of work pressure that was being felt by academics. Participants mentioned that a lot of their time was being spent on lectures/teaching, countless meetings in addition to consulting with or assisting students. Such high workloads and large intake of students are likely to lead to a decline in commitment and job insecurity (Theron and Dodd, 2011), as well as low levels of well-being. The fourth most prominent demand mentioned was *work-family life conflict*. This could have been a direct result of the pandemic COVID-19 lockdown and the move to remote working with resultant utilization of online and technology-mediated teaching technologies.

Although there are still many challenges to overcome, there were also positive elements identified from the interviews

conducted. Aspects such as autonomy, flexibility in ones work schedule and having the support of supervisors, colleagues, and peers appeared to make quite a difference.

The JD-R model proposes that the interaction between job demands and job resources is important for developing motivational processes leading to work engagement and well-being, as well as depletion processes of job strain that lead to burnout (Bakker et al., 2014). As we did not ask participants about the interaction of their job demands and resources, it is not clear how they made sense of this interaction. However, job resources particularly influences engagement and well-being when job demands, such as publication pressure and work overload are high. In line with the Conservation of Resources theory by Hobfall (1989), resource gain becomes more salient in contexts of resource loss. As one example gleaned from the across the interviews attest, publication pressure was buffered by participants' acknowledgment that they have complete autonomy in deciding what they want to research. Our interpretation of the interaction of job demands and resources of academics are purely speculative, however, there is reason to believe that personal resources of those who choose to be academics could be used in creative ways to buffer inescapable work demands.

Limitations and Recommendations

The present study was not without limitations. It is important to emphasize that the findings of this study were related to academic employees in a Higher Education Institution in South Africa, and it cannot be assumed that the results would be applicable to all other settings and other Higher Education Institutions. Another possible limitation is that participants may have felt hesitant to share certain information considering the sensitive nature of the topic being discussed. However, the interviewer felt contented that an acceptable level of care was in place to ensure that open and honest feedback was shared by participants.

For future research, it is recommended that a longitudinal study exploring job demands and job resources from the perspective of academics be identified over a period of time. This could add to a better understanding of changes taking place within the Higher Education Sector. It is also suggested that future research concentrates on discovering ways in which higher education institutions can provide support to employees to assist them in better dealing with the demands experienced, and provide employees with training on how to better manage their resources to enable them in dealing with challenges faced in work and life. This could include training to empower employees with skills to effectively raise concerns around demands being experienced in the workplace, and help employees to explore alternative ways of achieving the desired results through open and candid dialogue or job crafting interventions (Van Wingerden, 2016). A further recommendation is to explore areas of positive deviance. This could involve investigating areas in other sectors where there is a lower incidence of employees being at risk of burnout and exploring the factors present in the environment that could contribute toward this outcome, for example, increased work engagement (Alzyoud, 2016; Gauche et al., 2017).

CONCLUSION

The present study provided insight into how academic employees make sense of the demands and resources in their job roles. Mention was made of how demands cause strain and stress, whereas resources was linked to the meaningfulness of the job. Research has progressively demonstrated that not considering the proper management of job demands and resources of one's workforce as a key element, can result in negative setbacks (Dhanpat et al., 2019).

By understanding the lived experiences of academics, leaders and human resource departments in HEI's could consider suitable interventions to alleviate job demands and implementing methods in which to structure work in order to increase resources at academics' disposal (Van Wingerden, 2016; Bakker and Demerouti, 2018).

Higher Education Institutions and key stakeholders should therefore be encouraged to reflect on the findings of the current study to ensure that the most appropriate method in which to offer ongoing support to their employees is considered.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Human and Social Science Research Ethics Committee of the University of the Western Cape. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Performance Pressure as an Antecedent and Authentic Leadership as a Moderator of the Relationship Between Co-worker Undermining and Psychological Capital

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As a component of organizational aggression, co-worker undermining erodes the well-being of the victims and the sustainability of the organization. Drawing on conservation of resources theory, this study identified the negative impact of co-worker undermining on the victim's psychological capital, and empirically examined the influence of performance pressure as an antecedent and of authentic leadership as a moderator to suggest approaches to minimize this negative impact. A total of 485 subordinate employees from 10 organizations in South Korea completed a questionnaire survey. To prevent common method bias, the survey was designed to recruit participants from multiple organizations and was conducted in two waves. First, the results revealed that performance pressure had a positive relationship with the perception of co-worker's undermining. Second, this perception of co-worker undermining had a negative influence on the victim's psychological capital. Third, authentic leadership had the moderating effect of decreasing the negative relationship between co-worker undermining and psychological capital. Furthermore, authentic leadership moderated the mediating relationship between the performance pressure and psychological capital through co-worker's undermining. These findings suggest that the level of performance pressure should be managed in advance so as not to reach excessive levels and the psychological capital of victims should be preserved through authentic leadership to minimize the negative impact of co-worker undermining.

Keywords: performance pressure, co-worker undermining, psychological capital, authentic leadership, conservation of resources theory

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INTRODUCTION

Social undermining has recently received attention as one form of organizational aggression that victimizes employees (Duffy et al., 2002). In particular, co-worker undermining may not only pose a psychological and physical threat to the victim (Aquino and Thau, 2009), but may also lead to serious conflicts within the organization, hindering its sustainability.

Many studies have been conducted to date on the negative consequences of co-worker undermining, but there is relatively little research on the antecedents of undermining. The role of leaders will likely be critical in minimizing the negative impact on victims in cases of co-worker undermining. However, few studies have analyzed what leadership styles can help alleviate the negative influence of co-worker undermining. Therefore, this study was conducted from the perspective of a sustainable workplace to provide data to facilitate pre-controlling and post-managing the negative effects of co-worker undermining.

There may be several predictors of victimization due to co-worker undermining, such as personality or other traits of the individual, but studies on organizational stressors are needed to elucidate the collective and implicit causes of co-worker undermining in the organization. In particular, performance pressure is a stressor caused by excessive task demands from the organization or supervisor, which leads employees to experience intense internal pressure (Mitchell et al., 2018) and strain (Lazarus and Folkman, 1984). Although performance pressure occurs frequently in most organizations, there has been little research on it, as opposed to other stressors. Moreover, no study has hitherto assessed whether employees who experience performance pressure may engage in negative interactions with their co-workers rather than with the organization or with supervisors. Therefore, this study empirically investigates whether performance pressure as an antecedent has significant influence on co-worker undermining.

Second, organizational aggression is known to cause negative emotions and attitudes in victims and degrade a victim's well-being. It has been argued that this aggression damages the positive psychological resources of that employee (Martinko et al., 2013). To demonstrate this relationship, this study empirically examines the relationship between co-worker undermining and psychological capital (henceforth, "PsyCap") of the victim. PsyCap refers to an individual's positive psychological state, which acts as a personal resource that can predict the attitudes and behaviors expressed in stressful situations within an organization (Schaufeli and Bakker, 2004; Crawford et al., 2010; Christian et al., 2011). However, there are few studies on the relationship between negative organizational interactions and the victims' PsyCap (Karatepe and Talebzadeh, 2016; Wu and Parker, 2016). Therefore, the current study focuses on co-worker undermining and empirically characterizes its relationship with victims' PsyCap.

Third, this study draws on conservation of resources theory (Hobfoll, 1989; Halbesleben et al., 2014) to hypothesize that a victim's lost PsyCap because of co-worker undermining could be regained by a positive leadership style. In particular, we focus on authentic leadership as one such positive leadership style (Luthans and Avolio, 2003; Avolio and Gardner, 2005; Walumbwa et al., 2007). Authentic leadership is a leadership style that can promote organizational performance and desirable organizational behaviors from employees based on authenticity. However, the effectiveness of this authentic leadership remains unclear, despite the positive reported aspects (Walumbwa et al., 2010, 2011). Therefore, additional research on specific factors of contextual difference is needed (Cooper et al., 2005; Yammarino et al., 2008) as are more empirical studies in diverse organizational context settings (Gardner et al., 2011; Petersen and Youssef-Morgan, 2018). Further, there exists an urgent need to study whether authentic leadership influences negative organizational situations.

Because the study assesses whether authentic leadership moderates the negative situation in which co-worker's undermining lessens the PsyCap of the victim, its findings can contribute to more precisely establishing the role of authentic leadership in leadership theory.

In summary, this study investigates the influence of performance pressure as one of the antecedents of co-worker undermining. As a consequence of co-worker undermining, we examine the negative influence of undermining the PsyCap of the victim. In addition, we empirically investigate whether authentic leadership could decrease the negative impact of co-worker undermining on the PsyCap of the victim. We aim to elucidate implications that leaders could use to improve the sustainability of their organizations and employees by controlling the level of excessive performance demand and minimizing the negative impact of co-worker undermining through authentic leadership.

THEORY AND HYPOTHESES DEVELOPMENT

Performance Pressure and Co-worker Undermining

Pressure is generally defined as any factor or combination of factors that increases the importance of performing well (Baumeister, 1984). Most organizations demand high performance from their employees (DeZoort et al., 2006), and such performance pressures put employees under stress to enhance their performance. In this way, employees potentially experience disadvantages if they fail to achieve the required performance level (Gutnick et al., 2012). Therefore, high performance pressure can lead employees to form negative emotions, attitudes, and behaviors, which degrade their well-being (Mitchell et al., 2018).

The stronger the performance pressure, the more employees need to justify their performance. According to social comparison theory, people continually evaluate their own traits or performance, but if they cannot find an objective basis for evaluation, they compare themselves to others around them (Festinger, 1954). Thus, employees under performance pressure try to evaluate their performance against their co-workers. When a performance discrepancy is recognized, namely that their performance is (or will be) worse than that of their co-workers, negative emotions, such as anxiety and envy are engendered. To relieve this stress, employees under performance pressure try to improve their performance. However, if they believe the scope for performance improvement is limited, they can be tempted to undermine the performance of their co-workers. In particular, forced distribution rating systems, currently in common use, tend to cause excessive internal competition and such performance pressure is more likely to trigger undermining of co-worker's.

Therefore, when performance pressure is severe, there may be increased co-worker undermining behavior in real-world

organizations, and under performance pressure, employees may also feel victimized through co-workers' undermining. Accordingly, the following hypothesis was proposed:

Hypothesis 1: Performance pressure is positively associated with co-worker undermining.

Co-worker Undermining and PsyCap

Social undermining is one type of negative interaction that can occur within an organization (Aquino and Thau, 2009). It refers to behaviors intended to hinder a target person from creating and maintaining positive interpersonal relationships, achieving success at work, or maintaining a good reputation (Duffy et al., 2002). The two types of social undermining in business organizations are undermining by supervisors and by co-workers; however, the latter is more likely to occur due to performance pressure than the former, which requires additional performance.

By contrast, PsyCap is a positive psychological resource that consists of four sub dimensions: hope, resilience, self-efficacy, and optimism. This resource operates as an important source of internal motivation and is known to elicit desirable attitudes and behaviors among employees. Several studies have shown that PsyCap has a positive relationship with attitude to work (Avey et al., 2010) and job performance (Luthans et al., 2007; Peterson et al., 2012).

The perception of victimization due to the aggression of co-workers is likely to have a negative impact on the PsyCap of the victim. If the victim recognizes that co-worker's undermining will diminish their chance of success in work and interpersonal relationships, the victim's hope, resilience, self-efficacy, and optimism will decrease. This decline in PsyCap ultimately has a negative impact on the victim's job performance and attitude. Accordingly, the following hypothesis was proposed:

Hypothesis 2: Co-worker's undermining is negatively associated with the subsequent PsyCap.

Moderating Role of Authentic Leadership in the Relationship Between Performance Pressure and Co-worker Undermining

There are several studies on the relationship between leadership style and the perception of victimization by subordinates. The perception of victimization by subordinates tends to increase among leaders who are bureaucratic (Ashforth, 1997) or authoritarian (Coyne et al., 2003), those who do not share sufficient information with subordinates (Agervold and Mikkelsen, 2004), those who fail to resolve conflicts within their organizations (Hallberg and Strandmark, 2006), and laissez-faire leaders (Skogstad et al., 2007). Conversely, leaders with positive and open leadership styles may be able to decrease the perception of victimization following organizational aggression such as co-worker undermining.

Authentic leadership is a representative positive leadership style defined by four dimensions: self-awareness, internalized moral perspective, balanced processing of information, and relational transparency (Walumbwa et al., 2007). Authentic leaders make moral judgments based on their beliefs, regardless of social pressures (Taylor, 1992; Guignon, 2004), and reveal the relational characteristic of open communication with their subordinates (Walumbwa et al., 2007, 2011). Based on these characteristics, authentic leadership helps increase employees' PsyCap (Avey et al., 2010).

The role of authentic leadership as a moderator of the negative relationship between co-worker undermining and the PsyCap of the victim can be explained by conservation of resources theory. The theory posits that individuals essentially pursue situations in which resources are sufficient and avoid situations in which resources can be lost (Hobfoll, 2001). As previously mentioned, the victim of co-worker undermining experiences severe stress. Cobb (1976) argued that the perception of social support by providing socio-emotional resources can be a moderating variable in such stressful situations. The behavior of the leader can be interpreted to correspond to that of the organization (Kang, 2019), leading employees to perceive that these direct supervisor actions are a form of social support in the organizational context (Eisenberger et al., 2002; Stinglhamber and Vandenberghe, 2003). Moreover, authentic leadership provides confidence in achieving the organization's goal by the leader demonstrating their best ability, and encourages expectations and hopes for the future through transparent and fair communication (Bouckenooghe et al., 2014). Thus, the four positive dimensions of authentic leadership promote subordinates to form the positive PsyCap needed (Gardner et al., 2005).

Therefore, similar to social support, authentic leadership can act as a moderating variable that replenishes the PsyCap of victims lost owing to co-worker undermining. Although co-worker undermining leads to decreased PsyCap, the employees who perceive a high level of authentic leadership receive sufficient socio-emotional resources from the authentic leader such that the loss of PsyCap owing to co-worker undermining is relatively small. By contrast, employees who perceive a low level of authentic leadership will have an insufficient capability to cope with the stress caused by co-worker undermining. Therefore, authentic leadership will have the moderating effect of decreasing the strength of the negative relationship between co-worker undermining and PsyCap, thereby leading to the following hypothesis:

Hypothesis 3: Authentic leadership moderates the relationship between co-worker undermining and the victim's PsyCap, such that the association will be weaker when authentic leadership is high (versus low).

Moderated Mediation Model Role of Authentic Leadership

With reference to the previously proposed hypothesis, this can be considered to be a moderated mediation model. Excessive performance pressure increases the perception of co-worker's undermining and accordingly the victim's PsyCap will be decreased. The perception of authentic leadership can moderate this indirect effect where performance pressure negatively affects PsyCap through co-worker's undermining. In detail,

the higher the level of their leader's authentic leadership hat employees perceive, the more the negative effects of performance pressure on their PsyCap through co-worker's undermining will be alleviated.

In other words, the indirect effect of performance pressure on PsyCap through co-worker's undermining may vary depending on the perceived level of authentic leadership. Specifically, the perceived level of authentic leadership can moderate the influence of performance pressure on PsyCap which is mediated by co-worker's undermining. Thus, the following hypothesis is established:

> ***Hypothesis 4:*** The perceived level of authentic leadership will moderate the mediating relationship between the performance pressure and PsyCap through co-worker's undermining. This conditional indirect effect will be shown when the perceived level of authentic leadership is higher.

According to the above hypotheses, the research model was established, as shown in **Figure 1**.

MATERIALS AND METHODS

Sample and Data Collection

To test our hypotheses, 485 employees who work at various companies in South Korea responded to an online survey. That is, to address potential sampling bias, data were collected using random sampling at two different time points. In this way, the limitations of cross-sectional research were addressed. Participants had the opportunity to complete the online survey during a 4-week period. Through this research design, we reduced concerns regarding common method bias (MacKenzie and Podsakoff, 2012). Specifically, 688 workers participated in our survey at the first time point and 490 employees at the second. Data from 485 responses were used in the final analysis. The characteristics of the sample are presented in **Table 1**.

Measures

The questionnaire used a five-point Likert scale, and the questionnaires originally constructed in English were translated into the Korean language (all questionnaire items used for the survey are provided in Appendix). We used a standard translation and back-translation procedure (Brislin, 1980) to ensure the reliability and validity of the research tool.

Performance Pressure

We measured employees' perceptions of performance pressure using Mitchell et al.'s (2018) four-item scale. A sample item is "*The pressures for performance in my workplace are high.*" The resulting Cronbach's α was 0.94.

Co-worker Undermining

We measured employees' perceptions of co-worker's undermining using Duffy et al.'s (2006) seven-item scale. A sample item is "*How often group members criticized them in front of other members/didn't listen to them?*" The resulting Cronbach's α was 0.97.

PsyCap

We measured employees' perceptions of PsyCap using Luthans et al.'s (2007) 12-item scale. A sample item is "*I feel confident in representing my work area in meetings with management.*" The resulting Cronbach's α was 0.92.

Authentic Leadership

We measured employees' perceptions of authentic leadership using Walumbwa et al.'s (2007) ALQ 16-item scale. A sample item is "*My leader encourages everyone to speak their mind.*" The resulting Cronbach's α was 0.96.

Control Variables

We included gender, age, education level of employees, status, and tenure as control variables because they may affect employee attitudes toward the organization (Tsui et al., 1992). Additionally, Woolley et al. (2011) found that gender could moderate the relationship between authentic leadership and positive organizational climate. The gender response option of "male" was coded as 0 and "female" as 1. Age, status, and tenure are likely to represent increased seniority over time, and knowledge or experience related to duties can affect members' behavior when carrying out tasks (Wu and Parker, 2016). Age and tenure were measured in years. For status, the responses included "under assistant," coded as 1; "under manager," coded as 2; "under department manager," coded as 3; and "over executive," coded as 4. All control variables were collected at time point two.

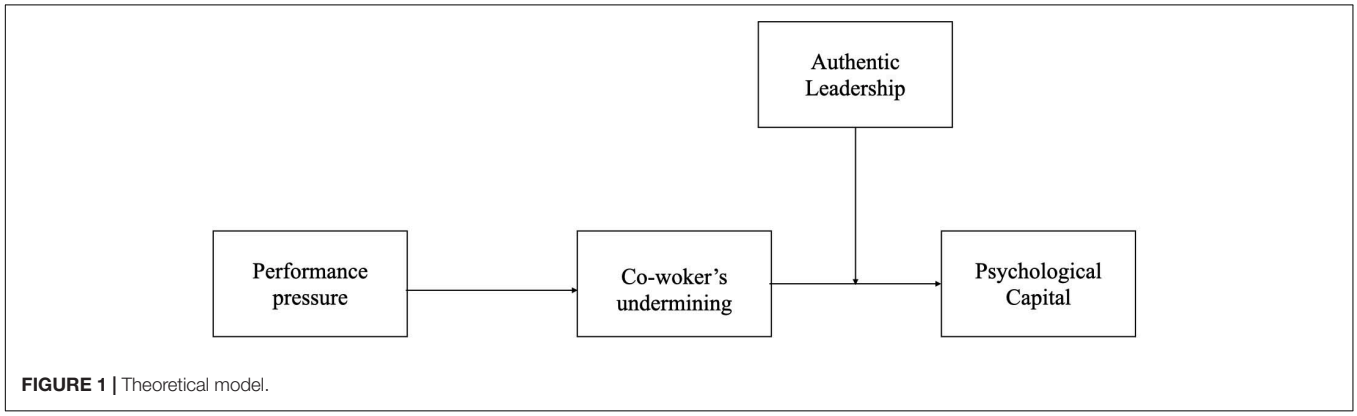

FIGURE 1 | Theoretical model.

TABLE 1 | Descriptive characteristics of the sample.

Characteristic	Frequency	Percent
Gender		
* Male	247	50.9%
* Female	238	49.1%
Age (years)		
* 20–29	92	18.9%
* 30–39	215	44.3%
* 40–49	135	27.9%
* 50–59	43	8.9%
Tenure (years)		
* 1–4	249	51.4%
* 5–9	128	26.4%
* 10–14	66	13.5%
* over 15	42	8.7%
Job level (rank)		
* Assistant	254	52.3%
* Manager	109	22.5%
* Department Manager	54	20.6%
* Executive	22	4.5%

Statistical Analysis

All statistical analyses were performed using STATA 16.1. Before testing the hypotheses, we conducted a series of confirmatory factor analyses (CFAs) to examine the construct validities of the variables. To evaluate whether the model fit was acceptable, several goodness-of-fit indices were considered: comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). According to previous studies (Browne and Cudeck, 1992), to consider a model adequate, CFI and TLI should be greater than 0.90 and RMSEA below 0.06. Ordinary least-squares regression-based analysis was used to examine the direct and interaction effects. To examine the moderating effect, we mean centered the values of the independent variable and moderator and then created interaction terms using the centered variables. We also calculated the variance inflation factor (VIF) scores; the VIF scores of all variables were below 10 (Chatterjee et al., 2006).

RESULTS

Descriptive Statistics

The means, standard deviations, and correlations of the variables are summarized in **Table 2**. There were significant correlations between performance pressure and each co-worker undermining and PsyCap. Co-worker undermining had a negative significant correlation with PsyCap but was not significantly correlated with authentic leadership. PsyCap was positively correlated with authentic leadership.

Measurement Model

Table 3 presents the measurement model fit indices for the study variables. As previously mentioned, we conducted CFA using STATA 16.1 to examine the construct validities of the variables. As shown in **Table 3**, the fit indices supported that the hypothesized four-factor model of performance pressure, co-worker undermining, PsyCap, and authentic leadership ($\chi^2 = 2091.73$, $df = 685$; RMSEA = 0.06; CFI = 0.91, TLI = 0.90) yielded a better fit to the data than the three-, two-, and one-factor models. These CFA results confirm the distinctiveness of the four study variables for subsequent analyses.

Hypothesis Testing

Hypothesis 1 posited that the perceptions of performance pressure would be positively associated with co-worker undermining. As shown in Model 2(Co-U) of **Table 4**, we found that the perceptions of performance pressure were significantly and positively related to co-worker undermining ($\beta = 4.32$, $p < 0.001$). Therefore, Hypothesis 1 was supported.

Hypothesis 2 proposed that co-worker undermining would be negatively related to their PsyCap. As shown in Model 2 (PsyCap) of **Table 4**, we found that the perceptions of co-worker undermining were significantly and negatively related to their PsyCap ($\beta = -4.01$, $p < 0.001$). Therefore, Hypothesis 2 was also supported.

To test the moderating role of authentic leadership on the relationship between co-worker undermining and PsyCap (Hypothesis 3), we conducted hierarchical multiple regression analysis, as shown in **Table 5**. The interaction term (co-worker undermining × authentic leadership) was significant ($\beta = 4.05$,

TABLE 2 | Means, standard deviations, correlations, and reliabilities.

Variable	Mean	SD	1	2	3	4	5	6	7	8
(1) Gender	1.49	0.50	1							
(2) Age	37.46	8.37	−0.34**	1						
(3) Job level	2.64	1.46	−0.40**	0.66**	1					
(4) Tenure	2.73	1.17	−0.21**	0.45**	0.41**	1				
(5) PP	3.02	0.94	−0.09*	0.12**	0.21**	0.10*	(0.94)			
(6) Co-U	3.47	0.65	−0.14**	0.01	−0.01	−0.04	0.18**	(0.97)		
(7) PsyCap	1.77	0.94	−0.12*	0.32**	0.36**	0.19**	0.18**	−0.17**	(0.92)	
(8) AL	3.28	0.78	−0.01	0.08	0.10*	0.050	0.02	−0.06	0.43**	(0.96)

*N = 485. *p < 0.05, **p < 0.01. () is a Cronbach's alpha's coefficient. PP = Performance Pressure, Co-U = Co-worker Undermining, AL = Authentic Leadership, PsyCap = Psychological Capital.*

TABLE 3 | Chi-square difference tests and fit statistics for alternative measurement models.

Model	χ2	*df*	RMSEA	CFI	TLI	Δ*df*	Δχ2
4-Factor model [a]	2091.73***	685	0.06	0.91	0.90	-	-
3-Factor model[b]	4418.22***	691	0.11	0.76	0.74	6	2325.49***
2-Factor model [c]	6218.55***	701	0.13	0.68	0.66	10	1800.33***
1-Factor model [d]	11194.04***	702	0.18	0.39	0.35	1	4975.49***

*N = 485. ***p < 0.001. RMSEA = Root Mean Square Error of Approximation, CFI = Comparative Fit Index, TLI = Tucker-Lewis Index. PP = Performance Pressure Co-U = Co-worker Undermining, AL = Authentic Leadership, PsyCap = Psychological Capital.*
[a] 4-Factor model = hypothesized model.
[b] 3-Factor model = AL and PsyCap merged.
[c] 2-Factor model = AL, PsyCap and PP merged.
[d] 1-Factor model = all variables merged.

$p < 0.001$), as indicated in **Table 5**, Model 3. Accordingly, Hypothesis 3 was also supported.

This modulating effect of authentic leadership is shown in **Figure 2**, which illustrates that, although co-worker undermining and PsyCap are negatively related, employees who perceived greater authentic leadership tended to exhibit a smaller decrease in PsyCap than those who perceived lower levels of authentic leadership; that is, authentic leadership reduced the negative impact of co-worker undermining on PsyCap.

We also conducted a simple slopes test for the significant interaction. As predicted, the significance of the indices for high authentic leadership (β = −0.44, n.s) and low authentic leadership (β = −5.60, $p < 0.001$) supported Hypothesis 3.

Even though we identified the moderating effect by validation of the significance of the interaction terms by moderated multiple regression, we conducted additional testing utilizing the process macro model 1 suggested by Hayes (2017). We implemented 5,000 boot strapping sessions in addition, all variables were mean-centered.

The results of bootstrapping showed that the change in R^2 according to the addition of interaction terms between co-worker's undermining and authentic leadership was 0.01 ($p < 0.01$), which is statistically significant. The coefficient of the interactional terms was 0.11 (LLCI = 0.04, ULCI = 0.18), since zero is not included between LLCI and ULCI, the moderating effect of authentic leadership on the relationship between co-worker's undermining and PsyCap was supported. Therefore, the significance of the moderating effect of authentic leadership has been re-verified.

To validate the moderating mediation model of Hypothesis 4, we utilized the conditional indirect effect analysis method suggested by Preacher et al. (2007) using model 14 of the process. And to verify the significance of each indirect effect depending on the perceived level of authentic leadership, 5,000 boot strapping sessions were performed. In addition, all variables were mean-centered for this analysis, and the results are shown as follows in **Table 6**.

Whether the moderated mediation effect is significant can be verified by testing the index of moderated mediation (Hayes, 2015). For moderated mediation effect verification, we performed a bootstrapping using mean ± standard deviation (M ± SD) to verify coefficient and statistical significance testing of indirect effects based on conditional values of authentic leadership. The moderated mediation effect of the average level of authentic leadership is −0.14, the effect of the group of the low level of authentic leadership perception (M-1 SD) is −0.22, and the effect of the group of high authentic leadership perception (M+1 SD) was −0.05. Therefore, as the level of authentic leadership perception increases, the effect of moderated mediation increases.

In particular, zero was not included between LLCI and ULCI in the groups with low authentic leadership perception (M-1 SD) and mean (M), but it was revealed that the effect was not significant in the groups with high authentic leadership perception (M+1 SD). Therefore, it is confirmed that authentic leadership perceived by employees moderates the mediation effect of the performance pressure on PsyCap through co-worker's undermining and is regulated by the level of awareness of authentic leadership.

TABLE 4 | Results of regressions testing Hypothesis 1 and Hypothesis 2.

Variable	Co-U		PsyCap	
	Model 1	Model 2	Model 1	Model 2
Gender	−3.60***	−3.62***	0.96	0.31
Age	0.37	0.54	2.63**	2.74**
Job level	−1.04	−1.77	4.47***	4.35***
Tenure	−1.37	−1.51	0.62	0.38
PP		4.32***		-
Co-U		-		−4.01***
R^2	0.03	0.20	0.15	0.17
ΔR^2	0.02	0.19	0.14	0.16
F	3.70**	6.80***	20.58***	20.19***

*n = 485, **p < 001, ***p < 0.001. Entries are standardized regression coefficients. PP = Performance pressure, Co-U = Co-worker undermining, AL = Authentic leadership, PsyCap = Psychological capital.*

DISCUSSION

Co-worker undermining can damage sustainability of organizations and their employees. This study identified an antecedent and moderator that minimize the effect of organizational co-worker undermining. The results of this study can be summarized as follows. First, the study empirically

TABLE 5 | Results of hierarchical multiple regression testing Hypothesis 3.

Variables	PsyCap		
	Model 1	**Model 2**	**Model 3**
Gender	0.31	−0.02	0.25
Age	2.74**	2.73**	3.09**
Job level	4.35***	4.13***	4.25
Tenure	0.38	0.38	0.24
Co-U (A)	−4.01***	−3.82***	−4.82***
AL (B)		10.18***	1.39
A x B			4.05***
R^2	0.17	0.32	0.34
ΔR^2	0.17	0.31	0.33
F	20.19***	37.70***	35.70***

*n = 485, **p < 001, ***p < 0.001. Entries are standardized regression coefficients. PP = Performance pressure, Co-U = Co-worker undermining, AL = Authentic leadership, PsyCap = Psychological capital.*

demonstrated that excessive organizational performance pressure can lead to the negative action of undermining among employees.

Second, the perception of co-worker undermining reduced the PsyCap of the victimized employee. That is, the victim of co-worker undermining has less confidence in their ability, less hope and optimism that they can achieve the desired results, and less resilience to the stress experienced in the process of achieving the required performance level.

Third, if the employee perceives that the supervisor's leadership is authentic, the loss of an employee's PsyCap from co-worker undermining can be reduced. That is, authentic leadership is effective in the negative organizational context of co-worker undermining. To summarize, co-worker undermining has negative effects on a victim's PsyCap; as such, excessive performance pressure should be controlled so that it does not cause co-worker undermining and leaders should exercise authentic leadership to minimize any negative influence of undermining.

The results of this study have the following theoretical and practical implications. First, this study focused on co-worker undermining as a form of organizational aggression and suggested two directions to reduce its negative impact. We considered performance pressure as an antecedent and empirically examined its relationship with co-worker undermining, which has not been studied to date. In particular, this study broadens the scope for further research by presenting both the organizational cause of intensive internal competition, namely performance pressures, and the psychological cause of victimization, namely stress from the possibility of failing to meet goals. These findings also have useful practical implications for organizations. Specifically, performance pressure may have the positive effect of improving short-term performance but a negative influence as well (Gardner, 2012), namely causing stress among employees, negative attitudes and behaviors of employees toward the organization or leader, as well as negative interactions among co-workers. Therefore, even if some degree of performance pressure is inevitable in organizations, it is necessary to ensure that it is not excessive.

Second, this study demonstrated empirically for the first time that co-worker undermining consumes the PsyCap of victims. This is consistent with Cassidy et al. (2014), who investigated the relationship between bullying, which is a similar form of organizational aggression, and PsyCap. This is further related to Duffy et al.'s (2006) argument that an individual who is socially undermined tends to perceive him- or herself as a victim of interpersonal injustice in the organization. By being undermined by co-workers within the same organization, the victim feels that they have experienced discrimination by the organization or supervisor (Tepper, 2000; Duffy et al., 2002), this stress eventually negatively affects their positive PsyCap. These findings show

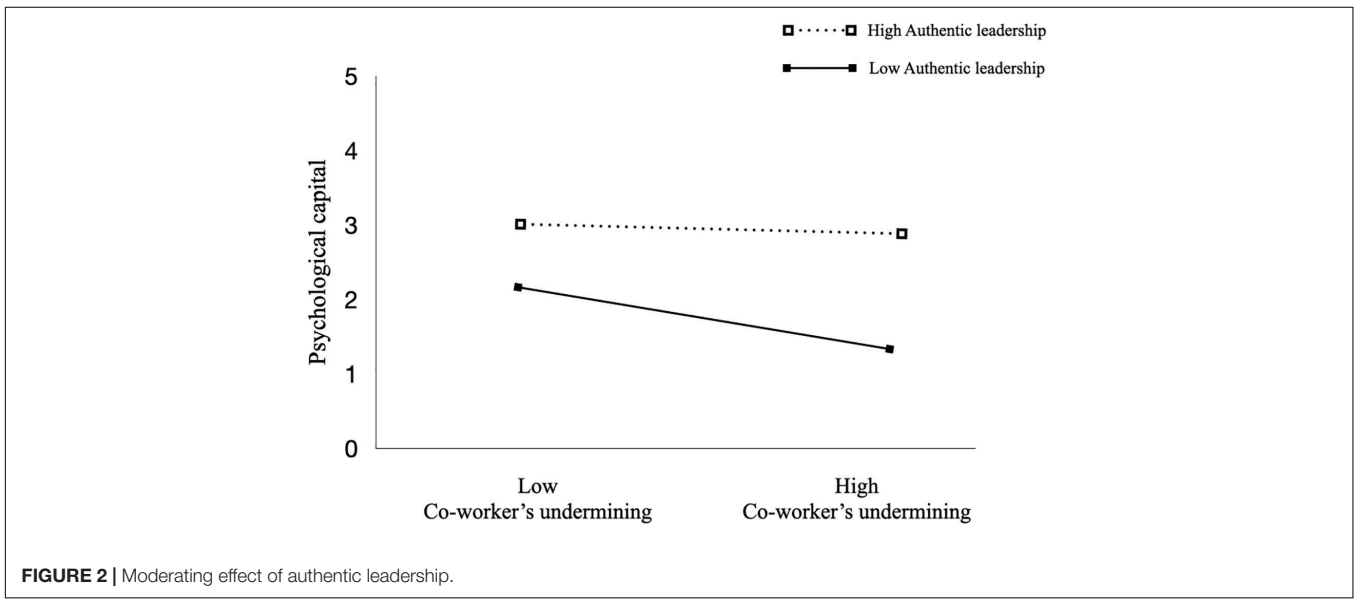

FIGURE 2 | Moderating effect of authentic leadership.

TABLE 6 | Conditional effect of Authentic leadership according to co-worker undermining and PsyCap.

Moderato r	Effect	Standard error	*p*-value	LLCI*	ULCI**
M-1SD (2.49)	−0.22	0.04	0.00	−0.31	−0.14
M (3.27)	−0.14	0.02	0.00	−0.19	−0.08
M+1SD (4.06)	−0.05	0.03	0.09	−0.12	0.01

*n = 485, *LLCI = The lower limit in the 95% confidence section of the boot indirect effect; **ULCI = Upper limit within 95% confidence section of boot indirect effect.*

that organizations and leaders should maintain an equal level of exchange with all employees and try to resolve peer conflicts proactively to maintain a high level of positive PsyCap among employees.

Third, based on conservation of resources theory, we revealed that authentic leadership has a moderating effect that replenishes an employee's PsyCap that was reduced by co-worker undermining. This is consistent with Cobb's (1976) argument that the perception of social support can be the moderating variable in a stressful situation. Further, Salas Vallina et al. (2019) argued that leadership is a key contributor to individual ambidexterity, acting as the mechanism that balances the development of new knowledge and effective performance in clinical practice. Moreover, in situations in which the effectiveness of authentic leadership is questioned, its moderating effect, demonstrated in this study, will help to reinforce the theoretical basis of authentic leadership. Further, these results will also help rediscover the importance of the leaders' roles in the context of negative interactions within the organization, especially the need for authentic leadership. In other words, if a leader honestly and authentically communicates with subordinates and shares detailed information fairly, an organizational climate of mutual cooperation will be created rather than competition or mutual antagonization. This climate will boost PsyCap, which drives future performance, even if there is undermining or conflict among co-workers. Therefore, in situations where negative interactions within the organization occur, leaders should be encouraged to exercise a higher level of authentic leadership.

In real world organizations, the most common pressure is a requirement for performance above a target level in a limited time period. Authentic leaders interact with their employees based on influence and encourage voluntary performative and desirable behaviors by role modeling. This process of role modeling takes considerable time and can conflict with the organization's short-term performance pressures, resulting in a dilemma for authentic leaders. Therefore, leaders must manage a balance between the organization's short-term performance needs and the development of employees, as argued by Salas Vallina et al. (2019).

Limitations and Future Research

Despite the theoretical and practical implications, this study has some limitations. First, the data used in this study were all collected from the same respondents by self-report questionnaire, and there is concern about the common method bias. In order to prevent common method bias in research design, a longitudinal survey (2 times) was organized and conducted. The survey responses utilized in this study were collected from the same respondent twice with a time lag of 1 month. Nevertheless, we further conducted a single factor analysis suggested by Podsakoff et al. (2003) to verify whether Harman's single factor test common method bias can be issued.

This test indicates that when all variables are inputted into the factor analysis at once, and the non-rotating factor analysis results are either aggregated as single factor or a single factor describes most of the covariances between the variables, then common method bias would occur. As results of the test, it is shown that a total of five factors were classified from factor analysis, and the single factor with the highest explanatory power is 26.14% of the total covariance. Therefore, common method bias can be considered not to be serious.

Second, our study only considered performance pressure. However, other antecedents may also cause co-worker undermining; these remain to be discovered and examined. Co-worker undermining is an organizational aggression that is often exposed to a superficial extent, but nevertheless affects the attitudes and behaviors of other employees negatively, while disrupting the cooperation within the organization and thereby hindering organization performance. To create sustainable organization performance, it would be desirable to identify the causes of negative behaviors and prepare solutions in advance, rather than reacting ex post facto. Therefore, similar studies need to be conducted on other challenging stressors, such as time pressure or role ambiguity, which can also appear while pursuing additional performance.

Third, effective leadership has a positive impact on the attitudes, behaviors, and performance of employees, and many studies have revealed that authentic leadership also has a positive relationship with work engagement (Walumbwa et al., 2010), OCB and job performance (Peterson et al., 2012). Although the current study investigated the effectiveness of authentic leadership as a moderator of the relationship between the perception of co-worker's undermining and PsyCap, further studies are required because other moderators, such as negative social trends or proactive personality, could have different effects in diverse contexts. In particular, team-level study of authentic leadership and its influence is requested in the future, as it can give different implications from dyad-level research. Fourth, authentic leadership shares characteristics in common with other positive leadership styles, such as transformational or ethical leadership. In particular, these styles are exemplified by moral, ethical managers, and show characteristics of idealized influence in transformational leadership. However, despite these common characteristics, ethical and transformational leadership differ in that they exert not only indirect influence but also direct influence on their subordinates, while authentic leaders primarily exert indirect influence by role modeling. Therefore, it would be of interest for future studies to assess whether other positive

leadership styles, such as transformational and ethical leadership, have the same moderating effect to alleviate the negative relationship between co-worker's undermining and PsyCap.

Another limitation relates to the control variables in this study: only gender, age, status, and tenure were used as control variables. In future studies, educational background, employment type, job, and industry will need to be added as control variables to verify whether the analyzed relationships differ with respect to each control variable.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

EJ did the conceptualization, performed the methodology and software, validated and investigated the data, carried out the formal analysis, resources, and data curation, wrote the original draft, wrote, reviewed, and edited the manuscript, and visualized the data. HK supervised the data and carried out the project administration and funding acquisition. Both authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

APPENDIX

Performance pressure (α = **0.94**) **Mitchell et al. (2018)**
(1) The pressures for performance in my workplace are high.
(2) I feel tremendous pressure to produce results.
(3) If I don't produce at high levels, my job will be at risk.
(4) I would characterize my workplace as a results-driven environment.

Co-worker undermining (α = **0.97**) **Duffy et al. (2006)**
(1) How often intentionally ignored them.
(2) How often gave them the silent treatment.
(3) How often went back on their word.
(4) How often look bad or slow you down.
(5) How often belittled them or their ideas.
(6) How often talked down to them.
(7) How often didn't listen to them.

Psychological capital (α = **0.92**) **Luthans et al. (2007)**
(1) I feel confident in representing my work area in meetings with management.
(2) I feel confident contributing to discussions about the organization's strategy.
(3) I feel confident presenting information to a group of colleagues.
(4). If I should find myself in a jam at work, I could think of many ways to get out of it.
(5) Right now, I see myself as being pretty successful at work.
(6) I can think of many ways to reach my current work goals.
(7) At this time, I am meeting the work goals that I have set for myself.
(8) I can be "on my own," so to speak, at work if I have to.
(9) I usually take stressful things at work in stride.
(10) I can get through difficult times at work because I've experienced difficulty before.
(11) I always look on the bright side of things regarding my job.
(12) I'm optimistic about what will happen to me in the future as it pertains to work.

Authentic leadership (α = **0.96**) **Walumbwa et al. (2007)**
(1) My leader says exactly what he or she means.
(2) My leader admits mistakes when they are made.
(3) My leader encourages everyone to speak their mind.
(4) My leader tells you the hard truth.
(5) My leader displays emotions exactly in line with feelings.
(6)My leader demonstrates beliefs that are consistent with actions.
(7) My leader makes decisions based on his or her core values.
(8) My leader asks you to take positions that support your core values.
(9) My leader makes difficult decisions based on high standards of ethical conduct.
(10) My leader solicits views that challenge his or her deeply held positions.
(11) My leader analyzed relevant data before coming to a decision.
(12) My leader listens carefully to different points of view before coming to conclusions.
(13) My leader seeks feedback to improve interactions with others.
(14) My leader accurately describes how others view his or her capabilities.
(15) My leader knows when it is time to reevaluate his or her position on important issues.
(16) My leader shows he or she understands how specific actions impact others.

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Between Adaptation and Resistance: A Study on Resilience Competencies, Stress, and Well-Being in German VET Teachers

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We demonstrate the relationships between occupational demands in German vocational education and training (VET) teacher training, stress symptoms, and different behavioral resilience competencies. Taking into account interindividual differences in resilience competencies, we use a typological approach to identify different types of (trainee) teachers classified by their degrees and configurations of resilience competencies. Our empirical analysis is based on questionnaire data from 131 German vocational trainees and qualified teachers. The results reveal, among other things, that all three resilience competencies—resistance, flexibility, and dynamism—are significantly negatively correlated with the demands of working conditions and workload. Via a latent class analysis, we were able to identify three groups of (trainee) teachers who differed in their resilience competencies to adapt appropriately to different situations and their requirements ("behavioral flexibility"), to recover rapidly from setbacks and to defy the expectations of others ("behavioral resistance"), and to initiate changes as soon as they are necessary or desirable ("behavioral dynamics"). More resilient (trainee) teachers show, among other things, lower values for anxiety as an emotional stress symptom and higher values for job engagement. The findings are discussed with regard to implications for VET teacher training and we stress the need for equilibration on a systemic perspective.

Keywords: occupational stress, cluster analysis, well-being, vocational education and training, resilience

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INTRODUCTION

Today, mental health problems are becoming more and more prevalent in Western society. According to Wittchen et al. (2011, p. 656), "in every year over a third of the total EU population suffers from mental disorders. The true size of "disorders of the brain" including neurological disorders is even considerably larger." One of the main causes for this phenomenon is stress, which is often a result of time and social pressure and pressure to adapt (Sembill, 2015). Johnson et al. (2005) have shown that work-related stress differs considerably in various occupations. Teachers, especially, tend to show worse than average levels in physical health, psychological well-being, and job satisfaction compared to other occupations (Kieschke and Schaarschmidt, 2008; Paulus and Schumacher, 2008). Numerous studies confirm that the teaching profession is associated with great stress (e.g., Pithers and Fogarty, 1995; Kyriacou, 2001; Montgomery and Rupp, 2005; Zurlo et al., 2007; Stoeber and Rennert, 2008; Liu and Onwuegbuzie, 2012; Newberry and Allsop, 2017). Not only experienced teachers but also prospective teachers suffer from work-related stress that can

already be observed in the teachers' early career when they start to work as beginning teachers or even earlier as trainees (Chaplain, 2008; Gardner, 2010; Harmsen et al., 2018).

The preparatory teacher traineeship in Germany shapes many prospective teachers for their subsequent career. Studies have shown that many trainee teachers associate this preparatory traineeship with heavy burdens and stressful experiences and as a time full of pressure to adapt, ambivalences and conflict potential (e.g., Christ, 2004; Speck et al., 2007; Klusmann et al., 2012; Schumann, 2019). Trainee teachers have to withstand a variety of potential stressors, including, among other things, high workload and performance pressure, conflicts with students or colleagues, or the dependency on the instructors (e.g., Kyriacou and Stephens, 1999; Christ et al., 2004; Chaplain, 2008). Nevertheless, some trainee teachers seem to cope better with the requirements than others (Englert et al., 2006; Chaplain, 2008; Košinár, 2014). One possible explanation for this phenomenon can be assigned to the concept of *resilience*, which refers "to a dynamic process encompassing positive adaptation within the context of significant adversity" (Luthar et al., 2000, p. 543). As the construct of resilience is very complex, it has been discussed and measured in the past 20 years in multiple ways [for an overview, see for example, Beltman et al. (2011)]. In this study, we refer to three *resilience competencies* (*flexibility*, *dynamism*, and *resistance*) that are indicative of resilient behaviors (Friederichs et al., 2019, 2021). As typological approaches are common in educational research or psychological science (e.g., Hayenga and Corpus, 2010; Boiché and Stephan, 2014; Martinent and Decret, 2015; Sappa et al., 2018), they also seem to be promising in the analysis of teacher resilience from a person-centered view. Thus, taking into account interindividual differences in sets of resilient behavioral competencies may provide a possible explanation why (prospective) teachers differ in their perception of work-related stressors and in their psychological and physiological stress symptoms. Further, groupings according to resilience profiles could reveal that different groups of teachers need different types of support, such as mentoring or other kinds of interventions.

The study of teacher resilience is certainly not a new field of research. However, the focus on vocational education and training (VET) teachers, especially during teacher training, represents a missing field that has not yet been considered sufficiently (with the exception of Sappa and colleagues). Consequently, our primary interest can be formulated as the following research question: How do VET (trainee) teachers differ in terms of their resilience competencies? We are also interested in how those groups perceive, on the one hand, *occupational demands* (in terms of all objectively seen requirements made upon teachers that result from the job) and, on the other hand, differ with regard to *subjective appraisal* of experienced demands and various *stress symptoms*.

THEORETICAL FRAMEWORK

The first part of this section introduces the German context of VET teacher training, as teacher training in Germany generally differs from teacher training in other countries. The following section then presents the underlying model of our study, which has its origin in the model of teacher stress from Kyriacou and Sutcliffe (1978). The model basically consists of three components: (1) potential occupational stressors, which are appraised either as irrelevant, challenging, or threatening by a (trainee) teacher; (2) stress symptoms, which can be of a psychological or physiological nature; and (3) our construct of resilience, measured via the three behavioral resilience competencies flexibility, resistance, and dynamism.

The Organizational Context of German VET Teacher Training

VET teacher training in Germany initially takes place at the university or college of education in the field of business or technical education; it includes a ten-week teaching practice, followed by a preparatory traineeship at the colleges of didactics and teacher education[1], as well as directly in vocational schools (Deißinger and Kremer, 2004; Deißinger et al., 2018). Our study focuses on the so-called *second phase of teacher training*—the in-service training (Sembill, 1984)—in which the beginning VET teachers "complete [. . .] a period of school-based and seminar-supported practical training focusing strongly on didactics and teaching competence (normally for 18–24 months, depending on the state)" (Deißinger et al., 2018, p. 34). Due to the federal structure, education policy in Germany is the responsibility of the federal states [BMBF (Federal Ministry of Education and Research), 2020]. As a result, the structures and contents of the preparatory traineeship differ among the federal states (Krüger, 2014). For example, the duration of the preparatory service for a career in higher education at vocational schools in the federal state of Baden-Wuerttemberg is 18 months, whereas the preparatory service for a teaching profession at vocational schools in the federal state of Bavaria lasts 24 months [KM Baden-Wuerttemberg (Ministry of Education, Youth and Sports Baden-Wuerttemberg), 2020; KM Bavaria (Bavarian State Ministry for Education Cultural Affairs), 2020]. Nevertheless, nationwide similarities can be identified. Normally, the traineeship takes place at two locations or learning venues: the colleges of didactics and teacher education and the training schools. The traineeship thus follows the principle of duality, similar to that of apprenticeship training in Germany, and offers the opportunity for "learning on the job" (Halász et al., 2004, p. 32). In most federal states, the traineeship consists of two phases: a preparatory phase that takes place exclusively at the colleges of didactics and teacher education and a second phase, in which the prospective teachers have to conduct a fixed amount of lessons independently (Bölting and Thomas, 2007).

A Model of Teacher Stress

There are different approaches for modeling stress that share the basic ideas of the transactional stress model of Lazarus and colleagues (Lazarus, 1966; Lazarus and Launier, 1981; Lazarus and Folkman, 1984; for an overview, see Van Dick and Stegmann,

[1]In the following, the term "seminar" is used as a synonym for the *colleges of didactics and teacher education*, the place (outside of the training schools) where teacher training takes place.

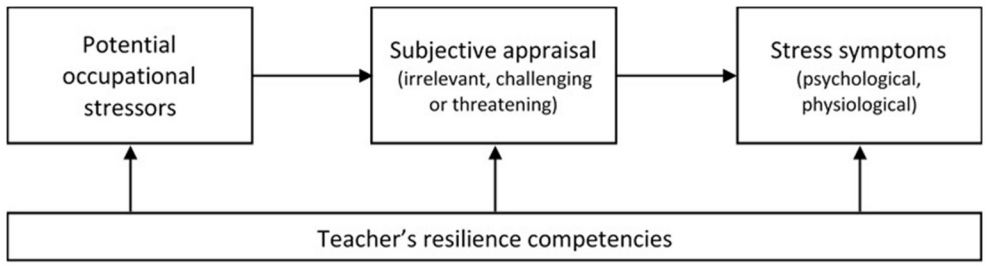

FIGURE 1 | Model of teacher stress according to Kyriacou and Sutcliffe (1978).

2013). An established approach to describing stress in the teaching profession is the model of teacher stress from Kyriacou and Sutcliffe (1978, et passim), which also uses the theory of Lazarus and colleagues as an initial model that has proven itself in the past decades of research. The model is generic with respect to its basic psychological ideas. Even though the model of Kyriacou was first published in 1978, it was continuously used in psychological teacher stress research and applied in further applications (e.g., Kyriacou, 2001, 2011). We adapted the model of Kyriacou and Sutcliffe (1978, et passim) as shown in **Figure 1**.

The basic idea of the model is that strain can arise through the *subjective appraisal* of *potential occupational stressors* (see section Potential Stressors in VET Teacher Training). For instance, there might be teachers who perceive interaction with the students' parents as a threat, whereas others might appraise these interactions as irrelevant or even (positively) challenging. If a potential stressor is evaluated as a threat and the associated perceived strain exceeds the available resources, a subjectively perceived burden becomes stress, which can manifest itself in psychological (e.g., anxiety, anger, poor well-being) or physiological (e.g., headaches, nausea) *stress symptoms* (Kyriacou and Sutcliffe, 1978; Lazarus and Folkman, 1984; Kalisch et al., 2015; see section Stress Symptoms, Well-Being, and Work Experience). Thus, objectively identical potential occupational stressors can be perceived as differently burdensome depending on the individuals' resources (Sembill, 2012). How individuals actually cope with stressful encounters mainly depends on the *resources* that are available to them and the constraints that inhibit use of these resources in the context of the specific encounter (Lazarus and Folkman, 1984). Here, *resilience* is seen as an ability to meet or cope with occupational demands and can therefore be regarded as one of the teachers' coping resources (see section Three Resilience Competencies: Dynamism, Flexibility, and Resistance). In the following and in reference to the model of teacher stress according to Kyriacou and Sutcliffe (1978, et passim), we will describe potential stressors in VET teacher training, different stress symptoms, and different competencies of teacher resilience in greater detail.

Potential Stressors in VET Teacher Training

Numerous studies have already explored the sources of work-related teacher stress (e.g., Pithers and Fogarty, 1995; Griffith et al., 1999; Zurlo et al., 2007). There are also studies that have explored the sources of stress among prospective teachers (e.g., Chaplain, 2008; Gardner, 2010; Klusmann et al., 2012). As Kyriacou (2001) points out, identified sources of (prospective) teacher stress must be viewed in the context of a teacher's perception, individual characteristics, and their environment. Depending on the country in which a teacher works, even country-specific main sources of teacher stress are possible. Therefore, the term "potential stressor" seemed to be the most appropriate to us.

Christ (2004), Rudow (2000), and Van Dick (1999) categorized potential stressors in the teaching profession and teacher education in general. Specific VET-related stress factors are described by Sappa and colleagues (Sappa et al., 2015, 2019, 2021; Boldrini et al., 2019) and Kärner and colleagues (Kärner et al., 2016; Kärner and Höning, 2021). In that regard, stressors reported by VET teachers are, among other things, high workload and pressure to perform, disturbances of the regular workflow, time pressure and deadlines, social conflicts in the workplace, and additional administrative tasks (Kärner et al., 2016). Further, VET teachers suffer from the decline of the social reputation of vocational teaching and learning, students' lack of professional motivation, maturity and engagement, and the heterogeneity of students' prior knowledge and experiences [Sappa et al., 2021; see also Kärner and Höning (2021)].

By taking into account existing categorizations and reviewing the existing literature regarding the sources of work-related teacher stress, we derived three main sources of potential occupational stressors. The categories can be summarized under the umbrella terms *working conditions and workload* as well as *social conditions*. Only Christ (2004) refers to training-specific stressors, which are especially relevant during teacher training and thus, form our third category *training-related aspects*. **Figure 2** illustrates our synthesis of potential stressors in teacher training.

The potential stress factor *working conditions and workload* describes occupational demands such as workload, time pressure or preparation and follow-up for classes. Especially in teacher training, coping with several demands from different institutions (e.g., seminar, school or mentor) may lead to stress. Additionally, the prospective teachers are under constant observation and may be affected in their private life as well (e.g., hobbies, partnership or friends), which is also known as "work-privacy conflict" (e.g., Kyriacou, 2001; Chaplain, 2008; Nübling et al., 2012; Kärner et al., 2016; Munderloh, 2018).

Stress also results from the typical *training-related aspects* of teacher training in Germany. This includes the relationship of trainee teachers with the mentor, seminar teacher or headmaster,

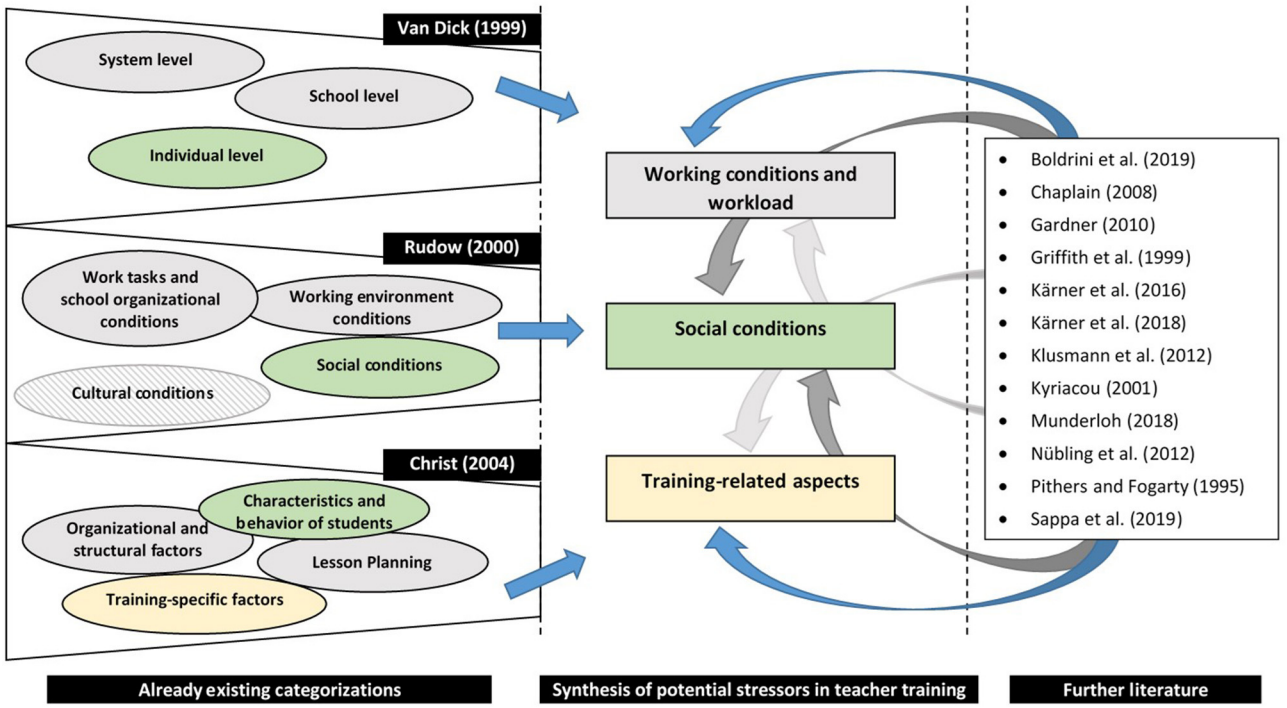

FIGURE 2 | Three main sources of potential occupational stressors in VET teacher training.

dealing with colleagues and the ambivalent role of the seminar teacher, who is simultaneously coach and evaluator. Another potential stressor in this context could be the uncertainty about grading or performance evaluation (e.g., Christ, 2004; Klusmann et al., 2012; Kärner et al., 2018, 2019)[2].

Specific *social conditions* are a third source of stress in teacher training. This aspect includes the student's behavior during classes, conflicts between students among themselves, but also conflicts between certain students and the trainee teacher. Great heterogeneity in one class is also experienced stressfully, as a trainee teacher has to cater to all students—with different learning styles and prior knowledge—at the same time. Dealing with parents also plays a significant role in this context because their expectations have to be met as well (e.g., Van Dick, 1999; Christ, 2004; Chaplain, 2008).

Stress Symptoms, Well-Being, and Work Experience

Psychological stress symptoms are responses such as anger, depression, or high job dissatisfaction (Kyriacou and Sutcliffe, 1978). Drüge et al. (2014) have compared psychosocial hazards and the resulting strains on trainee teachers with teachers and two other occupational groups. The analyses show that trainee teachers have appreciably higher values in burnout and cognitive stress symptoms and lower values in their health condition than the reference groups. Chaplain (2008), for instance, investigated psychological distress among trainee teachers in England and found female trainee teachers had, compared to male trainee teachers, higher dissatisfaction regarding their current mental state.

Mental well-being is closely related to psychological stress and may be negatively affected if potential stressors are perceived as a threat (Kyriacou and Sutcliffe, 1978; Lazarus and Folkman, 1984). Teachers' well-being is often investigated in combination with occupational stress and burnout (Spilt et al., 2011). In that regard, *emotional exhaustion* is seen as the key symptom of burnout as a stress-related disorder (e.g., Klusmann et al., 2012), which results "from occupational stress among human service workers, including teachers" (Jennett et al., 2003, p. 583). Klusmann et al. (2012) found that the emotional exhaustion reported by trainee teachers is, on average, comparable to that of teachers who have been in the profession for an average of 20 years. As the study of Christ et al. (2004) on trainee teachers shows, a higher level of perceived burden is associated with poorer psychological well-being and increased physical complaints. Lesson- and training-related burden factors appear to be especially highly correlated with well-being and physical symptoms.

Besides psychological symptoms, stress manifests itself in *physiological symptoms*, which are characterized, for example, by high blood pressure (Kyriacou and Sutcliffe, 1978) or other physical symptoms such as headaches or nausea. Lazarus and Folkman (1984) defined this kind of response correlate as *somatic health* and distinguish between short-term and long-term adaptational health outcomes.

[2]Kärner, T., Goller, M., Bonnes, C., and Maué, E. (in revision). Die professionelle pädagogische Beziehung zwischen Referendar*innen und ihren Seminarlehrkräften: Belastungsfaktor oder Ressource? [The professional pedagogical relationship between trainee teachers and their seminar mentors: stress factor or resource?].

According to Affolter (2019), in teacher stress research positive work experience has also become important in recent years. As a counterpart to negative concepts, such as stress, strain or burnout that can result from negative work experience, this positive perspective can be divided into a short-term and long-term dimension. The concept of *job satisfaction* reflects the short-term dimension, whereas *work engagement* reflects the long-term dimension. Job satisfaction can be understood as a short-term positive response to the perception of several job characteristics, taking into account individual needs (Ulich and Wülser, 2004). Schaufeli and Bakker (2004b, p. 295) define "engagement as a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption."

After describing potential stressors in VET teacher training as well as possible stress responses, we will now look at the characteristics of teachers' resilience that help prospective teachers to cope with stressful encounters and occupational demands.

Three Resilience Competencies: Dynamism, Flexibility, and Resistance

The concept of resilience was initially applied to the long-term development of children exposed to various risk factors (e.g., poverty or unstable family relations; see Werner and Smith, 1982) and, more generally, to the developmental psychopathology field in early childhood education and in childhood and adolescence (see Garmezy et al., 1984; Garmezy, 1985; Scheithauer et al., 2000). Due to the increasing relevance of mental health disorders, resilience research has consequently been extended to adulthood (e.g., Friederichs et al., 2019, 2021). Although there are striking parallels between the resilience in childhood and resilience in adulthood, Bonanno (2004, 2005) points out that adults have more resilience-promoting factors available when it comes to, for example, potentially traumatic events. In the context of (trainee) teachers, Gu and Day (2013, p. 26) have specified that teacher resilience "is not primarily associated with the capacity to "bounce back" or recover from highly traumatic experiences and events but, rather, the capacity to maintain equilibrium and a sense of commitment and agency in the everyday worlds in which teachers teach." In the literature, the understanding and consequently the definition of the term resilience differ. Masten and Obradovic (2008, p. 2) define resilience generally as follows:

> Individual resilience refers to the processes of, capacity for, or patterns of positive adaption during or following exposure to adverse experiences that have the potential to disrupt or destroy the successful functioning or development of the person.

Resilience is often also seen as psychological resistance, in the sense of it being a relatively stable personality trait. Here it is assumed that resilience is a given quantity that some individuals possess and others do not. However, this approach excludes the elucidation of the underlying behavioral processes of resilience and suggests that resilience-promoting intervention strategies are of little use (Bengel and Lyssenko, 2012).

The present study does not consider resilience as *one* stable personality trait but rather as a set of behavioral competencies that are required in a particular context to cope adequately with stress and to remain mentally and physically healthy (Friederichs et al., 2019, 2021). If we refer to the term *resilience competencies*, we somehow follow the idea from Howard and Johnson (2004, p. 403), who argue that "protective factors [. . .] support "resilient" teachers" and are learnable. Resilience competencies can be defined as abilities to cope with occupational demands and to protect (trainee) teachers' health. Our understanding of resilience is based on Friederichs et al. (2019), who consider resilience from a multifactorial behavioral perspective. The underlying model is supported by the two-process model of behavior regulation according to Brandtstädter (2011; see also Brandtstädter and Rothermund, 2002; Brandtstädter, 2009), who distinguishes between *assimilative* and *accommodative* processes as part of a theoretical framework for coping processes. Assimilative processes strive to change given development and living conditions in favor of one's own objectives, while accommodative processes facilitate the adaption of personal goals to the possibilities or limitations of action. Additionally, Brandtstädter and Greve (1994) propose a third process, *immunizing*, in this context, which Leipold and Greve (2009) call *defensive mode*. Leipold and Greve (2009) describe this third reaction mode as a defensive process, in which the individual completely ignores and denies the meaning or existence of a problem. Dealing with problems in this case occurs completely in the background of the individual, and neither adaption to a problem nor active problem-solving takes place. Based on the mentioned postulated psychological processes of behavior regulation, the resilience model of Friederichs et al. (2019) assumes that the following three behavioral competencies of resilience form an individual's ability to cope with actual demands:

- *Behavioral flexibility* is understood as a competence of adaption—that is, to react appropriately to different situations and their requirements. It is the ability to accept other people and their peculiarities and, if necessary, to put one's own needs aside.
- *Behavioral dynamics* in terms of openness to change is seen as a competence to initiate changes as soon as they are necessary or desirable and to abandon time-honored habits or practices.
- *Behavioral resistance* in terms of persistence tendency is the competence to recover rapidly from setbacks and to defy the expectations of others—that is, to demarcate from others.

The three resilience competencies under consideration reflect individual evaluation and balancing processes between perceived expectations and expectation fulfillment as well as between own needs and external demands (Sembill and Kärner, 2018). It is assumed that the three behavioral competencies of resilience have a dynamic relationship with each other. Behavioral flexibility thus describes the tendency to react to external requirements and to put one's own interests and goals last. The tendency to persist can be seen as the opposite pole, since it involves distancing oneself from external expectations while at the same time fixating on one's own needs and goals. An extreme expression on one of the two poles is assumed to be maladaptive in the long run. Openness to change can be seen here as an equilibration regulative for being able to move appropriately on the continuum between

adaptation and resistance (Sembill and Kärner, 2018; Friederichs et al., 2021).

In a previous study of Friederichs et al. (2021), the three mentioned resilience competencies were validated on a sample of 150 employees at a German automotive supplier company, and results showed that the resilience competence "dynamism" is significantly associated with parasympathetic parameters of heart rate variability that indicates somatic adaptation to stress. Further, all three resilience competencies are negatively correlated with different scales of the "Trier Inventory of Chronic Stress" (Schulz et al., 2004).

RESEARCH AIM

By taking up the complex and even stressful working environment of (trainee) teachers, we are interested in identifying different types of (trainee) teachers classified by their degrees of resilience competencies. We therefore want to answer the following research question: How do VET (trainee) teachers differ in terms of their resilience competencies? To answer this general question and to examine (trainee) teachers' perception of occupational demands and stress symptoms, we derived the following hypotheses from our underlying model of teacher stress and reviewed literature:

(1) *Different patterns, in terms of the three resilience competencies flexibility, resistance, and dynamism, can be identified among VET (trainee) teachers.* I.e., VET (trainee) teachers can be assigned to a group with a certain degree of resilient behavior, for example, a high/low degree of resilient behavior.
(2) *The resilience competencies are significantly negatively correlated with perceived occupational demands and stress appraisal.*
(3) *The resilience competencies are significantly negatively correlated with stress symptoms and emotional exhaustion and significantly positively correlated with work experience and well-being.*

As the research of resilience has focused in the past primarily on teachers in general and even less on teacher training, we wanted to widen this promising concept to the VET sector. At this point, a typological approach seems to be the means of choice for understanding why different (trainee) teachers perceive occupational demands differently and show different degrees of stress symptoms, although they are exposed to comparable structural settings.

METHODS

Data Collection and Sample

Data were collected via an online questionnaire, which was provided via teacher forums and mailing lists. The study was conducted between December 2, 2019 and January 8, 2020. There were 845 clicks on the online questionnaire, and after data cleaning, we could use data from 131 VET (trainee) teachers who finished the relevant items, resulting in a response rate of 15.50%. Our sample consisted of 74 females and 57 males, with a mean age of 38.37 years (SD = 9.97, Min. = 24, Max. = 63). At the time of the survey, 74.8% of the sample had already completed their practical teacher training[3], with a mean vocational experience as a teacher of 11.13 years (SD = 9.08, Min. = 1, Max. = 39); 84% of the sample (n = 110) were vocational (trainee) teachers in the subject area "business economics," six (trainee) teachers (4.6%) worked in the field of technical education, eight (trainee) teachers (6.1%) worked in the subject area "household and socio-pedagogical" and seven (5.3%) participants taught in other domains (e.g., computer sciences, textile technology). All participants were informed about data protection compliance and provided written informed consent.

Measures

Measures of resilience competencies, occupational demands and subjective stress appraisal, and stress symptoms, well-being and work experience are summarized in **Table 1**, including Cronbach's α as a measure for test-score reliability, the number of items per scale, an example item, and the reference literature. Measures of occupational demands and stress appraisal are based on our synthesis of potential stressors in teacher training. Thus, the potential stressors for trainee or experienced teachers reported in the original sources (**Figure 2**) were the basis for our item formulation. Further, measures of occupational demands and stress appraisal were adapted from the original sources concerning the introductory texts ("During teacher training, I experienced …") as well as concerning scale ranges and evaluation modes (demand assessment and subjective appraisal). Measures of stress symptoms, well-being, and work experience were adapted from the original sources concerning the introductory texts ("During teacher training, …") and scale ranges.

The three *resilience scales* were assessed via a 5-point Likert-type scale (1 = "strongly disagree," 2 = "disagree," 3 = "neither agree nor disagree," 4 = "agree," and 5= "strongly agree").

For analyzing participants' perception of *occupational demands* during teacher training, the participants were asked about how demanding they experienced the named demands to be on a 4-point Likert-type scale (1 = "not demanding," 2 = "slightly demanding," 3 = "demanding," and 4 = "very demanding"). Additionally, *subjective appraisal* of experienced demands was assessed, and participants were asked whether they perceived the demands as irrelevant (= 1), challenging (= 2) or threatening (= 3).

Concerning *stress symptoms*, participants were asked how often they experienced physical stress symptoms, emotional stress symptoms, well-being, and emotional exhaustion during teacher training (5-point Likert-type scale: 1 = "never," 2 = "seldom," 3 = "sometimes," 4 = "often," and 5 = "very often" for the stress symptoms). Furthermore, participants were asked how strongly they were *satisfied* and *engaged* in the job (4-point Likert-type scale: 1 = "strongly disagree," 2 = "disagree," 3 = "agree," and 4 = "strongly agree" for job satisfaction and job engagement).

[3]Training-related questions also had to be answered by the fully trained VET teachers, based on their memory.

TABLE 1 | Measures and operationalisation.

Variables	Cronbach's α	No. of items	Example	References
Resilience competencies				
Dynamism	0.849	4	I see changes as a chance for personal growth	Friederichs et al. (2019)
Resistance	0.629	4	Others cannot easily influence me	
Flexibility	0.675	4	I can accept decisions even though I do not like them	
Occupational demands and stress appraisal			During teacher training, I experienced …	
Working conditions and workload (demands)	0.874	6	... The workload (for instance because of many different tasks to manage) as …	Adapted from Van Dick (1999), Rudow (2000), Christ (2004), Christ et al. (2004), Kärner et al. (2016), Boldrini et al. (2019), and Kärner et al. (2019) (see also **Figure 2**)
Working conditions and workload (appraisal)	0.826	6		
Social conditions (demands)	0.711	5	... Conflicts between me and some students as …	
Social conditions (appraisal)	0.798	5		
Training-related aspects (demands)	0.744	3	... The ambivalent role of my instructor (coach at the one hand, evaluator on the other hand) as …	
Training-related aspects (appraisal)	0.708	3		
Stress symptoms, well-being, and work experience			During teacher training, …	
Physical stress symptoms	0.820	6	... I suffered from headaches	Adapted from Lohaus et al. (2018)
Anger	0.861	4	... I was angry	
Anxiety	0.859	4	... I was nervous	
Well-being	0.915	4	... I was happy	
Emotional exhaustion	0.858	4	... I felt emotional exhausted	Adapted from Maslach and Jackson (1981) and Barth (1985)
Job satisfaction	0.903	5	… I was delighted in what I was doing	Adapted from Westermann et al. (1996), Maes and Van der Doef (1997), Sann (2003), and Affolter (2019)
Job engagement	0.891	9	... I was overflowing with energy	Adapted from Schaufeli and Bakker (2004a)

Cronbach's α values indicated sufficient reliability for measurements.

Statistical Analysis

To assess interindividual differences in behavioral resilience competencies, we used a latent class analysis (LCA) as a statistical method to identify homogenous subgroups in a sample. In the current study, the classification into different classes was conducted on the basis of the mean scales for the three resilience scales. In order to determine the most adequate number of classes, different solutions are compared on the basis of common indices (Hagenaars and McCutcheon, 2002). For cluster identification we used Mplus 8 (Muthén and Muthén, 1998–2017). For analyzing descriptive data, Pearson correlations between variables, and cluster differences via ANOVAs, we used IBM SPSS 26.

FINDINGS

Descriptive Data and Pearson Correlations

Table 2 contains descriptive data and Pearson correlation coefficients. Correlations show small but significant positive associates between the three *resilience competencies*. The three resilience scales are negatively correlated with experienced demands concerning working conditions and workload, as well as with subjective appraisal. This means that the higher the values of the three resilience competencies are, the less working conditions and workload are experienced as demanding and the less the stressors in question are perceived as threatening. Furthermore, "flexibility" is significantly negatively correlated with experienced demands concerning social conditions and training-related aspects. It is also significantly negatively correlated with anger, anxiety, and emotional exhaustion and significantly positively correlated with well-being, job satisfaction, and job engagement. The resilience scale "dynamism" is significantly negatively correlated with anxiety and emotional exhaustion and significantly positively correlated with job satisfaction and job engagement. None of the resilience scales are significantly correlated with sociodemographic data.

Working conditions and workload (experienced demands and stress appraisal) are significantly positively correlated with physical and emotional stress symptoms (anger, anxiety) and emotional exhaustion, and the mentioned occupational demand is significantly negatively correlated with well-being, job satisfaction, and job engagement. Demands resulting from *social conditions* are significantly positively correlated

TABLE 2 | Descriptive data and Pearson correlations.

Variables	Min.	Max.	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
Resilience competencies																								
1. Dynamism	2.75	5.00	4.03	0.62																				
2. Resistance	1.75	4.50	2.93	0.63	0.20*																			
3. Flexibility	1.75	4.75	3.33	0.65	0.22*	0.19*																		
Occupational demands and stress appraisal																								
4. Working conditions and workload (demands)	1.00	4.00	3.01	0.65	−0.20*	−0.32**	−0.21*																	
5. Working conditions and workload (appraisal)	1.00	3.00	2.15	0.44	−0.15	−0.35***	−0.21*	0.74***																
6. Social conditions (demands)	1.00	3.20	2.04	0.47	−0.16	−0.11	−0.23*	0.32***	0.19*															
7. Social conditions (appraisal)	1.00	2.80	1.71	0.38	0.04	−0.14	0.05	0.11	0.36***	0.40***														
8. Training-related aspects (demands)	1.00	4.00	2.26	0.70	−0.06	0.01	−0.20*	0.38***	0.26**	0.23*	−0.03													
9. Training-related aspects (appraisal)	1.00	3.00	1.76	0.52	−0.06	−0.15	−0.04	0.31**	0.41***	0.09	0.36***	0.61***												
Stress symptoms and work experience																								
10. Physical stress symptoms	1.00	4.33	1.90	0.72	−0.11	−0.11	−0.14	0.47***	0.40***	0.25**	0.00	0.16	0.04											
11. Anger	1.00	5.00	2.59	0.86	0.03	0.12	−0.26**	0.41***	0.25**	0.16	−0.10	0.43***	0.23**	0.41***										
12. Anxiety	1.25	5.00	3.41	0.87	−0.32***	−0.17	−0.21*	0.57***	0.48***	0.34***	−0.01	0.28**	0.19*	0.64***	0.45***									
13. Well-being	1.50	5.00	3.53	0.73	0.13	0.09	0.30**	−0.51***	−0.42***	−0.08	0.04	−0.41***	−0.20*	−0.45***	−0.49***	−0.54***								
14. Emotional exhaustion	1.00	5.00	3.25	0.93	−0.20*	−0.18	−0.24**	0.78***	0.64***	0.22*	−0.01	0.34***	0.19	0.56***	0.52***	0.68***	−0.62***							
15. Job satisfaction	1.20	4.00	3.06	0.70	0.22*	0.05	0.19*	−0.49***	−0.29**	−0.16	0.02	−0.27**	−0.02	−0.34***	−0.40***	−0.49***	0.69***	−0.55***						
16. Job engagement	1.56	4.00	2.88	0.56	0.28**	0.04	0.21*	−0.47***	−0.33***	−0.16	−0.03	−0.27**	−0.10	−0.40***	−0.43***	−0.52***	0.70***	−0.56***	0.88***					
Sociodemographic variables																								
17. Gender[a] (% female)	56.50				−0.15	0.16	−0.01	−0.22*	−0.17	−0.08	0.01	−0.04	−0.03	−0.25**	−0.11	−0.13	0.05	−0.19*	0.10	0.06				
18. Age	24	63	38.37	9.97	0.12	0.16	−0.01	−0.16	−0.14	0.19*	0.14	0.09	−0.02	−0.24**	−0.10	−0.19*	0.07	−0.24**	0.02	0.06	−0.01			
19. Training status[b] (% completed)	74.80				0.12	0.05	−0.04	−0.29**	−0.19*	0.11	0.21*	0.06	0.08	−0.20*	−0.11	−0.19*	0.14	−0.33***	0.16	0.19*	−0.02	0.53***		
20. Time after training	1	39	11.13	9.08	0.07	0.04	0.04	−0.03	−0.04	0.19	0.09	0.01	−0.08	−0.12	−0.14	−0.11	0.11	−0.15	0.04	0.05	−0.03	0.88***	–	
21. Final grade[c]	1.00	3.20	1.77	0.47	−0.07	0.12	−0.10	0.18	0.10	0.00	−0.16	0.39***	0.17	0.24*	0.37***	0.38***	−0.43***	0.29**	−0.42***	−0.44***	0.01	0.04	–	−0.03

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; $80 \leq n \leq 131$; [a]0 = female, 1 = male; [b]0 = in teacher training, 1 = teacher training completed; [c]1 = very good, 2 = good, 3 = satisfactory, 4 = sufficient, 5 = not sufficient/failed.

with physical stress symptoms, anxiety, and emotional exhaustion. Demands resulting from *training-related aspects* are significantly positively correlated with emotional stress symptoms and emotional exhaustion, and they are significantly negatively correlated with well-being, job satisfaction, and job engagement.

Cluster Identification and Cluster Differences

Table 3 contains information concerning cluster identification and model fit. Likelihood-ratio tests (VLMRT, aLMRT and PBLRT) showed that the 3-cluster solution fit best. Cluster 1 contains 31 (23.66%) participants, Cluster 2 contains 37 (28.24%), and Cluster 3 contains 63 (48.09%) participants.

In addition to the model fit criteria, the mean class membership probabilities also indicate an acceptable 3-cluster solution (**Table 4**).

TABLE 3 | Cluster identification and model fit information.

		No. of classes				
		1	**2**	**3**	**4**	**5**
Cell frequencies per class	1	131	21	31	29	13
	2		110	37	64	16
	3			63	19	63
	4				19	17
	5					22
Model fit information						
No. of free parameters		6	10	14	18	22
LL		−375.771	−366.621	−355.446	−351.007	−346.084
AIC		763.542	753.242	738.892	738.015	736.169
BIC		780.793	781.994	779.145	789.768	799.423
ssaBIC		761.816	750.365	734.864	732.836	729.839
Entropy		NA[a]	0.799	0.867	0.821	0.826
VLMRT		NA[a]	0.001	0.039	0.170	0.589
aLMRT		NA[a]	0.002	0.047	0.187	0.604
PBLRT		NA[a]	< 0.001	< 0.001	0.333	0.308

LL, Log likelihood; AIC, Akaike's Information Criterion; BIC, Bayesian Information Criterion; ssaBIC, Sample-size adjusted Bayesian Information Criterion; VLMRT, Vuong–Lo–Mendell–Rubin Likelihood-Ratio Test (p-value); aLMRT, Lo–Mendell–Rubin adjusted Likelihood-Ratio Test (p-value); PBLRT, Parametric Bootstrap-Likelihood-Ratio Test (p-value); [a]not available for the one-class model.

TABLE 4 | Mean class membership probabilities.

	Participants of Class 1		**Participants of Class 2**		**Participants of Class 3**	
	M	**SE(M)**	***M***	**SE(M)**	***M***	**SE(M)**
MP for Class 1	0.905	0.029	0.000	0.000	0.013	0.008
MP for Class 2	0.000	0.000	0.928	0.022	0.029	0.009
MP for Class 3	0.095	0.029	0.072	0.022	0.958	0.012

MP, Membership probabilities.

Figure 3 shows cluster profiles concerning the three resilience competencies, and **Table 5** shows cluster differences concerning all assessed variables. Participants in Cluster 2 show the highest values in "dynamism" ($p < 0.001$; large effect), "flexibility" ($p < 0.05$; medium effect), and "resistance" ($p < 0.10$; small effect), whereas participants in Cluster 1 show the lowest values in these resilience scales. Participants in Cluster 2, compared to participants in Cluster 1, also show the lowest values in demanding working conditions and workload ($p < 0.05$) as well as in demanding social conditions ($p < 0.10$). Concerning anxiety as an emotional stress symptom, participants in Cluster 2 show the lowest values, and they show higher values for job engagement compared to participants in Cluster 1. Furthermore, participants in Cluster 2 descriptively show the lowest scores on physical stress symptoms and emotional exhaustion, and the highest scores on job satisfaction ($p < 0.10$). There are no significant cluster differences in terms of age, time after training, and final grade, or concerning gender ($p = 0.468$) and training status ($p = 0.450$; via Chi-squared tests).

DISCUSSION

Summary of Findings

This paper attempts to explain the differences between German VET (trainee) teachers' resilience competencies and their diverse perception of the demands and objective burdens made upon them. The concept of resilience was introduced as a set of competencies required to cope adequately with teacher stress and to remain mentally and physically healthy. To answer our research question, we derived three hypotheses.

Regarding our *first* hypothesis, we found three manifestations of resilience competencies in our sample, as the 3-cluster solution fit best. Cluster 2 (28.24%) indicated the strongest degree of behavioral resilience competencies, followed by Cluster 3 (48.09%) with an average level, and Cluster 1 (23.66%) with the lowest level of resilience competencies. The (trainee) teachers from Cluster 2 seem to have the most balanced mix in terms of behavioral flexibility, dynamics, and resistance. As our analysis

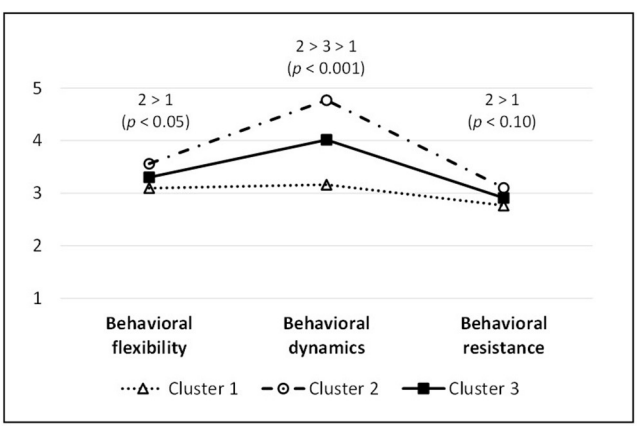

FIGURE 3 | Cluster profiles.

TABLE 5 | Cluster differences (ANOVAs).

Variables	Cluster 1			Cluster 2			Cluster 3			*p*	partial η^2	*Post-hoc*[a]
	M	SD	*n*	M	SD	*n*	M	SD	*n*			
Resilience competencies												
Dynamism	3.16	0.25	31	4.77	0.19	37	4.02	0.20	63	<0.001	0.886	2 > 3 > 1
Resistance	2.77	0.51	31	3.10	0.72	37	2.91	0.62	63	0.087	0.037	
Flexibility	3.10	0.72	31	3.56	0.62	37	3.30	0.59	63	0.011	0.068	2 > 1
Occupational demands and stress appraisal												
Working conditions and workload (demands)	3.16	0.46	29	2.75	0.80	32	3.08	0.60	54	0.024	0.064	2 < 1
Working conditions and workload (appraisal)	2.22	0.29	29	2.01	0.51	31	2.20	0.45	52	0.104	0.041	
Social conditions (demands)	2.10	0.40	29	1.88	0.51	32	2.10	0.47	54	0.068	0.047	
Social conditions (appraisal)	1.64	0.37	29	1.71	0.46	31	1.74	0.34	52	0.478	0.013	
Training-related aspects (demands)	2.39	0.75	29	2.17	0.71	32	2.23	0.67	54	0.443	0.014	
Training-related aspects (appraisal)	1.81	0.52	28	1.68	0.55	31	1.78	0.51	52	0.588	0.010	
Stress symptoms and work experience												
Physical stress symptoms	1.94	0.62	29	1.65	0.55	32	2.02	0.83	56	0.063	0.047	
Anger	2.57	0.62	29	2.54	1.08	32	2.63	0.84	56	0.897	0.002	
Anxiety	3.82	0.73	29	2.95	0.77	32	3.47	0.87	56	<0.001	0.138	2 < 1, 2 < 3
Well-being	3.38	0.59	29	3.68	0.82	32	3.52	0.73	56	0.272	0.023	
Emotional exhaustion	3.49	0.81	29	2.96	1.00	32	3.29	0.91	56	0.074	0.045	
Job satisfaction	2.87	0.67	29	3.28	0.75	32	3.03	0.68	56	0.072	0.045	
Job engagement	2.71	0.50	29	3.12	0.57	32	2.83	0.55	56	0.010	0.078	2 > 1
Personal information												
Age	36.77	10.67	31	39.97	9.03	37	38.21	10.15	63	0.416	0.014	
Time after training	10.10	10.29	21	11.80	7.88	30	11.17	9.37	47	0.807	0.005	
Final grade[b]	1.81	0.37	21	1.72	0.57	30	1.78	0.44	47	0.805	0.005	

[a]*Post-hoc test with Bonferroni correction;* [b]*5-point grading scale: 1 = very good, 2 = good, 3 = satisfactory, 4 = sufficient, 5 = not sufficient/failed.*

shows, the resilience competence "dynamism," as an equilibration regulative and a competence to initiate changes as soon as they are necessary or desirable and to abandon time-honored habits or practices, showed itself to be the strongest separation factor between clusters. On the one hand, this finding could indicate that the mentioned resilience competence is most important in teacher training; on the other hand, it could be a result of sample selection. Interestingly, the three manifestations of resilience competencies showed striking similarities to the study of Bowles and Arnup (2016) and a former study conducted by Bowles and Hattie (2013). Bowles and Arnup (2016, p. 147) investigated "the link between adaptive functioning and resilience in early career teachers." The authors identified three typologies of adaptability—stabilizers, adapters, and innovators—and showed that resilience is strongly associated with these typologies of adaptive change. Their analysis showed that *stabilizers* were the least resilient, which corresponds to Cluster 1 in our study with the lowest level of resilience competencies. *Adapters* were more resilient, corresponding to Cluster 3 in our sample with an average level of resilience competencies. Finally, *innovators* were most resilient, corresponding to Cluster 2 with the strongest level of resilience competencies in our sample. According to Bowles and Arnup (2016), the close relation between resilience and adaptive functioning can also be found in other studies (Gu and Day, 2007; Mansfield et al., 2012). This leads us to assume that our 3-cluster solution of resilience competencies can be linked to the concept of adaptive change. What reinforces our suspicion is that neither in our study nor in the study conducted by Bowles and Arnup (2016), was length of service significantly associated with resilience.

Regarding our *second* hypothesis, we found significant correlations between some resilience competencies and occupational demands or stress appraisal, respectively. *Flexibility* was significantly negatively correlated with all occupational demands—that is, the higher the degree of flexibility, the less burdening occupational demands were perceived to be. Moreover, all resilience competencies were significantly negatively correlated with the *demands regarding working conditions and workload*. Our second hypothesis can therefore be partly confirmed.

Regarding our *third* hypothesis, *flexibility* was significantly negatively correlated with all stress symptoms, except for *physical stress symptoms*. *Flexibility* was further significantly positively correlated with *well-being, job satisfaction* and *job engagement*. This can be an indication that (trainee) teachers with a certain degree of behavioral flexibility do indeed show less stress symptoms or emotional exhaustion and not only feel better but also have a better work experience. These findings are in line with the results of Pretsch et al. (2012), who found significant positive correlations between teacher resilience and well-being

as well as job satisfaction. The importance of flexibility with respect to (preservice) teacher resilience is also highlighted by Le Cornu (2009), Mansfield et al. (2012), and Tait (2008). Indications for our third hypothesis can also be found in *dynamism*, as *emotional stress symptoms (anxiety)*, and *emotional exhaustion* are significantly negatively and *work experience* significantly positively correlated with this resilience competence.

Limitations of the Study

Our study has strengths and weaknesses that must be weighed against each other. We not only asked prospective teachers in training to participate in our survey but also fully trained teachers (mean vocational experience as a teacher of 11.13 years), who have already completed their practical teacher training to improve our response rate. A bias in their retrospective assessments with regard to the perceptions experienced during teacher training cannot be ruled out. However, none of the three resilience competencies were significantly correlated with sociodemographic variables. Moreover, no cluster differences regarding training status were found, both indicating that trainee teachers and already trained teachers are comparable concerning the assessed resilience competencies.

Bearing in mind the (trainee) teachers' experienced demands were assessed on a 4-point Likert-type scale (1 = "not demanding," 2 = "little demanding," 3 = "demanding," and 4 = "very demanding"), the highest value was achieved for working conditions and workload (M = 3.01). Social conditions (M = 2.04) and training-related aspects (M = 2.26) were evaluated as less demanding (**Table 2**). As the survey was conducted on a voluntary basis, it cannot be ruled out that the sample is selective—that is, that mainly those persons who participated in the survey are (were) not under great stress during their traineeship. Further, the sample is not representative for other domains and vocations; thus, the findings are not generalizable to other contexts.

Concerning the interpretability of our findings, the correlative relationships are based on cross-sectional data. This means that no statements can be made about causal interpretations for the correlations found. Further, no statements about the assumed alterable nature of the described resilience competencies (i.e., in terms of learnability) can be made on the basis of cross-sectional data. Although we cannot draw any causal conclusions from our study, we were able to show that there are basically three manifestations of resilience competencies among VET (trainee) teachers in Germany, which are closely related to the concept of adaptive change (see Bowles and Hattie, 2013; Bowles and Arnup, 2016). In order to investigate causal relationships between resilience competencies and occupational stress in teacher training, as well as the development of resilience competencies in the course of time, a longitudinal study design or an experimental design is needed.

Considering that stress is not a one-, but a multidimensional phenomenon—as psychological and somatic processes constituting a complex system of relations are involved (e.g., Kemeny, 2003; Kärner et al., 2017; Friederichs et al., 2020, 2021)—we only used self-reports to measure participants' physiological symptoms. Thus, further investigations should also use somatic markers, such as those of the autonomic nervous system, to measure physiological responses to occupational stress in teacher training.

Implications for VET Teacher Training and the Need for Systemic Equilibration

From our study findings we suggest the integration of certain stress-management programs or, in particular, resilience trainings into the teacher training process. Studies regarding such interventions in teacher training are rare. Nevertheless, Dicke et al. (2015) were able to show that their stress-management training in groups had positive effects on trainee teachers' well-being. The authors assume a relationship here, as the perception of higher classroom management skills led to lower perceived strain and higher perceived well-being, confirmed by studies conducted with teachers in general. In addition to stress-management training in face-to-face groups or self-help books, online stress-management training is playing an increasingly important role and offers great opportunities for stress reduction (Hillert et al., 2019). One example of such online-based trainings is the BRiTE[4] (*Building Resilience in Teacher Education*) program, which is especially designed for pre-service teachers and developed to promote resilience [BRiTE (Building Resilience in Teacher Education), 2014–2020]. The benefit of this particular program is highlighted by Beltman et al. (2018) who found evidence that the usage of these online modules supports the promotion of resilience in pre-service teachers. Nevertheless, such programs especially for (trainee) teachers have found relatively little application to date (Hillert et al., 2019; Sappa and Barabasch, 2020).

In the present study, we took a person-centered view on resilience. However, since individuals are embedded in specific contexts and exposed to specific environments, further studies would need to include additional contextual resources. Such contextual resources in vocational schools include, for instance, intra-scholastic support services, a supportive school leadership, and a collaborative school climate (Boldrini et al., 2019; Sappa et al., 2021). In that regard, Sappa et al. (2021) stress the necessity of *multi-level interventions*. This also seems relevant because resilience is not only a characteristic of individuals, but also of social systems and organizations (e.g., Holling and Gunderson, 2002; Keck and Sakdapolrak, 2013). Crises or external shocks, such as distance education as a result of COVID-19-related school closures, are also accompanied by stress at the organizational level and require appropriate balancing. Institutions and their actors are challenged to recognize destabilizations of system-inherent relationships, rules and organizational structures caused by external and internal disturbances, and further, to ensure their restabilization in accordance with valid, participatively determined and generally accepted social and human values and norms (Reinke and Kärner, 2020). Thus, in a broader sense stress-management programs should take into account various *ontogenetic and sociogenetic stratifications* that include a societal ("macro"), group interactive ("meso"), individual ("micro"), and biological

[4]https://www.brite.edu.au/.

("nano") level. *Balancing and evaluation processes* play a central role on each of the mentioned stratifications. In this regard, evaluation means the affective appraisal of internal and external stimuli. Balancing stands for equilibrating regulatory processes between diametrically opposed or even antagonistic subject areas, e.g., free, chaotic-ideal and individual perspective vs. normative, ordered and social perspective (Sembill and Kärner, 2018, 2020).

In order to reach *systemic equilibration*, on each of the above-mentioned stratifications corresponding target variables for interventions must be identified and defined. On a biological ("nano") stratification it is relevant to support an individuals' somatic adaptation to stress. This can be achieved by interventions that address parasympathetic activity (Friederichs et al., 2021), for instance, via biofeedback training that helps individuals to sensitize one's own body perception (Goessl et al., 2017). As results of Friederichs et al. (2021) show, somatic stress regulation is associated with behavioral dynamics in terms of an equilibration regulative for being able to move appropriately on the continuum between adaptation and resistance (Sembill and Kärner, 2018; Friederichs et al., 2021). In that regard, on an individual ("micro") and on an interactive ("meso") stratification, behavioral resilience competencies must be promoted in order to help individuals to perceive one's own and others' demands and needs, to reflectively but also critically engage with others, and to take responsibility for self and others (Sembill and Kärner, 2018, 2020; Kärner and Sembill, 2021). On a societal ("macro") stratification, the actors of the system, such as (trainee) teachers in our consideration, need to be empowered to actively participate in and shape risky development processes in changing personal and social environments and to develop a sense of distributive justice and sustainable conservation of personal and societal resources. On an *individual level*, this requires not least the development of the ability to counter the power of the supposedly factual with a creative "will to not have to" (Sembill, 1995; Kärner and Sembill, 2021). Our results support this assumption because behavioral dynamics, as equilibration regulative, apparently discriminates very well within specific groups of (trainee) teachers. One might speculate that evaluating specific trainings that influence this competency might be useful. On an *educational and systemic level*, this requires not least a discourse about underlying conceptions of man. On the one hand, humans can be regarded as beings who are responsible for their own actions and carry them out in a self-determined manner, as well as critically questioning and reflecting on external requirements. On the other hand, humans can also be seen as beings who uncritically accept what they are given externally (Heid, 2003, 2018). Future research efforts should therefore address the question of the concrete design of interventions at different ontogenetic and sociogenetic stratifications. This seems relevant because the targeted promotion of individual resilience competencies should ultimately lead to humane and health-preserving learning and working conditions.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the data will not be shared publicly because for data protection reasons. Requests to access the datasets should be directed to tobias.kaerner@uni-hohenheim.de.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

TK: conceptualization, methodology, software, formal analysis, data curation, writing–original draft, writing–review, editing, visualization, supervision, and project administration. MB: conceptualization, methodology, formal analysis, writing–original draft, writing–review, and editing. EF and DS: writing–original draft, writing–review, editing, and validation. All authors contributed to the article and approved the submitted version.

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The Relationship Between K-Workers' Leader–Member Exchange, Organizational Citizenship Behavior and Task Performance—Evidence From Chinese Hospitals

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Aiming to reduce the difficulty of managing and motivating knowledge workers (k-workers), and promote the psychological well-being of them in Chinese hospitals, this study examines how k-workers' leader–member exchange (LMX) influences their task performance and the mediation effect of organizational citizenship behavior (OCB). Through a self-administered survey, valid questionnaires were collected from 384 k-workers in Chinese hospitals, and partial least squares structural equation modeling was employed for data analysis. The findings show that LMX is positively related to OCB and task performance, and that OCB mediates the relationship between LMX and task performance. This research has theoretical implications and also provides practical suggestions on how to manage, motivate, and inspire k-workers, and promote the psychological well-being of them, and finally enhance the organizational performance in Chinese hospitals.

Keywords: Chinese hospital, k-worker, leader–member exchange, organizational citizenship behavior, task performance

INTRODUCTION

For the past 20 years, the most valuable asset of most organizations has been the knowledge worker (k-worker). K-workers apply their knowledge to promote the development of an organization (Henard and McFadyen, 2008). In the twenty-first century, k-workers are key to building a competitive edge, and they are responsible for finding new solutions for business development (Igielski, 2017). Hence, how to improve k-workers' performance to enhance the core competitiveness of Chinese hospitals and better serve the public has become an urgent problem (Mei et al., 2014). To enhance the organizational performance and the development of Chinese hospital, the task performance of k-workers needs to

improve. The literature indicates that increasing the degree of k-workers' leader–member exchange (LMX) is an effective and useful way to improve their working performance (Byun et al., 2017; Lee et al., 2019). However, scholars have given very limited attention to the relationship between k-workers' LMX and task performance in Chinese hospitals, and little is known about the mechanism underlying this relationship. Besides, the previous researches of motivating and managing the k-workers working in hospitals are usually conventional methods, such as salary incentives, promotion incentives or improving the working environment (Razzaq et al., 2019). However, very limited researches have applied the supervisor-subordinate perspective to rethink the incentive methods based on the Chinese hospital context, and put forward more useful methods to manage, maintain and motivate the k-workers working in Chinese hospitals.

In recent years, organizational managers have realized the importance of k-workers and adopted specific approaches to recruit, maintain, and motivate this kind of special and valuable resource, such as improving their pay level and giving them more attention (Morgan et al., 2016). Although the existing measures are somewhat helpful, further measures still need to be studied (Bieńkowska and Ignacek-Kunicka, 2020). In addition, Mládková et al. (2015) suggested that misdirected motivation can negatively influence k-workers' performance, even though they are usually responsible professionals. The authors specifically identified several motivational or behavioral factors that can influence k-workers' task performance, many of which concern the relationship between k-workers and their supervisor: examples include "does my supervisor, or someone at work, seem to care about me as a person" and "conflict between what my manager says and what he does." Hence, the relationship between supervisor and k-workers is a crucial element that can motivate or influence k-workers' performance (Bieńkowska and Ignacek-Kunicka, 2020). Since the relationship between supervisor and subordinate can be tested by LMX, this study will investigate the relationship between k-workers' LMX and task performance in Chinese hospitals. LMX is a psychological variable originated from Social Exchange Theory, which can reflect the inner relationship between supervisors and subordinates. Hence, LMX is an important index in establishing the psychological well-being of k-workers in Chinese hospitals. In addition, limited researches putted the focus on how LMX can change k-workers' behavior on Chinese hospital, so it remained unclear explanation on the path of how LMX can affect k-workers' task performance Hence, this study will also consider the potential mediation of this relationship by organizational citizenship behavior (OCB).

LITERATURE REVIEW

K-Workers in Hospital

The "k-worker" concept was proposed by Drucker (1994). He defined k-workers as those people who are mastering and applying symbols and concepts and working with knowledge and information.

K-workers usually have a high educational level and professional knowledge and skills. These skills are characterized by high demand, short life cycles, and criticality to the organization, and include symbolic analysis skills (Despres and Hiltrop, 1995; Lee and Maurer, 1997; Jie et al., 2006), information analysis ability, distribution ability, production capacity (Banerjee, 2006), and the ability to use tools or techniques (Barley and Orr, 1997; Kubo and Saka, 2002). Reich (1991) defined k-workers as "symbolic analysts" including problem solvers who manipulate output to meet customer needs or who help to identify those needs in the market, as well as brokers such as financiers or researchers. In China, Jie et al. (2006) defined k-workers as individuals with high educational level, professional skills, and the ability to apply these skills to identify and solve problems.

Based on the hospital context, most of the clinical staff belong to k-workers (i.e., doctors, nurses). These k-workers are not engaging in simple or mechanical manual work, but complex or creative work. They are facing with complex and changing working environment because different patients have different pathological conditions (Wei, 2013). It requires k-workers who working in hospital should obtained qualified and professional medical knowledge to deal with many terrible situations in any time. Hence, the characteristics of k-workers determine that hospital managers must choose management strategies different from normal employees (Li and Song, 2012). Besides, as mentioned by Bieńkowska and Ignacek-Kunicka (2020), k-workers are usually have a strong personality, and need more autonomy when they are working. It also brings more challenges to hospital to manage when so many k-workers need to work together with different personality, cultural background and educational background (Razzaq et al., 2019). Therefore, it is great meaningful to put the focus on the k-workers in the hospitals, and manage or motivate them with more creative and useful management methods.

Leader–Member Exchange

Derived from social exchange theory, LMX refers to the quality of exchange relationships between leaders and subordinates and illustrates how leaders form different exchange relationships with different followers in the same group over time (Dansereau et al., 1975). The LMX model provides an alternative way to understand the superior–follower relationship. This model is based on the concept that the development of a role naturally leads to differences in role definitions and various exchanges between leader and members.

Most LMX studies assume a degree of negotiating latitude between leaders and members. Subordinate positions and LMX efficiency are split into two categories: in-group and out-group (Wang, 2016). The in-group is characterized by high-quality LMX with high trust and formal or informal incentives. In-group members within the organization can receive more feedback and their work has a greater degree of freedom to contribute outside their formal responsibilities (Liden and Graen, 1980). By contrast, the out-group is characterized by low-quality LMX with low trust, support, and incentives. The interaction of out-group members within the organization are confined to the requirements of

their contract of employment, meaning that they only engage in routine daily activities and interact formally with their supervisor (Lee et al., 2019).

Based on the hospital context, LMX is crucial element in the management of medical staff. According to the Donohue-Porter et al. (2019), understanding the emphasis on relationships inherent in the LMX communications helps nurse managers influence work satisfaction and organizational commitment. LMX is the key component to manage the nurses because nurses are the cornerstones of nursing administration and must be able to communicate effectively. Higher quality relationships with immediate supervisors are associated with greater structural and psychological empowerment for nurses, leading to greater psychological well-being and job satisfaction (Donohue-Porter et al., 2019). Hence, the LMX literature from hospital context shows that since LMX is an important variable in medical staff management, and LMX is associated with many positive variables, it will be possible that LMX has positive relationship on good behaviors (i.e., OCB) and well performance (i.e., task performance).

Organizational Citizenship Behavior

The concept of OCB was introduced by Bateman and Organ (1983). Organ (1988) defined OCB as an individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in aggregate promotes the effective functioning of the organization. This is the most cited definition of OCB in the literature. OCB includes activities or acts that are perceived to be extra-role, rather than in-role, and must be discretionary in nature, meaning that they are not mandatory requirements of the job (Organ, 1997; Indarti et al., 2017). Thus, performing such actions would not formally rewarded, but failure to perform such an act would not necessarily warrant punishment. Some examples of OCB include helping a colleague with their duties, engaging enthusiastically in company events, and tolerating temporary inconvenience without grievances.

Smith et al. (1983) suggested dividing OCB into two dimensions: OCB-individual (OCB-I) and OCB-organization (OCB-O). OCB-I is characterized by the quality of "altruism" intended to help a specific person, such as the leader, a workmate, or a customer. OCB-O is characterized by "general compliance," which is seen as more impersonal and intended to benefit the organization as a whole, such as fair use of work time.

Based on the hospital context, OCB are found to have association with many positive outcome variables. The result investigated by Subhadrabandhu (2012) showed that OCB positively related to higher job satisfaction and organizational commitment among 296 hospital staff. Besides, since hospitals are non-profit organizations, how to improve the service quality of medical staff has been a difficult problem in recent years. Sidin and Arifah (2019) evidenced that the higher degree of OCB can improved the service quality of medical staff in public hospitals. Hence, the OCB literature from hospital context shows that OCB can reflect the working attitude and the working quality of medical staff, and it provides a possible explanation of how psychological change can affect medical staff's behavior to this study. Since OCB positively relate to some active variables in some hospital context, it also implies that OCB possibly connect to the individual performance (i.e., task performance) of medical staff.

Task Performance

Task performance refers to workers' performance of duties officially accepted as part of their jobs. These actions contribute to the organization's overall performance both directly (e.g., executing part of a technological process) and indirectly (e.g., supplying required materials or services) (Borman and Motowidlo, 1993).

Researchers have investigated many situational factors that can facilitate or impede task performance. The focuses of previous studies include human resource practice is positive on job crafting and task performance (Guan and Frenkel, 2018), the influence of respectful engagement and work engagement on task performance (Basit, 2019), the effects of a positive working environment and work engagement on task performance (Geue, 2018), and the effects of employee involvement climate on task performance (Smith et al., 2018).

Based on the hospital context, in recent years, the researches of the task performance by medical staff have been become a focus. Carlisle et al. (2019) investigated that many external factors can affect the task performance of medical staff, like training effectiveness and work environment. Besides, the relationships between leaders and nurses also have significant impact on their task performance. Habib et al. (2020) point out the importance of keeping an effective communication and a harmonious relationship between leader and nurse in the hospital. The positive relationships between interpersonal leadership, engagement and task performance are highlighted. Hence, the task performance literature from hospital context shows that many active variables benefit to the development of the task performance of medical staff, and it provides an information to this study that a good interpersonal relationship may acts as a key role on the improving of the task performance of medical staff. Therefore, it implies that the relationship between supervisors and subordinates possibly connect to the task performance of medical staff.

THEORETICAL FRAMEWORK

A theoretical framework is used to model how and explain why particular phenomena, variables, or concepts are related to one another (Sekaran and Bougie, 2010). Drawing on social exchange theory, this study tests the relationship between k-workers' LMX and task performance and the mediating roles of OCB-I and OCB-O. The following **Figure 1** shows the theoretical framework of this research.

Leader–Member Exchange and Organizational Citizenship Behavior

In the context of social exchange and reciprocity, the primary reason for the relationship between LMX and OCB was investigated (Blau, 1964). Blau (1964) suggested that social interactions are built on trust and the hope that one individual

will reciprocate another's acts of goodwill. When certain actions by the supervisor are perceived positively by subordinates (high-quality LMX), these actions evoke feelings of subordinate obligation (Harris et al., 2014; Chow et al., 2015; Tang and Naumann, 2015). Subordinates thus respond by engaging in extra-role behavior (e.g., OCB) as a way of fulfilling the perceived duty.

The related studies based on hospital context have been investigated. Zhang et al. (2020) used structural equation modeling to prove that LMX has positive relationship with OCB among 426 nurses recruited from 12 public hospitals in China. They point out that LMX and OCB are crucial in evaluating the attitude of medical employees. Besides, according to Yusof et al. (2019), the positive relationships between LMX and OCB existed in the 539 medical employees who working in 133 public hospitals. This research highlighted that the personal-based relationship between the leader and the subordinate needs to be practiced in order to improve the chances of implementing OCB. Hence, according to previous researches, this study proposes the following hypotheses:

H1: There is a positive relationship between k-worker's LMX and OCB in Chinese hospitals.
H1a: There is a positive relationship between k-worker's LMX and OCB-I in Chinese hospitals.
H1b: There is a positive relationship between k-worker's LMX and OCB-O in Chinese hospitals.

Organizational Citizenship Behavior and Task Performance

According to Borman and Motowidlo (1993), OCB can improve performance because it is the "lubricant" of the social machine in an organization. Hanafi et al. (2018) suggested that the existence of such behavior will improve employees' motivation at work, facilitate social communication among employees, reduce disputes, improve work efficiency, and ultimately improve employees' performance.

The related studies based on hospital context has been investigated. Wibowo and Mochklas (2020) explained the urgency of OCB toward performance of nurses of type C hospitals in Surabaya because OCB not only can enhance productivity of work partners, but also can help resources saving to maintain group functions. As a huge individual contribution, OCB exceed the demands of roles in the organization, which made the achievement of excellent performance in the hospitals. Besides, Udin and Yuniawan (2020) tested the relationships between psychological capital, personality traits of big-five, OCB and task performance among 246 employees. It highlighted that OCB application in the working environment could develop the performance of the individual employee, performance of the unit, and performance of the organization. Hence, according to previous researches, this study proposes the following hypotheses:

H2: There is a positive relationship between k-worker's OCB and task performance in Chinese hospitals.
H2a: There is a positive relationship between k-worker's OCB-I and task performance in Chinese hospitals.
H2b: There is a positive relationship between k-worker's OCB-O and task performance in Chines hospitals.

Leader–Member Exchange and Task Performance

There are several reasons to expect a positive relationship between the quality of LMX and followers' task performance. First, the leader provides tangible and intangible benefits to followers in a high-quality leader–member relationship (Kuvaas and Buch, 2018). Tangible benefits (e.g., resources, money) promote better performance by offering them more profit and wealth, while intangible benefits (e.g., favors, appreciation, affection from the superior) motivate subordinates to reciprocate by making extra efforts or dedicating themselves to their work (Kuvaas et al., 2012). Second, followers in a high-quality relationship with their leader receive more support, are more motivated, and have a higher degree of job satisfaction compared to subordinates with low-quality LMX (Gerstner and Day, 1997; Hill et al., 2014). Third, followers in high-quality LMX relationships have greater opportunities for advancement compared to subordinates in low-quality LMX relationships. Therefore, they are more inclined and driven to perform well.

The related studies based on hospital context have been investigated. Nasiatin et al. (2021) used Partial Least Square to confirm the positive relationship between knowledge sharing, LMX, OCB and employee performance in the hospital. The research pointed out that LMX has a positive effect on individual performance, and finally contribute to the organizational performance (hospital performance). Besides, Sepdiningtyas and Santoso (2017) tested the relationship between LMX, work engagement, co-workers support and task performance among hospital nurses. The research confirmed the positive relationship between LMX and task performance and highlighted that the high quality LMX generates leader support both professionally and emotionally. This will encourage followers to offer their optimal abilities to complete their tasks, which is beneficial to the development of task performance of hospital nurses. Hence, according to previous researches, this study proposes the following hypotheses:

H3: There is a positive relationship between k-worker's LMX and task performance in Chines hospitals.

Leader–Member Exchange, Organizational Citizenship Behavior, and Task Performance

OCB is anticipated to mediate the LMX–task performance relationship because high-quality LMX entails an emotional connection and generally unstated shared expectations of reciprocity. In a high-quality exchange relationship, supervisors cater to subordinates' higher social needs by guiding them to prioritize collective benefits over individualized satisfaction in the short term. "Good citizens" (high OCB) are more willing to pursue collective interests. Hence, employees with high-quality

LMX are more committed to performing citizenship behaviors to promote the development of their organization in return (Truckenbrodt, 2000; Chow et al., 2015).

OCB is typically voluntary and not paid. Individuals performing OCB tend to show altruism, organizational commitment, and conscientiousness (LePine et al., 2002; Rapp et al., 2013), which are all positively related to task performance (Rapp et al., 2013). Accordingly, it is reasonable to expect a positive correlation between OCB and task performance. Hence, based on previous researches, this study proposes the following hypotheses:

H4: OCB mediates the relationship between k-worker's LMX and task performance in Chines hospitals.
H4a: OCB-I mediates the relationship between k-worker's LMX and task performance in Chines hospitals.
H4b: OCB-O mediates the relationship between k-worker's LMX and task performance in Chines hospitals.

RESEARCH METHOD

Sampling

According to Sekaran and Bougie (2003), the sample should include an adequate number of suitable individuals from the target population in order to estimate the parameter of the population. This research specifically focuses on k-workers working in 10 Chinese hospitals (including doctors, nurses, administrative staff, etc.). According to Jie et al. (2006), k-workers are a special group of people with at least a bachelor degree. Hence, this study only recruited people with a bachelor degree or higher educational qualification.

Data Collection Method

Data were collected using a self-administered questionnaire that was distributed to k-workers in Chinese hospitals. Measurement items in the questionnaire were adapted from previous researches. Of the 600 questionnaires distributed, 384 valid questionnaires were returned. Krejcie and Morgan (1970) suggested that for a population of over 100,000 people, a sample size of 380 is sufficient. Therefore, 384 k-workers from 10 Chinese hospitals were considered sufficient for this study.

The LMX measure was adapted from Graen and Uhl-Bien (1995) and applied to the hospital context. Participants responded to the seven items. on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The sample items are: "I usually know how satisfied my supervisor is with what I do in the hospital. My supervisor recognizes my potential in the hospital. I would defend and justify my supervisor's decision if he/she were not present to do so in the hospital."

The OCB scale was adapted from Smith et al. (1983) and applied to the hospital context. It comprised seven items for OCB-I and nine items for OCB-O. Participants responded to each item on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The sample items are: "I help other employees with their work when they have been absent in the hospital. I help others when their work load increases (assist others until they get over the hurdles) in the hospital. I volunteer to do things not formally required by the job in the hospital."

The task performance (TP) measure was adapted from Koopmans et al. (2014) and applied to the hospital context. Participants responded to seven items on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The sample items are: "I managed to plan my work so that it was done on time in the hospital. I kept in mind the results that I had to achieve in my work in the hospital. I was able to perform my work well with minimal time and effort in the hospital."

Data Analysis Techniques

The data collected from the self-administered questionnaires were analyzed using partial least squares structural equation modeling (PLS-SEM). PLS facilitates the analysis of a set of interrelated research questions by modeling the relationships among multiple constructs (Anderson and Gerbing, 1988). Even though covariance-based approach (CB-SEM) such as AMOS has been a focused by previous researches (Hair et al., 2013), however, a variance-based approach or PLS-SEM with distinctive methodological attributes making it a more possible alternative to the popular CB-SEM approach (Henseler et al., 2009). Besides, when employing PLS-SEM, it is a benefit that the study can get high efficiency in parameter estimation. This is because it demonstrated in the technique's superior statistical power compare to CB-SEM. Greater statistical power refers to the PLS-SEM is more likely to provide a specific relationship significant when it is, in fact, significant in the population (Hair et al., 2017). Thus, PLS-SEM is more appropriate to test the study's hypotheses than CB SEM as it is a flexible and good technique to build a statistical model and make a prediction (Ringle et al., 2010). Hence, the data will be analyzed by using Statistical Package for Social Sciences (SPSS) version 20.0 and SmartPLS 2.0 M3 software.

RESULTS

Demographic PROFILE

Table 1 presents the demographic characteristics of the study's respondents.

Most respondents are female (52.6%) and all respondents were aged between 28 and 55 years old, with the largest group (36.5%) aged between 40 and 50. In order to screen out the target respondents, education background is the main criterion. The participants who have a bachelor degree account for 60.2%, while the remainder have at least a master degree. Besides, regarding position in the organization, 51.6% of employees were at base level, while 46.1% were at middle level. Finally, regarding to the occupation in the hospital, based on the type of work, there are total 35.2% of participants is doctor, 27.9% is nurse, 29.1% is administrative stuff and the rest is contingent worker (7.8%).

Composite Reliability and Convergent Validity

Evaluating the measurement model is the first step in PLS-SEM. The validity of the measurement model needs to be determined

TABLE 1 | Demographic characteristics of the respondents.

Demographics	Category	*n*	%
Gender	Male	182	47.4
	Female	202	52.6
Age	<30	35	9.1
	30–39	123	32.0
	40–50	140	36.5
	>50	86	22.4
Education	Bachelor degree	231	60.2
	Master degree or above	153	39.8
Position	Base level	198	51.6
	Middle level	177	46.1
	High level	9	2.3
Occupation	Doctor	135	35.2
	Nurse	107	27.9
	Administrative staff	112	29.1
	Contingent worker	30	7.8

before checking a model or performing hypothesis testing. This includes checking that the instruments actually measure what they are intended to. First, composite reliability needs to be tested because reliability and validity are related. Although high reliability does not assure high validity, low reliability means that validity cannot be high. According to Hair et al. (2017), composite reliability values over 0.7 are considered reliable. As shown in **Table 2**, the composite reliability values of the four variables, LMX, OCB-I, OCB-O, and TP, are all over 0.7, thus meeting the requirement for establishing composite reliability.

Second, the model's convergent validity needs to be tested. Convergent validity refers to the degree of similarity of measurement results when different measurement methods are used to determine the same feature. According to Hair et al. (2017), to establish acceptable convergent validity, the factor loading needs to exceed 0.5 and the average variance extracted (AVE) needs to exceed 0.5. As **Table 3** shows, the factor loadings of LMX, OCB-I, OCB-O, and TP all exceed 0.5, and the four variables' AVE values all exceed 0.5. These results confirm that all four variables have acceptable convergent validity.

Discriminant Validity

Discriminant validity requires that the observed values should be distinguishable from one another when different constructs are measured using different methods. According to Fornell and Larcker (1981), discriminant validity is acceptable when the square root of the AVE of a construct is higher than the correlation between that construct and other constructs. As **Table 4** shows, all four constructs meet this criterion. These results confirm that all four variables have acceptable discriminant validity.

Analysis of the Structural Model

R^2-values can be used to investigate the quality of each variable in the structural model. If R^2 is within the range 0–1 then it is acceptable (Hair et al., 2017). **Figure 2** shows the first order of structural model while the **Figure 3** shows the second order of structural model. As **Figure 2** shows, the endogenous variables of

TABLE 2 | Composite reliability results.

Model construct	Items	Composite reliability
LMX	7	0.967
OCB-I	7	0.945
OCB-O	9	0.928
TP	7	0.958

Where the "LMX" abbreviation refers to leader-member exchange, OCB-I, organizational citizenship behavior—individual; OCB-O, organizational citizenship behavior—organization. The "TP" abbreviation refers to task performance.

TABLE 3 | Convergent validity results.

Model construct	Measurement items	Loading	AVE
LMX	LMX1	0.928	
	LMX2	0.905	
	LMX3	0.929	0.808
	LMX4	0.815	
	LMX5	0.927	
	LMX6	0.880	
	LMX7	0.901	
OCB-I	OCB-I1	0.856	0.710
	OCB-I2	0.798	
	OCB-I3	0.879	
	OCB-I4	0.870	
	OCB-I5	0.843	
	OCB-I6	0.786	
	OCB-I7	0.861	
OCB-O	OCB-O1	0.806	0.590
	OCB-O2	0.808	
	OCB-O3	0.755	
	OCB-O4	0.799	
	OCB-O5	0.735	
	OCB-O6	0.731	
	OCB-O7	0.785	
	OCB-O8	0.714	
	OCB-O9	0.771	
TP	TP1	0.824	
	TP2	0.867	
	TP3	0.928	0.767
	TP4	0.897	
	TP5	0.862	
	TP6	0.886	
	TP7	0.863	

Where the "LMX" abbreviation refers to leader-member exchange, OCB-I, organizational citizenship behavior—individual; OCB-O, organizational citizenship behavior—organization. The "TP" abbreviation refers to task performance.

OCB-I and OCB-O are at a substantial level, with R^2-values of 0.485 and 0.511, respectively. The R^2-value of TP is 0.591, which is also acceptable. As **Figure 3** shows, OCB, OCB-I, and OCB-O are at a substantial level, with R^2-values of 0.644, 0.753, and 0.790, respectively. The R^2-value of TP is 0.590, which is also acceptable.

Goodness of Fit

In PLS the global standard of goodness of fit (GoF) is applied to measure the entire model. GoF is calculated as the geometric

TABLE 4 | Discriminant validity of constructs.

Construct	LMX	OCB-I	OCB-O	TP
LMX	**0.899**			
OCB-I	0.695	**0.843**		
OCB-O	0.713	0.543	**0.768**	
TP	0.491	0.665	0.666	**0.876**

Where the "LMX" abbreviation refers to leader-member exchange, OCB-I, organizational citizenship behavior—individual; OCB-O, organizational citizenship behavior—organization. The "TP" abbreviation refers to task performance. The bold value means the square root of AVE of each variable.

mean of the average communality and average R^2 of the endogenous constructs. Following Wetzels et al. (2009), the model was evaluated with the baseline values of GoF (small = 0.1, medium = 0.25, large = 0.36). As **Table 5** shows, the model's GoF was 0.533, which indicates adequate PLS model validity.

Hypothesis Testing

The hypotheses were tested using bootstrapping, which entails repeated random sampling and replacement of the original sample to create a bootstrap sample. The resulting standard error is used to verify each hypothesis. **Figures 4**, **5** show the PLS bootstrapping method for the first-order and the second-order of structural model.

Table 6 presents the results for the hypothesized structural relationships between LMX, OCB (OCB-I, OCB-O), and TP. A 5% significance level of the two-tailed test requires a *t*-value of at least 1.96, while a 1% significance level of the two-tailed test requires a *t*-value of at least 2.58. LMX was found to be significantly associated with TP (t = 5.905), OCB (t = 19.484), OCB-I (t = 10.441), and OCB-O (t = 11.938). OCB was found to be significantly associated with TP (t = 10.068). Furthermore, OCB-I and OCB-O were also significantly associated with TP (t = 5.238, t = 5.639, respectively). Thus, hypotheses H1, H1a, H1a, H2, H2a, H2b, and H3 were supported.

To test the mediating effects of OCB, OCB-I, and OCB-O on the relationship between LMX and task performance, this study assessed how much of the direct path is absorbed by calculating variation accounted for (VAF): VAF $<$ 0.2 means no mediation effect, VAF from 0.2 to 0.8 means partial mediation, and VAF $>$ 0.8 means full mediation. As **Table 7** shows, OCB,

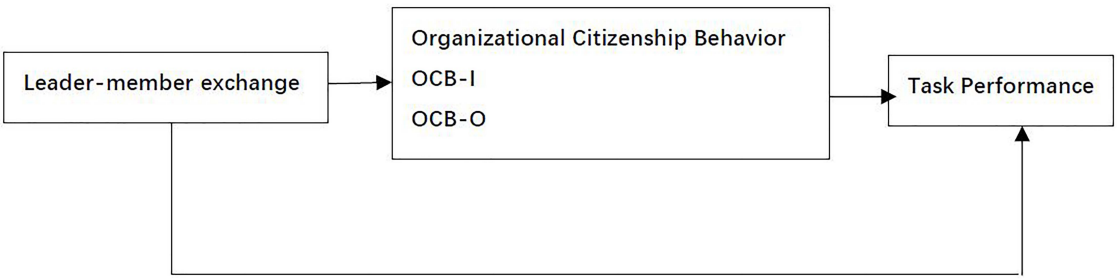

FIGURE 1 | Theoretical framework.

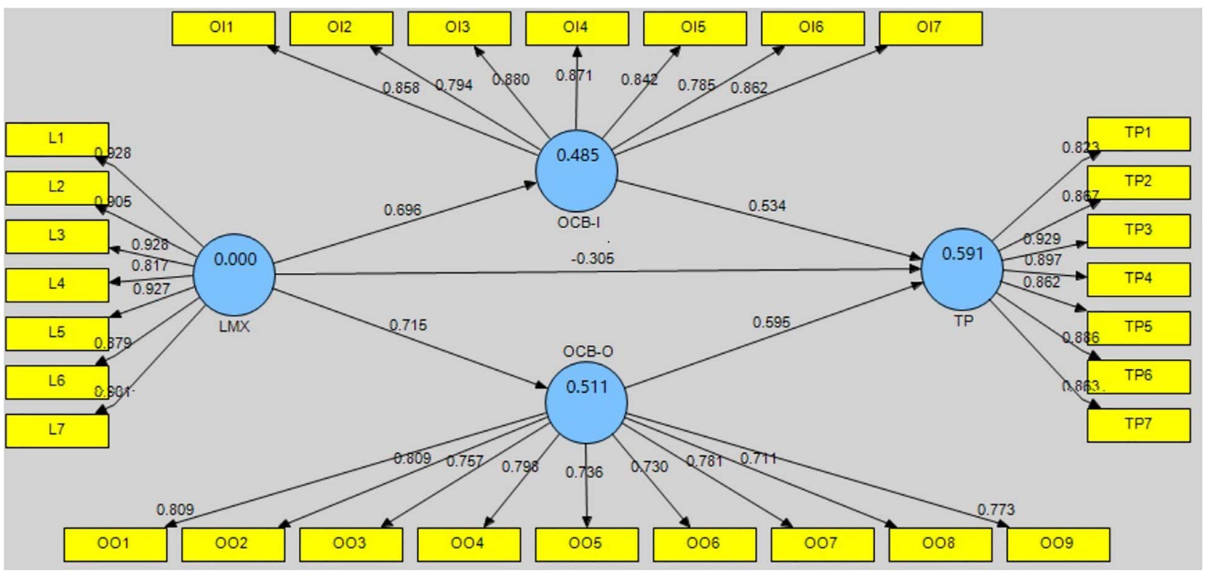

FIGURE 2 | The first order structural model for individual latent variable.

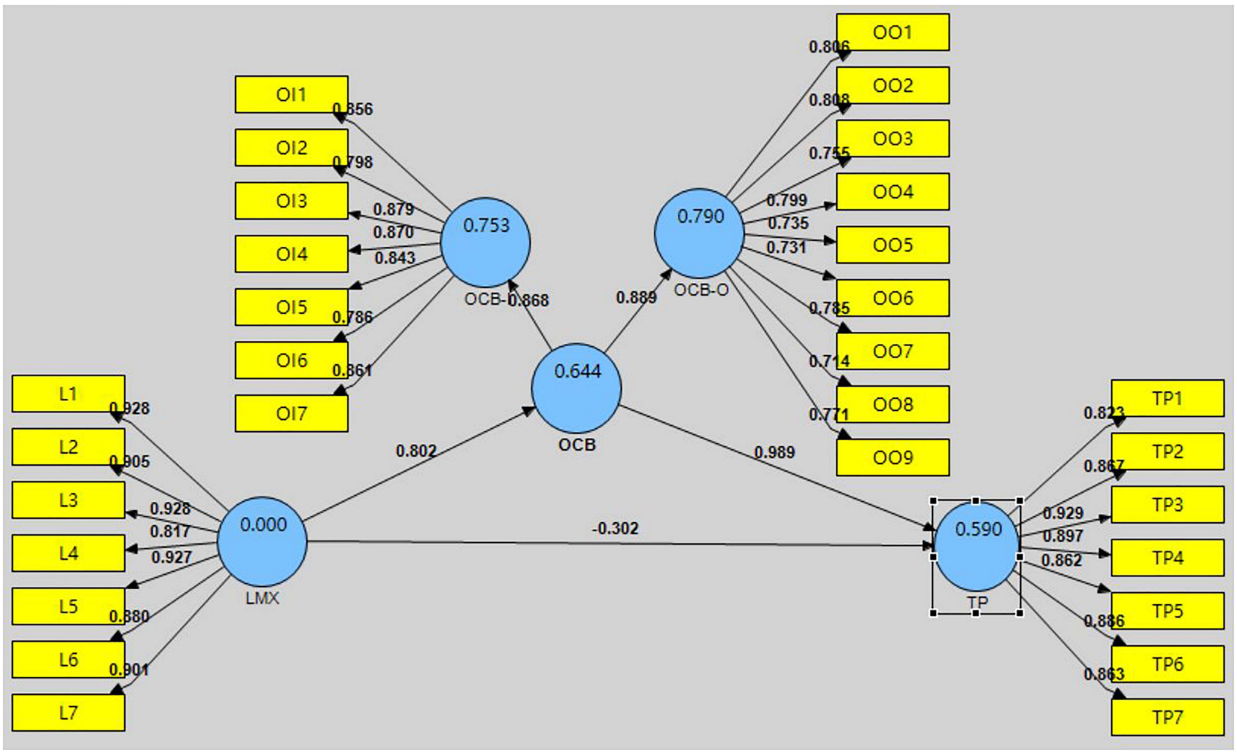

FIGURE 3 | The second order structural model for main latent variable.

OCB-I, and OCB-O fully mediate the relationship between LMX and TP. Hence, H4, H4a, and H4b were supported.

DISCUSSION

Taking k-workers working in Chinese hospitals as the research object and analyzing data collected through a questionnaire survey, this research investigated the relationships among LMX, OCB (OCB-I, OCB-O), and task performance from both theoretical and empirical perspectives. The results showed that LMX is positively related to task performance, which is consistent with previous research findings (Wang, 2016; Lee et al., 2019).

TABLE 5 | Structural model specification.

Construct	R^2	Communality
LMX	Predictor	0.806
OCB	0.645***	0.496
TP	0.591***	0.767
Σx/n	0.412	0.690
[(Σ*x*R2)/n] × [(Σ*xComm/n*]		0.284
Goodness of fit (GoF)		**0.533*** **

According to Wetzels et al. (2009), GoF_{small} = 0.10, GoF_{medium} = 0.25**, and GoF_{large} = 0.36***. Where the "LMX" abbreviation refers to leader-member exchange, OCB-I, organizational citizenship behavior—individual; OCB-O, organizational citizenship behavior—organization. The "TP" abbreviation refers to task performance. The bold value means the GOF value of the main model.*

In detail, the leader provides extra benefits to the follower in a high-quality supervisor-subordinate dyad. Hence, based on the principle of reciprocity on the social exchange theory, these benefits allow k-workers to make extra efforts or dedicate themselves to their work, which is benefit to the achievement of better task performance. This finding indicates that high-quality LMX and a harmonious relationship between supervisor and subordinates can promote increased task performance of k-workers in Chinese hospitals, ultimately contributing positively to long-term organizational success. Therefore, the present study suggests that LMX could be used as a basis for recruiting and selecting public sector supervisors. For example, nice and kind supervisors can create a harmonious relationship with their k-worker followers.

The results also showed that LMX was positively related to OCB and to its two dimensions of OCB-I and OCB-O, consistent with the findings of Harris et al. (2014), Chow et al. (2015), and Tang and Naumann (2015). This finding indicates that high-quality LMX leads k-workers to perceive that their superior trusts and supports them. To maintain this social exchange relationship, based on the principle of reciprocity on the social exchange theory (Blau, 1964), subordinates will try to work harder and even undertake tasks beyond their job requirements. Besides, the significant relationship between LMX and OCB also indicates that in a high-quality exchange relationship, the leader offers precious incentives for followers, including rewards for going beyond their formal duties. Therefore, according to social exchange theory, to preserve a balanced or equal relationship

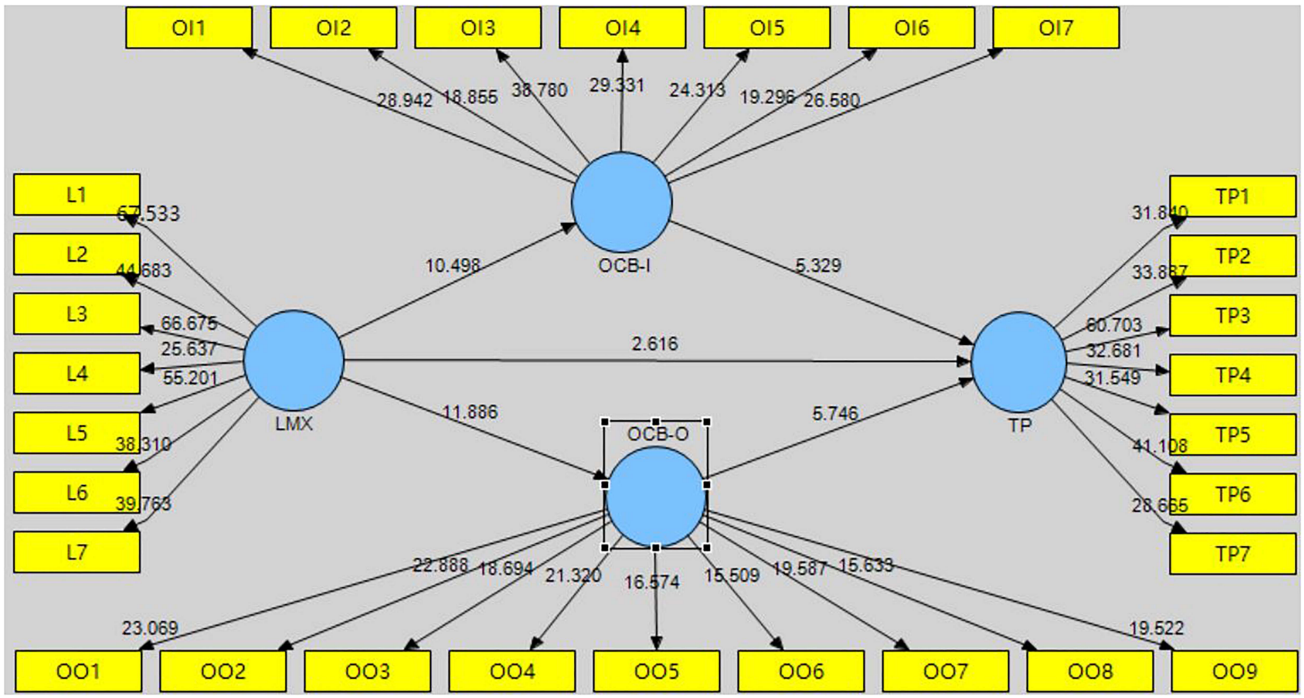

FIGURE 4 | Hypothesis testing of first order model.

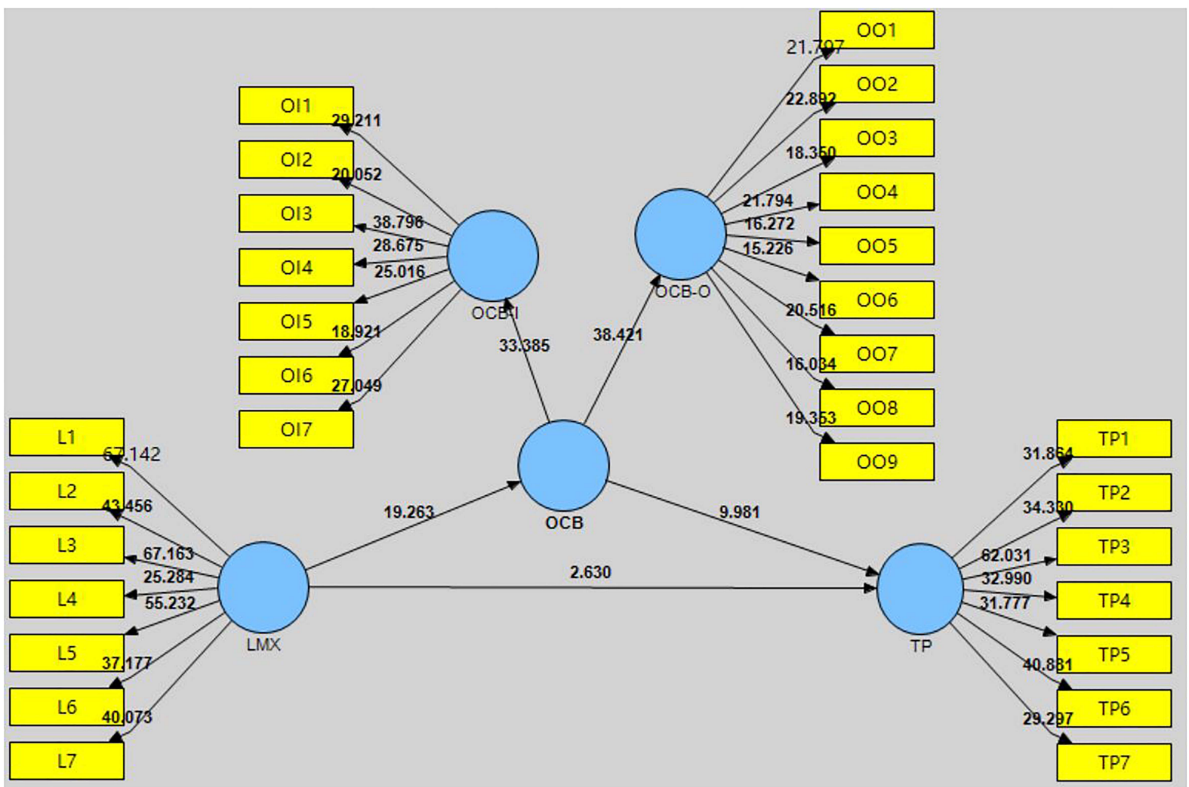

FIGURE 5 | Hypothesis testing of second order model.

TABLE 6 | Hypotheses testing.

Hypothesis	Relationship	Standard error	T statistics	Supported
H1	LMX—OCB	0.041	19.484**	Yes
H1a	LMX—OCB-I	0.067	10.441**	Yes
H1a	LMX—OCB-O	0.060	11.938**	Yes
H2	OCB—TP	0.098	10.068**	Yes
H2a	OCB-I—TP	0.102	5.239**	Yes
H2b	OCB-O—TP	0.106	5.639**	Yes
H3	LMX—TP	0.083	5.905**	Yes

**Significant at $p < 0.05$ at a two-tailed T statistics value of 1.96; **Significant at $p < 0.01$ at a two-tailed T statistics value of 2.58. Where the "LMX" abbreviation refers to leader-member exchange, OCB-I, organizational citizenship behavior—individual; OCB-O, organizational citizenship behavior—organization. The "TP" abbreviation refers to task performance.*

TABLE 7 | Testing the mediation effect.

Hypothesis	Relationship	VAF	Supported
H4	LMX—OCB—TP	1.620	Yes
H4a	LMX—OCB-I—TP	0.833	Yes
H4b	LMX—OCB-O—TP	0.939	Yes

Where the "LMX" abbreviation refers to leader-member exchange, OCB-I, organizational citizenship behavior-individual; OCB-O, organizational citizenship behavior-organization. The "TP" abbreviation refers to task performance.

of exchange, subordinates are more likely to perform extra-role behaviors (Huang et al., 2014). Good relationships between leaders and k-workers in Chinese hospitals is vital to motivating k-workers to carry out more extra-role behaviors.

Furthermore, this study empirically evidenced that k-workers' OCB (OCB-I, OCB-O) mediated the relationship between LMX and task performance in Chinese hospitals. According to the principle of reciprocity on the social exchange theory, when LMX between leaders and k-workers is high quality, subordinates are more likely to engage in OCB as return, which in turn helps to promote their task performance and, ultimately, benefits organizational performance. Thus, this result may indicate that managers need to establish and maintain harmonious relationships with their subordinates. It is also advisable to consider LMX and OCB in performance evaluations because both are directly related to k-workers' task performance.

With a high-quality degree of LMX with their supervisors, k-workers tend to establish a stabilized and harmonious relationship with supervisors. It will be benefit of the development of a psychological well-being. Such a psychological well-being is the key to the drive of engaging in OCB because of the autonomy of OCB and, finally, benefits task performance. Besides, such a psychological well-being also has a direct effect on improving the task performance of k-worker. Hence, starting from the supervisor-subordinate dyads perspective, the inner social exchange is the origin of k-worker's psychological well-being and ultimately benefits organizational development.

Overall, followed the suggestion of Hill et al. (2016) that more study should be investigated in different group, this study has some theoretical contribution and practical contribution. Theoretically, based on social exchange theory, this study established a theoretical framework that explained the relationship between k-worker's LMX, OCB and task performance. It contributes to the LMX literature with a special group and different cultural background. Practically, this research provided some useful implication to hospital managers, which is helpful for them to manage and motivates their k-worker employees. Such implications indicated that LMX is the key of management in hospital because the degree of LMX associate with the k-worker's psychological well-being, and finally connect to the organizational performance in hospital.

LIMITATIONS

This study has two main limitations. First, both the independent variable (LMX) and the mediator (OCB) were measured in the same group and at the same time, so common method bias cannot be entirely ruled out. To address this limitation, future studies should collect data on the independent variable and mediator at different times. Second, although the data were collected from a convenience sample of k-workers in several Chinese hospitals, the sample size still relatively small. Therefore, the findings are limited to the studied sample and cannot be generalized to all Chinese hospitals. More research should be conducted in different kinds of working group and in different cultural contexts. Finally, since this research adapted the scale from Graen and Uhl-Bien (1995) to test the k-worker's degree of LMX, only subordinates are needed to fill the questionnaires. Hence, it will be a limitation that the situation of supervisor-subordinate dyad is out of considering. The further research should be investigated in different supervisor-subordinate dyads, and such sample will be more contributive to the further study.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Universiti Utara Malaysia. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

XC performed this research and finished the manuscript of this research. ZG analyzed the data of this research. QC edited the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Swiss Primary Teachers' Professional Well-Being During School Closure Due to the COVID-19 Pandemic

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During sudden school closures in spring 2020 due to the COVID-19 pandemic, teachers had to move to distance teaching. This unprecedented situation could be expected to influence teacher well-being and schools as organizations. This article reports a qualitative study that aims at understanding how changes in teachers' professional lives that were related to school closure affected Swiss primary teachers' professional well-being. In semi-structured online-interviews, 21 teachers from 15 schools sampled by snowball method reported their experiences during school closure and distance teaching and how this situation influenced their professional well-being. Results showed that medium to high levels of teacher well-being could accompany a general negative evaluation of the move to distance teaching. Factors such as high work-load, social distancing and feelings of lack of competence and self-efficacy were among the most aversive aspects of distance teaching and associated with deteriorating professional well-being. Among a plethora of factors that supported teachers in maintaining their well-being, contextual work-related aspects such as school resources, collegial support or leadership support along with individual aspects such as resilience, coping strategies, and clear work structures were important. Additionally, it was found that teacher well-being was nourished by positive experiences with the new forms of distance teaching and feelings of professional mastery. Despite methodological limitations (snowball sampling, retrospective interviews), the findings of this study could inform schools and authorities about what is needed to support teacher well-being and might help to develop organizational strategies that aim at preventing harmful declines in teacher well-being during challenging and difficult times such as a pandemic.

Keywords: well-being, teacher, school, resilience, school closure, COVID-19

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INTRODUCTION

The main role of schools is the formal education of children and adolescents. Schools should support students in acquiring academic knowledge and skills, flourishing and striving as lifelong learners, as well as becoming responsible members of a sustainable and fair future in globalized societies. These challenging and demanding tasks call for optimal functioning and a highly

committed and effective teaching force in schools. Teacher well-being is a crucial resource for the academic success of students and for school effectiveness as it correlates positively with feelings of competence and relatedness with students (Collie et al., 2016), can affect teaching practices and student learning (Turner and Thielking, 2019), and temper effects of stress (Hung et al., 2016). However, international studies show that teacher well-being is at risk and that schools around the world experience teacher shortage and attrition (e.g., The Badass Teachers Association (BATs), 2017; Education Support, 2019; OECD, 2020). Teachers experiencing diminished well-being at school are less able to provide high quality teaching and tend to leave the profession earlier (OECD, 2021). Teacher attrition due to low levels of well-being, in turn, may undermine school quality. Concurrently, a teaching profession whose demands are known to challenge individual work-life balance fails to attract people to work in schools.

The outbreak of the COVID-19 pandemic in the beginning of 2020 dramatically changed lives in schools. After schools were fully or partly closed, schools as organizations as well as every individual principal, teacher, and school faculty member had to adapt to a predominantly new and potentially threatening situation. Never before, has any societal change had such a strong influence on schools. Never before, has any societal change impacted all members of a school community and in nearly every country. In Switzerland, where the vast majority of structures, organizations and processes of the education system are based on face-to-face education, school closure led to a very unfamiliar situation, specifically for teachers and learners in compulsory education. No teacher has been trained for the move to online teaching; no student has been prepared for learning from home; no parent has been prepared for home-schooling; no school has been equipped for the technical and pedagogical support of distance learning.

It is likely that this situation has influenced teacher well-being. Along with daily demands, teachers had to face new challenges with distance teaching, social distancing, technically driven communication with children and parents as well as with school colleagues and principals. Aside from worries about their own health, teachers were expected to provide the best education to children. Along with regular high expectations of the teaching force, teachers had to manage teaching and learning under even harder conditions due to school closure during the pandemic (OECD, 2021). Given the high demands on teachers, our study aims to understand how school closure due to the COVID-19 pandemic influenced primary teacher well-being and what could be learned from the results for the support of teacher well-being in primary schools. In order to get a deeper insight into teachers' perspectives, we wanted to emphasize their individual experiences during school closure and distance teaching in primary education. Both demands and potential resources during school closure were addressed and investigated regarding their impact on primary teacher well-being.

Teacher Well-Being

Teacher well-being has been acknowledged to be crucial for teachers' lives as low levels of teacher well-being are a threat to teacher health (e.g., Gray et al., 2017; School Mental Health Group, 2019). It is a major driver of teaching quality (Duckworth et al., 2009) and student achievement (Branand and Nakamura, 2017). Given the high workload and professional responsibilities that teachers face, their well-being is a precious resource for high quality teaching and supports teachers' professional ability. Also, for schools as organizations, teacher well-being is of utmost importance. In helping to prevent emotional exhaustion and burn-out, teacher well-being may contribute to prevent an individual's intentions to leave the profession and to a reduction in teacher attrition (e.g., Renshaw et al., 2015; McCallum et al., 2017; Skaalvik and Skaalvik, 2018). Understood as a symbol of predominantly positive emotions and cognitions toward the profession and individual work, teacher well-being supports teachers' optimal functioning in and commitment to school (Creemers and Reezigt, 1996). Teacher well-being is important for school improvement processes and successful educational governance (Sutton and Wheatley, 2003; Zembylas, 2010) whereas low levels of teacher well-being can hamper school improvement and educational reforms and lead to higher rates of teacher absenteeism (Parker et al., 2012; Education Support, 2019; Turner and Thielking, 2019). In sum, teacher well-being has been valued as a precondition as well as indicator of a successful fulfillment of the professional role and the meaningfulness of professional work as a teacher (e.g., Deci and Ryan, 2008). As teacher well-being is directly and indirectly linked to school effectiveness, it bears high relevance for schools as organizations that teach and educate future generations. However, among a plethora of studies that investigate teacher well-being studies seem to forgo the differentiation between different school type or to tailor research questions to the specific demands of primary education. Thus, less is known about teacher well-being in primary education that shows specific characteristics such as teaching children in an age range from 5 to 12 years, heterogeneous classroom composition, inclusive education, teaching goals that aim at basic education, and generalist teacher education.

Whilst there is agreement on the importance of teacher well-being, differences exist regarding the question of how teacher well-being is conceptualized. Definitions and operationalizations range from positive aspects of psychological functioning such as job satisfaction, intrinsic motivation, and positive emotions at work to worries and complaints related to work such as negative emotions, exhaustion, or stress. Also, various forms of well-being can be differentiated such as a psychological, physical, or social well-being (e.g., WHO, 1946), hedonic and eudemonic well-being (Ryan and Deci, 2001) or workplace well-being that is defined as consisting of organizational well-being and subjective well-being (Burns and Machin, 2013). This heterogeneity is based on the conceptualization of well-being as a multidimensional construct that has found its early roots in Diener (1984) definition of subjective well-being as a composite of satisfaction as well as positive and negative affect. Over the years, well-being has reached increasing multi- and transdisciplinary attention as well-being is expected to influence various dimensions of individual and societal life (McCallum et al., 2017). This multi- and

transdisciplinary view has contributed to the enhancement but also blurring of the construct of well-being.

With regards to the teaching profession, researchers from different fields of psychology (e.g., Seligman, 2002; Collie et al., 2016; Royer and Moreau, 2016), education (e.g., Laine et al., 2018), and health sciences (e.g., Sadick and Issa, 2017) aim for a greater understanding of teacher well-being. Teacher well-being can be described through a variety of indicators and factors. Frequently, positive factors (e.g., positive emotions, satisfaction, or self-efficacy beliefs) as well as negative factors (e.g., negative emotions, stress, or complaints) are recognized as defining components. Due to the co-existence of positive and negative factors, teacher well-being can be defined by their relationship and be understood as a "positive imbalance" that represents a dominance of positive over negative factors. The more pronounced this difference between the positive and negative factors, the higher the perception of well-being. Positive emotions, cognitive evaluations and worries, or complaints have been identified as core elements of teacher well-being (Hascher, 2012).

Interestingly, across a variety of studies it has been found that well-being and satisfaction can coexist with reports of stress and demands as shown for example by low negative correlations of well-being and demands (Burns and Machin, 2013), well-being and extra duties (Collie and Martin, 2017), or well-being and workload (Lavy and Eshet, 2018). This result was even more pronounced in an earlier study with Swiss teachers (Bieri, 2006). The co-existence of positive as well as negative perceptions and evaluations of the teaching profession needs further attention. One explanation could be that teachers experience high stress at work but also exhibit resources to cope with stressors. Personal resources and capacities such as resilience (Beltman et al., 2011; Brouskeli et al., 2018), work motivation (Collie and Martin, 2017), and emotion regulation skills (Lavy and Eshet, 2018) have been found to support and protect well-being. Resources at work are also of considerable importance for teacher emotions and well-being (Salanova et al., 2006; Leithwood, 2007). Accordingly, quality of school life (Cenkseven-Önder and Sari, 2009), teacher learning climate (Shoshani and Eldor, 2016), a supportive teacher environment (Ilgan et al., 2015; Renshaw et al., 2015), or more specifically, autonomy and social support at work (Ebersold et al., 2019) have been confirmed as influential for teacher well-being. Reciprocal effects could be expected as organizational resources may influence teacher well-being, which, in turn, may influence future personal and organizational development.

Among the array of job-related factors, social relationships have been repeatedly confirmed as a major source of teacher well-being (Hascher and Waber, in review). As a social profession, teaching depends on interactions with students, colleagues and parents and teachers, and so seems to be specifically vulnerable to social factors (Gu, 2014). It has been confirmed that positive teacher-student-relationships nourish teachers' needs for social relatedness (Spilt et al., 2011; Klassen et al., 2012; Collie et al., 2016), social support by colleagues and principals are relevant for teacher well-being (Wong and Zhang, 2014) as well as supportive leadership (Berkovich, 2018). Thus, teacher well-being can be nourished by individual social interactions as well as professional social interactions in the organization. However, little is known about the consequences for teacher well-being when teachers lose their familiar social environment and social embeddedness into school such as the COVID-19 requirement to work from home.

School Closure in Swiss Primary Schools

As soon as the Swiss government realized the detrimental impact of the COVID-19 pandemic on public health, a lockdown that also included school closure was issued. Schools were immediately closed over a weekend in March 2020. In most schools, teachers had been informed about school closure on Friday and expected to start with distance teaching the following Monday leaving the weekend for preparation of a fully unfamiliar online teaching. During the first weeks, schools, teachers, students, and parents were left with little clarity about the duration of school closure and distance teaching and learning. Schools were informed that the Swiss government aimed at re-opening of schools as soon as possible. More precisely, the Swiss government decided on school closures on Friday, March 13th 2020. Most schools were closed from Monday, March 16th. Schools had been informed by politicians about re-opening not earlier than April 04th, and finally primary schools re-opened on May, 11th 2020. However, in the first one or more weeks schools applied the method of reduced student attendance by a daily alternate grouping (Halbklassenunterricht), i.e., each day only half of the children attended school while the other students learned online.

In Switzerland, primary education covers the years from preschool to 6th grade (K-6). Primary teachers are usually trained to teach numerous subjects for K-2 or grade 3–6, and have an average workload of 24–26 lessons a week with a fulltime position. However, part time contracts are frequent. Age-grouped and multi-grade classroom (usually two age groups in one classroom) coexist, occasionally within the same school. Thus far, little is known about the specific practice of distance teaching in primary education during school closure in Switzerland in spring 2020. However, it can be assumed that this practice has been heterogeneous in terms of quantity and quality due to the variability of work conditions in schools along with the high autonomy that is assigned to teachers in the Swiss education system. Given the shortness of time that teachers were allowed in moving to distance teaching and the lack of opportunity in organizing high quality distance teaching, it can be expected that primary teachers faced high insecurity, high stress, and high pressure to succeed. Teaching quality might have been dependent on individual teacher dispositions and competencies, and the use of technically supported distance teaching could be determined by teacher technical interests, affinity, and skills. No guidance for teacher-parent collaboration during school closure was provided. Accordingly, results from the school barometer that collected data from teachers, parents and students in Switzerland, Germany, and Austria during school closure indicated qualitative differences and a huge variety in distance teaching and home schooling (e.g., Huber and Helm, 2020). Although the sample was highly biased with an overrepresentation of German adolescent students, the collected data showed that school closure has been highly demanding for

students, parents, and teachers as well as schools as organizations. A review of studies on German, Swiss, and Austrian schools during COVID-19 related school closure shows that the variety of applied teaching practices ranged from weekly task-books that students had to edit without or only minimal contact with teachers and peers to regular online meetings with the teacher and the whole classroom (Helm et al., 2021).

The Role of School Closure for Teacher Well-Being

Well-being can be threatened by critical situations (Filipp and Klauer, 1991; Parker et al., 2012). Serious events such as a pandemic, school closure and corresponding changes in the living and working conditions of teachers can be identified as crises or critical life events. Crises or critical life events such as unemployment are risk factors with a significant negative impact on individual and collective well-being (e.g., Latif, 2010). In view of findings that teachers need to be largely free of stress and feel comfortable at work to commit themselves to innovation and change (Sisask et al., 2014), it could be assumed that teachers' negative appraisal of working conditions under the pandemic will impede their well-being.

However, research has shown that a crisis or critical life event may even bear positive potential and also can trigger individual and collective development. There seems to be some agreement that positive effects of a critical situation or a crisis depend on how the challenging situation is appraised and whether the individual has opportunities to respond. For example, similar to the Lazarus (1966) and Lazarus and Folkman (1984) differentiation into primary and secondary appraisal, the "Job Demands-Resources Model" by Demerouti et al. (2001; Bakker and Demerouti, 2017) suggests the differentiation into two categories of job characteristics: (1) job characteristics such as high work load or emotional demanding interactions that are demanding and energy consuming; and (2) job characteristics such as opportunities for autonomy and personal growth that serve as resources for the individual and support the achievement of professional goals and development. In this model, also two opposite processes are distinguished: (1) The strain-process is characterized by the fact that challenges primarily consume energy and the high loads weaken a person's mental and physical resources, which can lead to health problems, to low levels of well-being and to burnout. (2) The motivation-process is described as motivating because available resources lead to the task being tackled and successfully managed. The individual is seen as reactive as well as proactive in dealing with challenging, demanding and critical situations. As regards the effects of the COVID-19 pandemic, the "Job Demands-Resources Model" suggests to identify how an individual teacher appraises the burden of the challenges along with her/his personal resources to respond to this extreme situation.

In a similar vein, Podsakoff et al. (2007) and Tadić Vujčić et al. (2017) differentiated between hindrance demands (i.e., tasks and characteristics of the work that impede task fulfillment) and challenge demands (i.e., workload, responsibility, and complex tasks that also include positive aspects). They showed that hindrance demands impede autonomous work motivation challenge while demands support autonomous work motivation that in turn influence secondary teacher well-being. Moreover, it has been found in research on resilience, that stressful situations can decrease teacher well-being whereas challenging situations may even foster well-being (Beltman et al., 2011). Based on these findings, various different effects of the COVID-19 pandemic are conceivable. As a risk factor, the consequences of the pandemic could have a substantially negative effect on well-being, for example if the break with familiar practices and the completely new form of distance teaching proves to be primarily a stressor. On the contrary, understood as an opportunity for example to create new practices in remote teaching and new professional forms of collegial cooperation, the consequences of the pandemic could also promote well-being. For example, in the United States Anderson et al. (2021) found that during COVID-19 lockdown teachers' creativity in distance teaching was related to well-being factors such as buoyancy, positive affect, and dispositional joy.

Consequences of a critical life event can affect or stimulate well-being temporarily or in the long term. A temporary influence tends to wane after a certain time and well-being settles back to its level before the event (Diener and Larsen, 1984). Current research shows that various major life events (e.g., child birth, financial loss, separation) differentially influence well-being (Kettlewell et al., 2020), i.e., how the consequences of a crisis or critical life event are perceived and which form of influence on well-being dominates is not only related to individual appraisal and individual factors such as resilience, coping strategies and individual resources but also to the nature of the event (Kettlewell et al., 2020). Moreover, as was found by Aldrup et al. (2017) contextual factors can contribute to this process of adaptation as possibly harmful effects of negative events on well-being (e.g., student misbehavior) can be moderated by social relatedness. In the case of the COVID-19 pandemic, contextual factors include, for example, policy decisions, governance by the school management, school leadership (Collie, 2021), and social support within the teaching force.

What does relevant empirical evidence indicate about how the COVID-19 pandemic influenced teacher well-being? So far, initial results from studies around the globe point to predominantly negative but also ambivalent effects. For instance, Fauzi and Khusuma (2020) found in a survey study with 45 Indonesian elementary school teachers that although the majority of teachers appreciated the opportunities given by online teaching during the pandemic, about 80% felt dissatisfied as they experienced a sense of ineffectiveness with online teaching that might have decreased their well-being. These results were confirmed in a mixed-method study with Indonesian 67 primary teachers (Rasmitadila et al., 2020) that identified challenges in online teaching, with selecting instructional strategies as well as teacher motivation, and underlined the role of teacher support (see also Putri et al., 2020). Similarly, Alea et al. (2020) identified in a survey in the Philippines that teachers felt challenged by a lack of knowledge, skills, and experience in teaching online. Gross and Opalka (2020, p. 1) found in a representative study that United States teachers had insufficiently been supported and encouraged to manage this difficult situation, leading to the result

that "Far too many districts are leaving learning to chance during the coronavirus closures."

Research also shows that teachers' major concerns related to student cognitive and social problems during school closure. Based on an interview study with 24 teachers from English state schools, Kim and Asbury (2020) found worries about vulnerable student to predominantly intensify teachers' anxiety and sadness. Having left student development and learning to chance could deteriorate teacher well-being. Alves et al. (2020) asked Portuguese teachers during the pandemic to compare their current professional well-being to their well-being before the pandemic. Data from 1479 teachers indicated a decrease in emotional well-being (more stressed, more tired, more work overloaded, more anxious, more pressed and more distressed along with feeling less satisfied, less motivated, less valued) and an increase in teaching difficulties regarding distance learning, use of digital platforms, and evaluation. Similarly, satisfaction with the education system and positive future perspectives declined.

Interestingly, Allen et al. (2020) could not find a decrease of teacher well-being in England measured with the Warwick-Edinburgh Mental Well-being Scale during the first weeks of the school closure. However, a closer look at the teachers' answers revealed positive as well as negative changes. For instance, during the school closure in April 2020, teachers reported that they had more energy to spare (7 versus 34%) and felt more relaxed (15 versus 37%) in comparison to regular school time in October 2019. At the same time, teachers reported feeling less useful in April 2020 (60 versus 44%), less optimistic about the future (39 to 30%), and less interested in new things (42 to 27%).

These results call for research that aims at a deeper understanding how teachers have responded to the new working situation in the context of the COVID-19 pandemic. What could have been positively experienced during school closure in spring 2020 to support a "positive imbalance" and maintain or restore teacher well-being? It is important to understand how teachers dealt with such challenging situations, how they mastered them, and how they would advise newcomers to deal with critical life events. Challenges might be specifically pronounced in primary education that – for example – capitalizes on personalized student-teacher relationship, includes a high heterogeneity of students regarding age and family background and is less prone to the use of digital tools. Therefore, this study aims to address the following questions: How did the situation of distance teaching during school closure due to the COVID-19 pandemic influence primary teacher well-being? What did primary teachers expect from schools to support their well-being during the school closure due to the COVID-19 pandemic? What could be learned from this situation for the promotion of primary teacher well-being in schools?

MATERIALS AND METHODS

This research follows a qualitative approach. The sampling strategy was based on the snowball principle and reached about 30 primary teachers that were personally invited by email. Twenty-one primary teachers (19 women, two men, age range 26–61) from 15 schools agreed to participate in semi-structured online interviews. Participants reflected a range of work profiles, with five in their first 5 years of teaching, 13 working part time, nine class teachers, one principal; six teachers in lower primary education and 15 teachers in upper primary education, 12 in multi-grade classrooms. Teachers were interviewed after school closure between April 2020 and October 2020. The interviews usually lasted 30 min and asked about teacher professional biography and teaching roles before and during the pandemic, resources and challenges of teacher well-being during distance teaching. The present study focuses on the results of the following questions:

1. How would you rate your well-being at work out of 10 (1 = extremely low; 10 = extremely high) at the moment? What has led you to make that judgment? How typical is that rating of how you usually feel at work?
2. Has there been a time during the COVID-19 crisis when you would have rated your sense of well-being at work at a low level? Can you tell me what was happening at that time?
3. Has there been a time during the COVID-19 crisis when you would have rated your sense of well-being at work at a high level? Can you tell me what was happening at that time?
4. What advice might you give to other people working in a similar position in relation to coping with such an adverse event as the COVID-19 pandemic?
5. Is there anything else you'd like to share about your experience of working in a school during this pandemic?

These five questions were integrated into a set of 12 questions in total. At the beginning of the interview, teachers were asked to describe their professional trajectories, the roles they had undertaken in the school in 2020, to select 1 of 10 photos to illustrate their current well-being (e.g., a photo of a tree, a beach scenario, a carousel) and to explain their lay definition of teacher well-being. Then, the definition of well-being as a positive imbalance was introduced to the teachers before asking about their well-being during the pandemic (see questions 2–5 above). Toward the end of the interview, additional questions regarding what has kept them going in their job and advice for people generally enrolled in education followed. Finally, teachers were encouraged to select another of the 10 photos that would represent their desired future well-being and explain why.

All interviews were transcribed verbatim and anonymized. Data analyses followed principles of qualitative context analyses (Kuckartz, 2014) and was carried out in several steps: (1) In a first step, teachers' central statements were sub-categorized. Central statements were identified by change in topics (e.g., a shift between teaching topics such as the use of digital tools to classroom management or a shift of the perspective of teacher to student needs). Thus, a sentence could be split up into several central statements as well as a statement could comprise several sentences and each statement could be assigned to one category. (2) The statements were then

grouped into a category scheme developed in a previous study for the systematization of sources of teacher well-being (Hascher and Waber, in review) that addressed the various predictors of teacher well-being, e.g., individual dispositions, working conditions, teacher-student relationship, or school climate. Additional categories needed to be defined for statements related to specific influencing factors in the context of the COVID-19 pandemic such as the unpredictability of a pandemic. The coding scheme (see **Table 1**) covered two main areas, namely objective and subjective factors. Objective factors were defined by their independence of an individual interpretation and a neutral description of characteristics such as teacher age, year of teaching, school form, or school size; subjective factors were defined by individual perception of the self (e.g., self-efficacy, competence) and the work context (e.g., collegial support, teacher-student relationship). Objective and subjective factors were each subdivided into general individual, work-related individual, and work-related contextual sub-factors. General individual factors include factors related to a persons' living condition (objective) or a person's character and dispositions (subjective). Work-related individual factors include years of teaching or class composition (objective) and subjective factors such as motivation, self-efficacy, or competences (subjective). Work-related contextual factors include the resources and organization of a school (objective) and experienced work-related contextual characteristics of a school such as teacher cohesion, principal support, or student motivation and well-being (subjective). For example, if a teacher referred to her/his many years of professional experience, this was classified under the category "objective factors, individual work-related." If a teacher mentioned that her/his work-situation had been impaired through a lack of support in the school faculty, this was categorized as "subjective factors, work-related contextual." (3) In a next step, it was specified within the categories whether the example mentioned was perceived as supporting or maintaining (S) or deteriorating (D) teacher well-being. Few statements were coded as ambivalent (A) as teachers reported both supporting/maintaining and deteriorating effects, e.g., student well-being could be supportive for teacher well-being as well as a concern for teachers that impeded their well-being.

The data-set consisted of $N = 615$ teacher statements and was analyzed with MAXQDA. At the beginning of the coding process, two independent raters coded 30% of the statements with a good interrater-reliability of Kappa = 0.86. Discrepant results were discussed and according statements were added as examples to the coding list in order to guide the subsequent coding process. All remaining 70% of the statements were coded by one of the two raters.

RESULTS

In the following sections, main results and most relevant factors are presented and illustrated by teachers' direct responses to the interview questions. Participant number (P01–21) and question number (Q1–5) are indicated with the examples, i.e., P21-Q3 indicates an exact quote from participant number 21 to question 3.

Primary Teacher Perceived Well-Being During School Closure

In general, it can be said that the 21 teachers reported a high level of well-being. On a scale of 1 (very low level of well-being) to 10 (very high well-being) all teachers indicated their well-being level above 6, and almost half chose the value 8. However, teachers agreed that school closures had a severe impact on everyday school life and that such experiences could affect their well-being as can be seen in the following examples.

> "At the beginning, when everything was so insecure, it was very difficult, you like hung in the air. And then suddenly there was no school, . . . until Sunday, we didn't know what was going on, and that was kind of unsettling or unreal. At first I almost didn't believe that something like this could happen" (P05-Q02).

> "At the very beginning when we were informed about school closure, I was extremely surprised and felt lost . . .. Also, when we started with the organization of distance teaching, my well-being went down again due to the high number of organizational tasks that are usually not related to my work as a teacher" (P14-Q02).

> "Yes, that was certainly at the start of this phase. Until I started the whole process with this distance learning, that the children could then really log into the different platforms. The whole electronic stuff and – also related to my well-being – to realize when parents are struggling with their children and I can't do anything" (P12-Q02).

Apart from the general negative evaluation of the sudden school closure, it became evident that each teacher had experienced the situation differently during the school closure. Despite the broad agreement on the evaluation of school closure as challenging and the high demands that school closure has placed on teachers, a variety of difficulties and resources in dealing with these challenges were mentioned. In general, subjective aspects were particularly decisive for teacher well-being. Although objective factors, such as employment conditions or policy prescriptions, played a significant role, in almost 90% of the statements, teacher well-being was associated with subjective factors such as personal conditions, available or missing psychosocial resources or social support. In total, teachers reported fewer deteriorating factors (39%) and more supporting factors (60%). However, the results also show that teachers report more deteriorating objective factors (60%) than supportive objective factors (37%), while the opposite can be found for subjective factors (deteriorating 36%; supportive 62%).

Objective Factors Deteriorating Primary Teacher Well-Being

The period of school closure has been an incisive experience with a number of negative facets that could have had a degenerative influence on teacher well-being. Teachers mentioned that, in the case of *objective individual factors (general and professional),* the

TABLE 1 | Coding scheme and results.

Category	Sub-categories	*Frequency and short verbal examples (D) deteriorating or (S) supporting teacher well-being*
Objective factors (N = 68; N_D = 41; N_S = 25; *N_A = 2)		
General individual *N* = 8 (12%)	Socio-economic status, age, living situation	N_D = 6; N_S = 2 (D) "My *home situation is not suitable for working from home* and I had to move so much stuff from the school" (S) "I just think by my *age,* . . . I have become a bit serene."
Work-related individual *N* = 20 (29%)	Years of teaching, class teacher, employment, class form, additional tasks	N_D = 8; N_S = 11; *N_A = 1 (D) "I was never credited that I still have a family at home and *could not teach only my part time 50%*, zero consideration was given to this." (S) "It was easier for me as I teach *first* graders. This is less stressful than fifth graders."
Work-related contextual *N* = 40 (59%)	Student background, school resources, political strategies, work-holiday times, changes of the profession due to the pandemic	N_D = 27; N_S = 12; *N_A = 1 (D) "*I have a student who does not even have internet at home.*" (S) "It was helpful that school closure also included *regular spring holidays*."
Subjective factors (N = 547; N_D = 199; N_S = 337; *N_A = 11)		
General individual *N* = 118 (21%)	General health, personal characteristics (Big 5), coping strategies, character strength, emotion regulation, serenity, self-care	N_D = 26; N_S = 91; *N_A = 1 (D) "I had the feeling that *I cannot cope with all these challenges* due to the pandemic" (S) "*Personally* I am actually *doing well*."
Work-related individual *N* = 240 (43%)	Word-loads, job demands, job satisfaction, professional attitudes, professional motivation and engagement, feelings of competence, self-efficacy beliefs, sense of commitment, professional challenges, consulting, autonomy, role as teacher, work-family balance, technical skills, new learning experiences	N_D = 128; N_S = 107; *N_A = 5 (D) "But the further the situation progressed and the more hopeless the situation became, that the child would connect and that I could reach it, *I felt like I was losing some*." (S) "I *love my job and liked the challenges* of distance teaching."
Work-related contextual *N* = 198 (36%)	Cooperation among teachers, peer conflicts, contact to faculty, relationship to students, principal support, relationship to parents, social appreciation, societal expectations, flow within school days, unfamiliar situations, structural resources	N_D = 45; N_S = 139; *N_A = 5 (D) "We had so *many problems in the team.*" (S) "I was just responsible for the subject of sport, someone else on the subject of French and *then we all did the dossiers and then everyone said the same thing, so you felt very carried in the faculty.*"

N_A = Example could not be coded as deteriorating or supporting as both aspects were addressed (example for subjective work-related individual: "One day, I was exhausted and tired, the other morning I felt good and motivated . . . there was no consistency in my well-being and also the children's well-being"; example for subjective work-related contextual: "Some children managed the situation well and others were lost").

double burden of work and family care (n = 4), as well as part-time employment (n = 4), affected professional well-being. For example, one participant spoke about family responsibilities.

> "That was perhaps the hardest thing. At home with the children . . . but at school I had to work a lot more than my assignment of less than 50%. And also, the expectation that I had to be available everyday for the school. My children also had appointments, zoom meetings, or they had to get material, they had to do their tasks" (P19-Q02).

Regarding *objective work-related contextual factors,* specific attention was given to diversity due to federalism (n = 11), challenging students (n = 5), insufficient school resources (n = 4), and changes of the teaching profession due to the pandemic (n = 4). The lack of a common strategy of schools and cantons and the navigation with the new professional technical tools could reduce teacher well-being as indicated in the example below.

> "I think clear instructions, for whole schools, or entire cantons or Switzerland-wide would also have been very nice. Every school or canton does something different and every teacher does a little bit as it does for them. I find this very difficult and also very difficult for the parents, who then have different children in different classes" (P07-Q04).

Subjective Factors Deteriorating Primary Teacher Well-Being

From the teacher's point of view, dealing with the crisis or distance learning was closely linked to their *general individual factors.* Well-being was impaired when emotional stability and resilience were low (n = 11), the uncertainty with the switch to distance learning was high (n = 5), or if teachers reported pre-existing health issues (n = 4). Low emotional stability during the switch to distance teaching reads as follows:

> "In various ways, not just professionally, just in general . . . the knowledge that I now have to switch to distance teaching has caused my anxiety. . . I felt like I couldn't handle that" (P15-Q02).

Among the *subjective individual work-related factors,* increased professional challenges (n = 33), heavy psychological stress (n = 25), a lack of experience of competence and self-efficacy (n = 18) and high workload (n = 17) were reported as negative influences. The shift in responsibility for children's learning from teachers to parents (n = 10) also affected teacher well-being. High workload was described as follows:

> "During the 8 weeks when the schools were closed, that was a dip and wake up after 8 weeks. It was just heavy. It wasn't all bad, however, it was just insanely intense, I was working

from the morning at 7, when I got up, always until late in the evening" (P16-Q02).

In addition, specific characteristics of the teaching profession (n = 17) proved to be detrimental to well-being.

"I just had the feeling that it's still the same with the fact that teachers are poorly supported and try to do everything alone. You talk about it a lot and do quality development and courses for fostering cooperation, but this has not yet sustainably changed our school culture" (P02-Q05).

Also, the general uncertainty and uncontrollability of the situation (n = 14) played an important role.

"This uncertainty was a burden for me, because this class will transit to another school in summer and I was totally unsure how to reach the learning goals with the students. I found that difficult" (P06-Q02).

Among the *subjective work-related contextual* factors, key topics of discussion included missing work structures in the school (n = 8) and lack of social and professional support of the school management (n = 5):

"We have not been optimally supported by the school management either. I can honestly say that we really didn't know what was going on for a long time" (P11-Q02).

Negative experiences were amplified when social relationships, specifically the relationship with students (n = 8) and parents (n = 5) and the parent-child relationship were unsustainable for the specific situation of distance learning (n = 5) as expressed in the following examples.

"The students did not work at home and they didn't come to school. I was there in the school and they didn't come to get the help I provided. The parents didn't support me, they said that the students just don't listen to them anymore, at 12–13 years old. It was such a low point where I noticed, I can't go any further" (P11-Q02).

Objective Factors Supporting Primary Teacher Well-Being

A few objective factors turned out to be relevant for the support of teacher well-being, among them education grade (individual work-related, n = 11) and a high IT-standard at school (work-related contextual, n = 6). It was also positively noted that the school closure period included school spring holidays (work-related contextual, n = 3). As can be seen in the following example, teachers also felt relaxed when school closure did not interfere with student selection and allocation (n = 8).

"I teach a 6th grade. I know the students well, I know the parents well, and the selections for transitions into secondary school were already done, so I was able to go into this school closure time quite relaxed" (P09-Q02).

Subjective Factors Supporting Primary Teacher Well-Being

Subjective *general individual factors* included competences and personal characteristics that are generally important for managing life challenges and being able to cope well with stress and multiple demands. Such competences and characteristics include character strengths (n = 12), emotional stability (n = 11), and serenity (n = 9). Resilience (n = 17) was demonstrated as will and confidence to succeed under adverse conditions as shown in the following example:

"I knew this situation was new to everyone. No matter what position you are in school and I knew it would be good, no matter what, there are solutions. I had few concerns or fear or whatever" (P01-Q02).

Self-care (n = 14) also played an important role in maintaining and promoting well-being. It was important that teachers paid attention to themselves and focused on activities that promoted their well-being.

"Yes, now I'm using this phase, that I'm just in the garden and in the house... I've been able to move forward and have just distracted myself a bit from this very unique situation" (P21-Q02).

Of equal importance were stress coping strategies (n = 10) and positive attitudes toward the teaching profession (n = 9). Successful coping reads as follows:

"First, I struggled and then I noticed, I can't change it, it's just like that and I just have to let it go and, yes, every kid has just his environment and it's going to come good ... the courage to accept the gaps somehow" (P21-Q03).

Among the *subjective individual work-related* factors that helped to maintain or promote well-being, positive experiences with new forms of teaching (n = 19, see example), feelings of competence and self-efficacy (n = 16) and job satisfaction (n = 11) were most frequently described.

"And then I started to create learning videos in every subject, and I really got into flow. I was really always at school, from 8 in the morning to 5 in the evening and just filmed and cut things together. In the beginning of course, it took forever until I was more experienced. But it was so much fun" (P10-Q02).

Being well organized with a clear work schedule (n = 17) also proved to promote teacher well-being.

"I think it also helped me that my everyday life continued as normal, because I went everyday to school. I have my own room here and here I met with my work colleagues and we did everything together. So, my everyday life went on pretty normal, just without the kids" (P03-Q02).

In addition, teachers capitalized on their high level of professional motivation and engagement (n = 10).

"It's actually my way, I think I love being a teacher. Yes, sometimes it's a lot, but somehow it keeps me alive, I feel" (P04-Q01).

Teacher well-being also was supported when teachers accepted the situation not as a hindrance but as a challenge (n = 7).

"You have to think about what is best to help the situation. I just discussed with my team teaching partner and the special needs teacher on what we can do for the children. We really just thought, who are the children who need the help most" (P08-Q02).

Subjective work-related contextual factors primarily concerned the social and relational aspects of teachers' work. Positive relationships with students (n = 34) and parents (n = 21) were of high importance. Also, participants described the way students promoted teacher well-being through signs of personal relatedness (n = 15) and parental recognition and gratitude (n = 12) as shown in the following example:

> "The relationship with the families, with the children themselves and also with the parents, has become much more intense. Every week we called the students at home (besides the phone times that we had anyway) and the families had my mobile number (normally they only know my home number) . . . and then I really got the kids, they wrote to me sometimes 'good night Mrs. X, sleep well'" (P06-Q03).

Similarly, collegial support (n = 22) and leadership support by principals (n = 17) were important as can be seen in the following two examples.

> "I think it was also the collaboration with other teachers who also provided a lot of teaching materials and it was a matter of course that you could exchange things" (P18-Q03).

> "Thank god, the school management gave clear instructions. There was also a lot of help from the school management who simply said, 'ok you do this and that,' this gave certainty" (P04-Q02).

Advice for Other Teachers

Teachers were asked about advice for other teachers in dealing with distance learning in a pandemic. Answers to this question were expected to reveal key ideas as to of what contributes to teacher well-being under very difficult circumstances. Each teacher gave several recommendations in dealing with such a challenging situation. The recommendations and strategies could be categorized into four main areas: personal mastery of the situation (professional skills and mental health), maintenance of social contacts with children and parents, cooperation with colleagues, and good administration.

Almost all teachers (n = 18) gave advice on how to keep personal mastery of the situation: to pay attention to one's own work-life balance, to improve technical and instructional skills, to exercise, to set realistic goals, to set structures, to practice calmness and distancing, and to maintain self-confidence as expressed in the following example.

> "The digital preparation is really important. I think that in today's time you have to use these media, you control them, the different channels of course and then at the class level, that this is well structured, that the flow of information is clear. Then the digitization of the teaching material is very important and the communication, quite clearly who does what and when. Then, of course, the personal condition, to organize yourself at home so that you can also do a bit of sports" (P17-Q04).

Advice also frequently referred to social contact with students and parents (n = 11) and how maintaining and even increasing contact was needed.

> "If you can communicate with the kids just now via teams or zoom, or somehow, then I think that's a very good thing, that you can talk to the kids that you see them, to share something with them. This depends on age, of course, but I really think that's the ideal if you can just see each other and talk to each other. The other way, simply giving working sheets and things home, is not satisfying. The important thing is really to stay in touch with the students and parents" (P04-Q04).

Teachers also recommended collaboration with colleagues (n = 5) which made it easier not only to solve problems, but to minimize loneliness.

> "It is essential to collaborate with colleagues. It is so important that you can ask someone for support and feedback, especially if you have little experience with the school material and then you can meet several times until you get a feeling for the needs of the children. Then, you are able to help the children, support them, accompany them. There is a risk that you will become lonely very quickly if you fail to connect yourself with students and parents and colleagues" (P20-Q04).

From a more technical perspective, participants highlighted the importance of having correct data and contacts for parents (n = 3). Obtaining and updating parents' contact details early on had proved to be a necessity together with careful instructions for both students and parents regarding online study.

> "In our school, a lot of teachers said that we don't have the contact details of the parents at all. In my case, it was easy because I had the data. When the school, however, wanted to send emails, it went back to half. So, I'd say if you have a new class personal data, mobile-phone numbers, email, that's a must" (P13-Q04).

DISCUSSION

This study aims at understanding Swiss primary school teachers' well-being during school closure due to COVID-19 pandemic in spring 2020. It was expected that the sudden school closure and the unprepared move to online teaching would lead to stress and discomfort among teachers and as consequence would have a negative impact on teacher well-being. Accordingly, this research also aimed at understanding how teachers react to restore or maintain their well-being in the face of adversity and the implications that can be drawn from these strategies for schools in order to support teacher well-being.

Results confirm that teachers faced severe professional challenges. Distance learning was neither a part of the societal culture nor the school culture, and so the move from face-to-face teaching to online teaching turned out to be a critical professional life event for all primary teachers (as shown in other studies, e.g., Klapproth et al., 2020) causing medium to high stress levels. Although they felt challenged by distance teaching, primary teachers in this study generally reported medium to high levels of well-being, similar to findings on general life quality of a representative Swiss sample 2 weeks after lockdown during spring 2020 (Moser et al., 2020). This result seems surprising as, according to the theory of critical life events (Filipp and Klauer, 1991; Parker et al., 2012), it was expected that the aversive and challenging experiences caused by school closure and distance teaching would hamper teacher well-being. As one explanation,

the hedonic adaptation process (hedonic treadmill; Eysenck, 1990) can be taken into account. Teachers' well-being might have settled back to its pre-pandemic level as was observed with other important life events (Diener et al., 2006). Based on our data, however, this unexpected finding might be better explained by the dominance of supportive factors that teachers reported during the interviews. Specifically, subjective individual factors such as self-efficacy and motivation and subjective factors that were related to the work context such as collegial support and social relationships to students and their parents seemed to empower teachers in coping with the difficult situation. With regard to the Job-Demands-Resource Model (Demerouti et al., 2001; Bakker and Demerouti, 2017) teachers could experience opportunities for personal growth through social support as well as positive experiences with new forms of teaching that contributed to a motivation process. Although teachers also reported an array of negative factors that affected their well-being, they seldomly seemed to experience a strain process. In line with Tadić Vujčić et al. (2017) the findings suggest that teachers appraised the difficult and new situation rather as challenge demands than as hindrance demands. It has to be noted, however, that teachers' positive evaluation may also be associated with a relief at the relatively short time period of school closure and also might fluctuate as was found in a diary study on university teacher well-being (Beltman et al., in press).

Despite the positive ratings of well-being, it should not be disregarded that primary teachers reported a plethora of factors that negatively affected their well-being. Interestingly, technical problems as reported in several other studies (Alea et al., 2020; Alves et al., 2020; Klapproth et al., 2020) did not turn out to be a major issue. Instead, work-load, social distancing and feelings of lack of competence and self-efficacy were among the most aversive aspects of distance teaching. Workload seemed to be more pronounced during the pandemic and a lack of confidence in teacher's own capacities confirmed the negative influence on well-being found in general studies on teacher well-being (e.g., Aelterman et al., 2007; Vazi et al., 2013). This result needs specific attention as teachers in Switzerland have high weekly workloads compared to other European countries (for lower secondary teachers see European Commission/EACEA/Eurydice, 2021). Given the fact that primary teachers tend to work part time and to cooperatively teach a class, extra workload might be a specific burden during the pandemic as cooperative distance teaching may consume additional resources. The loss of social relationships that was specific for the pandemic situation impeded well-being thus supporting the critical role that social aspects play for teacher well-being in general (Wong and Zhang, 2014) as well as during distance teaching.

The analysis of data differentiating objective variables that describe a teacher's working characteristics and situations in school, and subjective variables that cover a teacher's individual characteristics and interpretation of the working situation in school, proved to be helpful. It became evident that a negative influence was more pronounced among objective variables. Issues such as double burden of family and school demands, high expected workload, inconsistent political strategies and students that needed special support in online learning, are examples that impeded teacher well-being. Within objective and subjective variables, work-related contextual aspects such as school resources, collegial support or leadership support confirmed their high valence to teacher well-being during the pandemic. These results contribute to research that highlighted the importance of schools' organizational characteristics such school climate (Burns and Machin, 2013), organizational justice (Capone and Petrillo, 2016), or trust in principals (Berkovich, 2018) for teacher well-being. Also, they confirm the importance of teacher emotions for school effectiveness (Leithwood, 2007).

Distance teaching called for new actions and teaching competencies such as designing tasks that students could solve at home or maintaining contact with the class and individual students via digital media. This new "teaching profile" that was forced by distance teaching was described in an interview study with 15 Indonesian primary teachers (Putri et al., 2020). The profile indicated that: Teachers needed to adjust the curriculum, they had to figure out how to create exciting learning environments for online learning, they had to give online feedback to students and their parents to support student learning and they had to adapt their assessment strategies. Thus, it could be expected that also during a pandemic, schools that foster professional learning would contribute to teacher well-being (Tang et al., 2018).

Subjective variables were revealed to be predominately positive for teacher well-being. Individual characteristics such as resilience, serenity, emotional stability, self-care and professional attitudes supported teachers' well-being. As consistently found, resilience acts as a protective factor and a nurturing source when teacher well-being is under pressure as it helps teacher adaptation to an adverse situation (e.g., Beltman et al., 2011; Pretsch et al., 2012; Gu and Day, 2013; Brouskeli et al., 2018; Mansfield, 2021). In line with the "Job Demands-Resource Model" (Demerouti et al., 2001; Bakker and Demerouti, 2017) resilience may help to appraise challenging situations as opportunities for personal growth and to initiate a motivation process instead of a strain process. However, resilience may not exclusively be defined as a personality factor or an individual competence but can also be defined as an organizational feature. Organizational resilience represents a social construct that frames teacher effectiveness and support teachers' needs (Gu and Day, 2007). Both facets of resilience, individual and organizational, can support the maintenance of well-being (e.g., Richards et al., 2016). On the other hand, work-related contextual risk factors such as inconsistent policies, unsupportive administration or lack of school resources (e.g., Beltman et al., 2011) as reported by the teachers in this study can hamper resilience and teacher well-being.

Task focused coping was found to foster teacher well-being (Soykan et al., 2019). In the present study, factors that lead to teacher well-being can be identified as approach strategies as introduced by Carver and Scheier (1998) in their multidimensional model of coping. The teachers reported strategies such as acceptance of the situation, seeking emotional and instrumental support, practicing positive reframing as well as active coping and to improve their planning. Thus, in accordance with an international study on language teachers'

coping strategies during the pandemic (MacIntyre et al., 2020), approach-coping strategies were associated with teacher well-being.

Of specific interest is the result that new teaching experiences induced by distance teaching were empowering for the primary teachers. Teachers shared examples of innovative instructional designs such as producing learning videos, or giving individual feedback to recorded samples of student exercises in a foreign language which enhanced teacher self-efficacy and, in turn, teacher well-being. As regards schools as organizations, these positive experiences were grounded in the high autonomy that is given to the teachers in Swiss primary schools. Accordingly, good working structures and work organization, professional leadership and a supporting teacher learning climate (Shoshani and Eldor, 2016) helped to foster teacher well-being. It seemed important, that these new experiences were supported by colleagues and principals and valued by students and parents. These findings bear high practical relevance as they highlight how teacher professional development needs to be supported.

This study has several limitations. Although a characteristic of qualitative research and also current research on schools in the pandemic, one limitation is the non-representative character of the sample and the small sample size. Although the 21 participants are working in 15 different schools, the snowball sampling technique may have intensified the selectivity of the sample. However, detailed individual appraisals of the school closure could be identified. Another limitation is the timing of data collection. Due to the high demands on teachers during the pandemic and after the reopening of schools as well as school holidays, teacher statements might be impacted by memory bias. We could not compare teachers' well-being during the pandemic with their well-being before school closure and, thus, could not control for difference between their wellbeing experiences and *post hoc* reports. As we focused the interview on primary teacher well-being during the pandemic, findings might be only valid for this specific societal situation and primary education and be limited in terms of their *general* relevance for understanding teacher well-being.

Apart from these shortcomings, the results of this study contribute to the body of research that aims at understanding the factors that impede or support teacher well-being in challenging situations (Education Support, 2020) and, thus, contribute to the broader empirical evidence on teachers' professional lives as well as teaching and school effectiveness. More specifically, this study confirms the importance of schools providing an organizational frame and professional home for primary teacher well-being and effectiveness. Research on teacher well-being needs to better acknowledge that teacher work is nested within schools (Schaffer et al., 2007) and, thus, schools play a major role in supporting teacher professional well-being. This was evident for distance learning related to the COVID-19 pandemic. Individual support of primary teachers along with high quality school leadership that helps to structure and organize distance teaching seemed to be key for their well-being. The specific difficulties of primary education such as heterogeneous classrooms and educating young children from diverse backgrounds that are unfamiliar with forms of academic learning outside of school setting may have been an extra demand for the teachers. This points to the crucial role that a school communities play for teachers and support both the idea of well-trained school leaders – for example regarding health education and professional guidance – and cooperative school structures that respond to teacher needs such as the need for relatedness, for example through common rituals and shared working time for collaboration that can be continued during distance teaching.

During school closure when teachers had to develop new skills, various forms of support were needed. Practical implications for school management and teacher education emerging from this research are to create conditions for a support system where teachers individually and collectively receive support and feedback according to their needs in developing new teaching skills and new forms of communication with children and parents, colleagues and principals. Communities of learners in strong organizations with supportive leadership are needed to maximize teacher development, effectiveness and well-being.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because data set is restricted to the Swiss education system. Requests to access the datasets should be directed to the corresponding author.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

This research is the result of an ongoing collaboration between the authors. TH, SB, and CM developed this specific interview project. TH, SB, and CM contributed equally to the rationale of the project and the development of the interview guideline. TH realized the interview study and developed the coding scheme that was evaluated by SB and CM. TH analyzed the data and wrote a first draft of the manuscript. SB and CM both edited the manuscript and added specifically to Sections "Theoretical Introduction" and "Discussion." All authors contributed to the article and approved the submitted version.

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Pre-retirement Employees Experience Lasting Improvements in Resilience and Well-Being After Mindfulness-Based Stress Reduction

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The socio-economic benefits of interventions to prevent stress and related mental health problems are enormous. In the labor market, it is becoming desirable to keep employees for as long as possible. Since aging implies additional stressors such as increased risk of illness, and added pressure by professional tasks such as transferring knowledge, or learning new technologies, it is of particular relevance to offer stress-reduction to pre-retirement employees. Here, we report the effects of an eight-week Mindfulness-Based Stress Reduction (MBSR) intervention on mental well-being in 60–65-year-old work-active Danish employees, compared to a waiting-list control group. We observed improvements in resilience (Brief Resilience Scale) and mental well-being (WHO-5) not only at the end of the intervention, but also at the 12-month follow-up measurement that was preceded by monthly booster sessions. Interestingly, whereas well-being usually refers to experiences in the past weeks or months, we observed increasing Comfort in the MBSR-intervention group during a 5-minute eyes-closed rest session suggesting that this therapeutic effect of MBSR is measurable in how we feel even during short periods of time. We argue that MBSR is a cost-effective intervention suited for pre-retirement employees to cultivate resilience to prevent stress, feel more comfortable with themselves, maintain a healthy work-life in the last years before retirement, and, potentially, stay in their work-life a few more years than originally planned.

Keywords: stress reduction, resilience, resting-state thoughts and feelings, perceived stress, older employees, well-being, MBSR, mindfulness

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INTRODUCTION

Work processes become more complex, more intense, and require flexibility and mobility from employees, now more than ever due to changes in the workforce spurred by globalization, digitization, and societal transformation (Mack et al., 2015). In addition to these demands that characterize the times we live in, employees approaching the end of work-life, typically around the age of 65, may experience additional stress, because aging implies its own sources of stressors such as a weakened defense to illnesses. Indeed perceived stress is an independent risk factor for illness

and mortality (Prior et al., 2016). Long-term stress and associated feelings of control loss gives rise to psychological and physical diseases, such as heart disease, depression, type 2 diabetes (Stansfeld et al., 2002; Rosengren et al., 2004; Bartolomucci and Leopardi, 2009; Kelly and Ismail, 2015).

"Healthy aging" has been conceptualized as the sustained ability to adapt to the dynamic challenges of life (Juster et al., 2010), and hence relates closely to a well-regulated stress response, stress being defined as *an ongoing, adaptive process of assessing the environment, enabling the individual to anticipate and cope with changes and challenges* (McEwen and Akil, 2020). Despite additional stressors, imposed by aging, employees at pre-retirement age may wish to stay longer in the labor market because they find joy and meaning in their work and, importantly, workplaces may wish to hold on to the experience and wisdom offered by older employees—or society may decide to increase the retirement age. Retirement age has been steadily increasing since the 1990s in OECD countries (Denmark included) (Loichinger and Weber, 2016). As the proportion of older people in the population increases, there are calls for even further stimulation of labor force participation at older ages (Organization for Economic Co-operation and Development, 2006; United Nations Economic Commission for Europe, 2018). For the benefit of society and older employees it is important to help keep this cohort physically and mentally healthy in order to enjoy their last years in the workforce and be able to withstand the inevitable increase of the exit retirement age. Hence, identifying and implementing effective, evidence-based stress-management programs are urgently needed for pre-retirement employees.

The attempt to prevent and reduce perceived stress through strengthening our ability to adapt to changes and challenges is central in many self-development and mental training programs aimed at building resilience. A widely acknowledged prerequisite for adaptation is self-insight, especially awareness of personal strengths and weaknesses. One mental training program that has gained much support since its development in 1979 is Mindfulness-Based Stress Reduction (MBSR), which uses nonjudgmental attention training as its core feature in a body-oriented approach (yoga and meditation) combined with education on perception, stress biology, and communication (Kabat-Zinn, 1990). MBSR has been associated with a wide range of beneficial health effects that arise from the transformation of mental habits and behavioral schemes. Randomized controlled trials and meta-analyses of these show that MBSR training benefits individuals with or without a clinical diagnosis in terms of improvements on perceived stress, anxiety, depression, overall well-being, life satisfaction, and experienced quality of life (Khoury et al., 2015; Pallesen et al., 2016; Vibe et al., 2017; Juul et al., 2018, 2020; Young et al., 2018). In the MBSR exercises, attention is focused on the breath/bodily sensations, or stimuli in the immediate surroundings. The goal is to enhance awareness of sensations and feelings, such as signs of an overactivated stress response. Well-known to meditators, it is challenging to prioritize sensory presence over thoughts, which seem to constantly hi-jack our mind—a willful effort is needed to discipline attention. This training however—shifting between thoughts and sensations during the practice—raises the awareness of habitual thoughts that we tend to resort to and that often drive our feelings and related behavior. Gaining a meta perspective on our thought patterns enables a new perspective and an ability to regulate and transform maladaptive thoughts, feelings, and reactions into more adaptive ones that ultimately improve our mental and bodily health (Vago and Silbersweig, 2012).

In work places, the stress-reducing effects of mindfulness-based interventions are being measured as improved performance, productivity, agility, and innovative strength of organizations (Greiser and Martini, 2018). Studies show that workplace mindfulness interventions can lead to lessened emotional exhaustion potentially helping in preventing burnouts and more job satisfaction (Hülsheger et al., 2013). To our knowledge, no studies focused specifically on work-active older adults approaching retirement age. A number of studies address benefits of mindfulness training to retired older adults, showing beneficial effects on particular old-age-related health issues, such as insomnia (Zhang et al., 2015) and chronic back pain (Morone et al., 2008). It is plausible that mindfulness practice may promote healthy aging (Klimecki et al., 2019) by reducing symptoms of anxiety, depression, and stress, which are recognized risk factors for cognitive decline and dementia (Wilson et al., 2011; Diniz et al., 2013; Marchant and Howard, 2015; Gulpers et al., 2016). This association is corroborated by findings of improved memory and executive function in older adults following mindfulness training (Lenze et al., 2014; Moore et al., 2016; Wetherell et al., 2017).

The essential meaning of mindfulness is paying attention to sensations and stimuli in the present moment, hence associated with a decrease in mind wandering, i.e., attending to internally generated, stimulus-independent, thoughts and feelings (Rahl et al., 2017). Mind wandering is a strong mental propensity that occupies about half of our awake hours with impact on mood and task performance (Killingsworth and Gilbert, 2010; van Vugt and Broers, 2016; Irrmischer et al., 2018). Stressed individuals experience more mind-wandering and less engagement in/more rejection of the present moment (Crosswell et al., 2019). Generally, people feel more happy when focusing on the present (Killingsworth and Gilbert, 2010) and, conversely, psychiatric and neurological conditions are associated with an elevated tendency to mind wander (Christoff et al., 2016; Hoffmann et al., 2016). Not only the duration, but also the content of mind wandering can be quantified, and associated with mental health. Diaz et al. captured mind wandering—using the 5-min eyes-closed rest condition—and measured its content with the Amsterdam Resting-State Questionnaire (ARSQ) (Diaz et al., 2013, 2014). Using the ARSQ, reproducible patterns of individual thoughts and feelings have been observed, and associated with scores on insomnia, anxiety, and depression in large population samples (Diaz et al., 2013). Likewise, mental disorders including health anxiety, obsessive compulsive disorder (Gehrt et al., 2020) insomnia disorder (Palagini et al., 2016) and autism spectrum disorder (Simpraga et al., 2021) have been associated with distinct ARSQ profiles. Studies of the therapeutic benefits of MBSR have used clinical scales that refer to experiences during weeks or even months to assess participants' well-being, as well as symptoms

of stress, anxiety, and depression. Also sampling thoughts and feelings during 5-min rest could offer a new type of insight into MBSR participants' state of mind. During the resting state, the mind typically wanders in a way that represents habitual ways of thinking, feeling and responding that MBSR targets and, thus, might be affected by the intervention. Hence, we apply the ARSQ to assess the effects of MBSR on these basic mental events.

In the present randomized control trial, we investigated the benefits of MBSR on mental health in 82 pre-retirement employees. All measures were sampled at three time points: before MBSR (T0), after MBSR (T4), and 12 months after the first measurement (T12). We used five validated questionnaires, which have been used previously as MBSR effect measures, namely, the Perceived Stress Scale (PSS), the Symptom Checklist 5 (SCL-5), the Satisfaction With Life Scale (SWLS), the Brief Resilience Scale (BRS), and the WHO-5 Well-Being Index. In addition, we used the ARSQ to sample thoughts and feelings during a 5-minute eyes-closed resting-state condition. We predict that MBSR leads to improvements in perceived stress (PSS), resilience (BRS), well-being (WHO-5), and symptoms of anxiety and depression (SCL-5). In addition, we predict that MBSR leads to changes in the resting state, measured with the ARSQ. In particular, we hypothesize increasing Comfort, and decreases in Discontinuity of Mind, Sleepiness, and Negative Thought.

MATERIALS AND METHODS

Participants

Eighty-two healthy 60–65-year-old work-active employees in the private sector were recruited via public announcements on the website and social-media channels of the Danish Center for Mindfulness, Aarhus University. Exclusion criteria were a life-time diagnosis of psychosis, mania, or depression with psychotic symptoms.

Experimental Design

After a series of open information meetings, persons who met inclusion criteria and were interested in participating signed up by booking a time for an individual interview at the Danish Center for Mindfulness in November-December 2019. They were given the opportunity to ask questions and if they wished to participate, they signed an informed consent form. Self-report data were collected in the REDCap electronic data collection and storage solution administered by Aarhus University, securing the protection of personal data (Harris et al., 2009). In the electronic questionnaires, which were administered at home, participants were guided through a 5-minute eyes-closed rest session followed by reporting of thoughts and feelings using the Amsterdam Resting-State Questionnaire (ARSQ), after which they filled in five validated questionnaires: the Perceived Stress Scale (PSS), the Brief Resilience Scale (BRS), the WHO-5 well-being scale (WHO-5), the Symptom Checklist-5 (SCL-5), and the Satisfaction With Life Scale (SWLS).

When all participants had completed the T0 questionnaire, an automatized randomization procedure allocated them into either: (1) the MBSR intervention group, receiving the 8-weeks MBSR intervention a few weeks later, or (2) the waiting-list control group that received the MBSR after T12 data collection had been completed. An independent data manager had programmed the randomization algorithm in REDCap. Of the 82 participants, 41 were allocated to the MBSR-intervention group (28 females, 13 males) and 41 to the Control group (24 females, 17 males). The timeline of the three data collections (T0, T4, T12) and the MBSR intervention is illustrated in **Figure 1**. The study design, participant compliance and questionnaire completion are illustrated in the flow chart in **Figure 2**. The study was conducted according to the Helsinki Declaration (World Medical Association, 2000). It was approved by the Danish Research Ethics Committee. All participants were informed verbally and in writing and signed a written informed consent form prior to participation.

MBSR Intervention

The Mindfulness Based Stress Reduction (MBSR) intervention was delivered by an experienced MBSR teacher trained at the Danish Center for Mindfulness. MBSR is a standardized curriculum-based program in which participants learn a set of

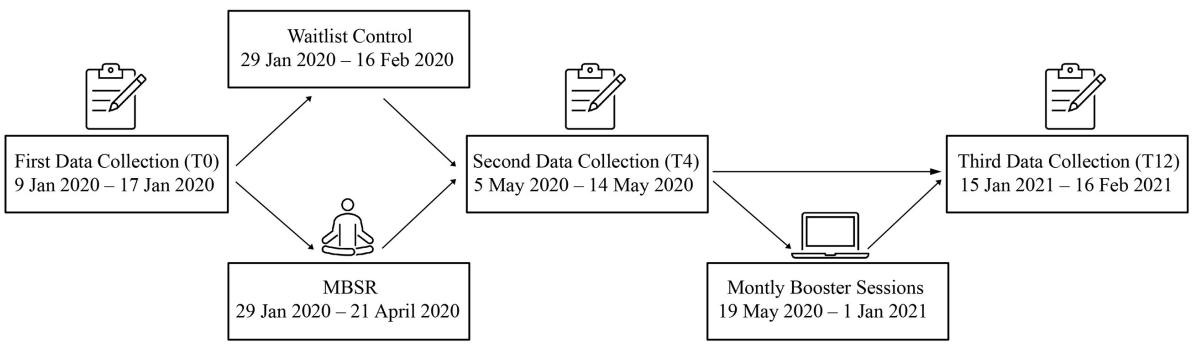

FIGURE 1 | Timeline of study. After fist data collection (T0), a randomization procedure allocated the participants into either the MBSR intervention group, receiving the 8-weeks MBSR intervention, or the waiting-list control group. The MBSR intervention was halfway transformed to an online intervention with monthly booster sessions preceding shortly after. All participants had their data collected for a second time (T4) and again a third time (T12). MBSR: Mindfulness-Based Stress Reduction.

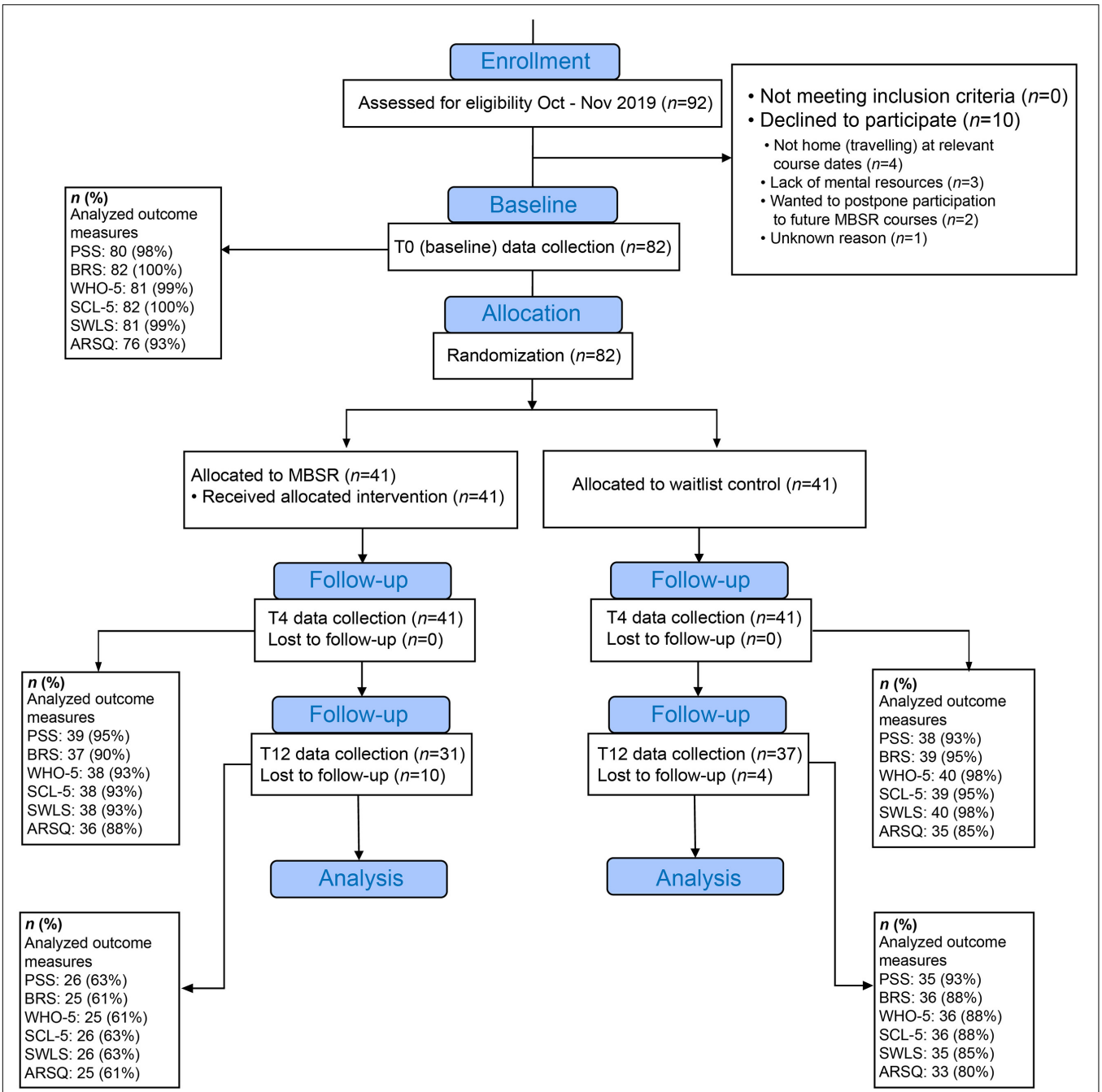

FIGURE 2 | Flowchart of study design. Due to the COVID-19 pandemic, the original experimental design was modified from a 2-year multi-method study to a 1-year study based on self-report electronic questionnaires data. Participant recruitment stalled due to the first COVID-19 lockdown in March 2020, and the number of participants was reduced from the planned 192 to 82. The first MBSR course, which was then halfway, was transformed to an online intervention with monthly booster sessions. Originally planned collection of physiological data at T4, and T12 eventually had to be abandoned. The study was rounded up prematurely in January 2021. T0: baseline measurement. T4 and T12: measurements after 4 and 12 months, respectively. MBSR: Mindfulness-Based Stress Reduction. PSS: Perceived Stress Scale. BRS: Brief Resilience Scale. WHO-5: the well-being scale. SCL-5: Symptom Checklist-5. SWLS: Satisfaction With Life Scale. ARSQ: Amsterdam Resting-State Questionnaire.

mental and physical training methods (relaxation, meditation, yoga) and receive materials (sound files with guided exercises) to enable training at home. The standard delivery of MBSR is a series of group sessions, eight weekly 2.5 h sessions and a full-day (7 h) session (UMass Memorial Health Care, 2019). Adherence to the home exercises during the MBSR program has been positively related to the extent of improvement in several measures of symptoms and well-being

(Carmody and Baer, 2008; Parsons et al., 2017). Therefore, before starting the course, participants are told that it involves a home training volume of 45 min/day during the course. Participants are encouraged to continue this volume of training after the course, because just like with physical health, in order to uphold the benefits, ongoing training is needed.

After 5 regular MBSR group sessions, due to COVID-19-related imposed restrictions in mobility, the remainder of the course was completed in the form of online sessions. Based on general participant feedback we deem that the character and total intensity of the intervention was conserved in spite of this transition. In addition, as a consequence of COVID-19, it was decided to develop and offer a series of monthly online follow-up "booster" MBSR sessions to support the continued practice for the participants in the MBSR-intervention group. This was originally intended to bridge the time period until the original protocol's post-intervention physiological follow-up data collection procedures could be made, but in the course of the prolonged lockdown the booster sessions became a spin-off with its own significant value to some participants—many of whom were otherwise socially quite isolated. This led to the continuation of online booster sessions for 10 months. The monthly booster sessions were 2 h long and optional, with about a third of MBSR-group participants joining each time. The content of the booster sessions was similar to the weekly meetings in the MBSR program, with guided meditations, articulation exercises and group dialogues, with a series of themes that reflected participants' experiences related to work/life balance, the COVID-19 crisis, retirement plans, etc. — as well as continuing and deepening mindfulness practice.

The waiting-list group received no particular instructions. They were encouraged to continue life as usual, even if this involved some mindfulness practices or similar.

Outcomes

Based on the extensive literature on the positive effects of MBSR on stress and well-being, we chose five validated clinical scales covering these domains (Juul et al., 2020). The BRS was included in these scales. Although measures of resilience were previously not extensively applied in mindfulness studies, it is a reasonable assumption that the stress-reducing effects of MBSR implicate measurable enhancements in resilience, previously indicated in e.g., one of our own studies (Juul et al., 2020) and another study (Nila et al., 2016). The ARSQ was included to test the applicability of 5-min samples of thoughts and feelings to capture expected changes in mental dimensions related to changes in the five classic questionnaires.

Primary Outcome

The Perceived Stress Scale (PSS)

The PSS is a self-report measure of subjective stress (Cohen et al., 1983). It consists of 10 questions indicating how often respondents have found their life unpredictable, uncontrollable, and overloaded in the past month. All items are scored on a five-point Likert scale from 0–4 (0 = never, 4 = very often) (total sum scores: 0–40). A score of 0–13 indicates low perceived stress, 14–26 moderate perceived stress, and 27–40 high perceived stress. The PSS has demonstrated good validity and reliability (Cohen et al., 1983; Lee, 2012; Eskildsen et al., 2015). A population-based study has shown a dose-response relationship between perceived stress measured by the PSS and mortality within a four-year period (Prior et al., 2016).

Secondary Outcomes

The Brief Resilience Scale (BRS)

The BRS is a self-report measure of resilience that inquiries about the respondent's perceived ability to bounce back/recover from stress (Smith et al., 2008). The scale contains six statements, which are rated on a Likert scale from 1–5 (1 = strongly disagree, 5 = strongly agree), and the summary score is the average of the six items (range 1–5) (Smith et al., 2008). The following cut-off points have been suggested: Scores from 1.00–2.99: low resilience; 3.00–4.30: normal resilience; 4.31–5.00: high resilience.

The WHO-5 Well-Being Scale (WHO-5)

The WHO-5 is a self-report measure of well-being (World Health Organisation, 1998). The respondent is asked to rate five statements on a 6-point Likert scale from 0–5 (0 = at no time, 5 = all the time). Each question assesses how often respondents have experienced specific positive thoughts or feelings in the past two weeks. The points are added and multiplied with four, calculating the total score ranging from 0–100; higher scores indicate a higher level of well-being. The WHO-5 well-being scale is considered to be a valid measure of the overall well-being with scores lower than 52% (corresponding to raw score = 13) considered critically low (Topp et al., 2015).

The Symptom Checklist-5 (SCL-5)

The SCL-5 is a self-report questionnaire to assess psychological distress, and symptoms of anxiety and depression (Tambs and Moum, 1993). The scale refers to the last 2 weeks and consists of five statements that are scored on a scale from 1 (not at all) to 4 (very much). The score is calculated as the average of the five items with higher scores indicating greater symptoms of anxiety and depression. The SCL-5 originates from the 25-item Symptom Checklist (SCL), which has been applied to detect mental disorders (Joukamaa et al., 1994) and correlates at $r = 0.92$ with the SCL. An SCL-5 score > 2 has been found to predict the presence of a mental illness, as assessed independently by psychiatrists (Strand et al., 2003).

The Satisfaction With Life Scale (SWLS)

The SWLS is a self-report questionnaire that measures global cognitive judgments of satisfaction with one's life (Diener et al., 1985). The scale consists of five statements that are rated on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The total score is 5–35; higher scores indicate greater satisfaction with life with scores of 5–9 being "extremely dissatisfied", 10–14 "dissatisfied", 15–19 "slightly dissatisfied", 20 "neutral", 21–25 "slightly satisfied", 26–30 "satisfied", and 31–35

"extremely satisfied". SWLS has demonstrated high validity and reliability (Pavot et al., 1991; Howell et al., 2010).

The Amsterdam Resting-State Questionnaire (ARSQ)

The ARSQ is a self-report measure of the content and quality of thoughts and feelings experienced during a resting state (Diaz et al., 2013). The ARSQ identifies 10 dimensions: Discontinuity of Mind, Theory of Mind, Self, Planning, Sleepiness,Comfort, Somatic Awareness, Health Concern, Visual Thought, and Verbal Thought. In the present study, we extended the 10-dimensional model of the ARSQ 2.0 (Diaz et al., 2014) with an experimental dimension labelled Negative Thought (**Figure 3**). The score on each of the 11 dimensions was calculated as the mean score of three items that were rated on a five-point ordinal scale (1 to 5) corresponding to the labels "Completely Disagree," "Disagree," "Neither Agree nor Disagree," "Agree," and "Completely Agree."

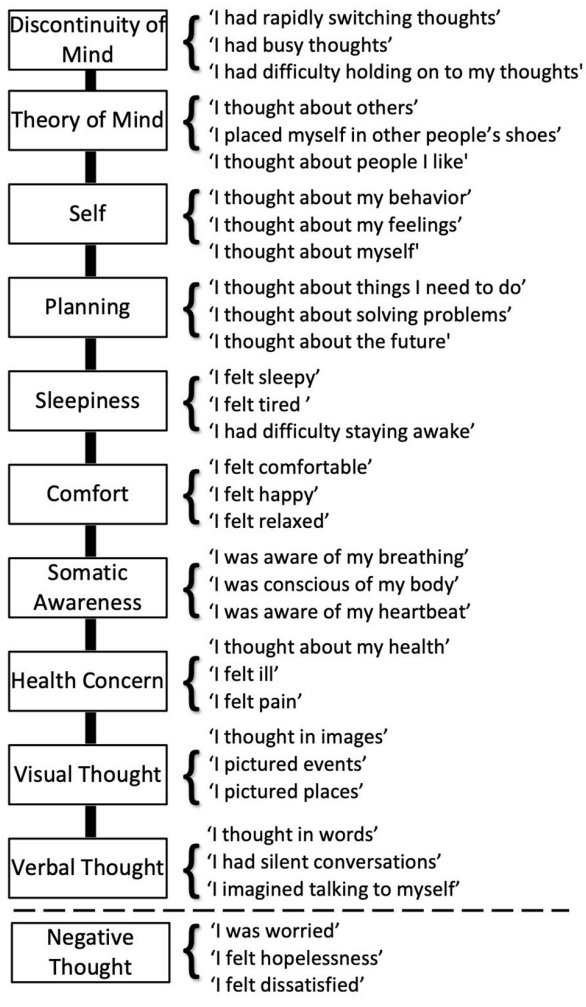

FIGURE 3 | An extended Amsterdam Resting-State Questionnaire capturing eleven dimensions of thoughts and feelings. The ARSQ 2.0 model of mind-wandering contains 10 factors defined by the items listed above the dashed line (Diaz et al., 2014). For the present study, we added the dimension labelled "Negative Thought".

Other Questions Asked

In the online questionnaire, we also asked a number of additional questions about participants' previous experience with yoga and/or meditation. *"Do you have previous experience with yoga and/or meditation?"* ("yes" or "no") and (2) "*How often do you practice yoga and/or meditation?*" ("every day", "every week", "every month", "rarely", or "never", corresponding to a 0–4 scale). We also inquired about participants' engagement in the home exercises that constitute an important part of the MBSR program (see Materials and Methods). The question was phrased like this: *"During the last week, how many times have you done yoga or meditation exercises (e.g., from the MBSR program or other sources)?"*. We also asked the participants of the MBSR group to give an estimate of their adherence to the booster sessions: *"How many booster sessions have you attended?"* ("none", "a few", "most" or "all"). Finally, we also asked participants to rate their current sleep quality as "very poor", "poor", "mixed", "good", or "very good" (corresponding to a 1–5 scale). We did this to acknowledge that sleep quality plays a central role to health in general, and that sleep disturbances pose a significant medical and public health concern for the aging population (Black et al., 2015). For example, an estimated 50% of people 55 years and older have problems initiating and maintaining sleep (Van Cauter et al., 2000; Foley et al., 2004). We also asked participants to rate their experienced job satisfaction as: very unsatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, or very satisfied (corresponding to a 1–5 scale), and to report illness-related absence: *"How many days were you absent from work the last month?"*.

Statistical Analysis

Linear Mixed-Effects Model

Linear mixed-effects models (LMMs) offer a statistical framework to analyze unbalanced longitudinal data structures with covariance among the repeated measures allowing to model both between- and within-subject sources of variability (Fitzmaurice et al., 2011). We used LMM to model the changes in the mean response for self-reported cognitive outcomes and test the null hypotheses of no intervention effect on changes in the mean response over time between the Control and MBSR-intervention group. Time, group, and their interaction were specified as fixed effects, and random intercepts on subject level were added to the model to allow for subject-specific idiosyncrasies in their propensity to respond. If N is the total number of subjects and n_i is the number of measurement occasions for subject i $(i = 1, ..., N)$, then the model can be expressed as following:

$$Y_{ij} = \beta_0 X_{ij0} + \beta_1 X_{ij1} + \beta_{2,j} X_{ij2} + \beta_{3,j} X_{ij1} X_{ij2} + b_i + e_{ij},\ j = 1, n_i,$$

where $Y_{ij} = (Y_{i1}, ..., Y_{in_i})^T$ are subject responses, $\beta_j = (\beta_0, \beta_1, \beta_{2,j}, \beta_{3,j})^T$ are population regression parameters (fixed effects), $e_{ij} = (e_{i1}, ..., e_{in_i})^T$ are measurement errors $b_i = (b_1, ..., b_N)$ are subject random effects (e and b are assumed to be independent and have zero-centered normal distributions), and $X_{ij} = (X_{ij0}, ... X_{ij2})^T$ are predictors, with $X_{ij0} = 1$ for all

i and j, X_{ij1} representing the Control or MBSR-intervention group, and X_{ij2} – the month in which the responses were collected. In our study, $N = 82$ subjects, $n_i = 3$ measurements: pre-intervention ($T0$), post-intervention after four months ($T4$), and at follow-up after twelve months ($T12$). As an example, Y_{ij} could be the score of subject i at measurement occasion j on the Brief Resilience Scale.

With this model, we compared the mean response profiles over time between the Control and MBSR-intervention group, $\mu_j\,(Con)$ and $\mu_j\,(MBSR)$, respectively. The null hypothesis is that the change in mean over time does not differ between the two groups at either measurement occasion:

$$H_{0j}:\ \mu_j\,(MBSR) - \mu_{T0}\,(MBSR) = \mu_j\,(Con) - \mu_{T0}\,(Con)\,, \quad j = T4, T12.$$

This can also be expressed in terms of the regression coefficients β. For that, we assign $X_{ij1} = 0$ to the Control and $X_{ij1} = 1$ to the MBSR-intervention group. Then, the mean response profile for the Control group can be written as:

$$\mu_j\,(Con) = E\left(Y_{ij} \mid X_{ij}\right) = \beta_0 + \beta_{2,j}X_{ij2},\ j = T0,\ T4,\ T12,$$

where $X_{ij2} = 0$ for the baseline measurement $\left(j = T0\right)$, and $X_{ij2} = 1$ for $j = T4, T12$. The mean response profile for the MBSR-intervention group will be:

$$\mu_j\,(t) = E\left(Y_{ij} \mid X_{ij}\right) = (\beta_0 + \beta_1) + (\beta_{2,j} + \beta_{3,j})X_{ij2}, \quad j = T0,\ T4,\ T12.$$

Coefficient β_0 is the intercept and corresponds to the mean response of the Control group at $T0$, β_1 is the shift from the intercept for the MBSR-intervention group at $T0$, β_2 is the slope for the Control group (the change in mean from $T0$ to $T4$ or $T12$), and β_3 is the shift from the slope for the MBSR-intervention group (i.e., how much the change in mean of the MBSR-intervention group from $T0$ to $T4$ or $T12$ is different from that of the Control group). Now, the null hypothesis is that the change in mean for the MBSR-intervention group is not different from the change in mean for the Control group:

$$H_{0j}:\ (\beta_0 + \beta_1) + \left(\beta_{2,j} + \beta_{3,j}\right) - (\beta_0 + \beta_1) = \beta_0 + \beta_{2,j} - \beta_0, \quad j = T4, T12,$$

which simplifies to testing whether the difference between the change in mean of the MBSR-intervention group and the one of the Control group is not different from zero:

$$H_{0j}:\ \beta_{3,j} = 0,\ j = T4, T12$$

For each outcome variable, we fitted a linear mixed-effects model by Maximum Restricted Maximum Likelihood (REML) using *lmerTest* package (Kuznetsova et al., 2017) with Satterthwaite's approximation (Luke, 2017) for degrees of freedom, *t*-statistics, and *p*-values for the fitted regression coefficients in R (R Core Team, 2019). A two-sided significance level of 0.05 was used for hypothesis testing. Due to the exploratory nature of the analysis, no multiple testing *p*-value adjustments were made (Feise, 2002; Althouse, 2016; Parker and Weir, 2020). Residuals were explored to evaluate the model's statistical assumptions (i.e., normality, homogeneity of variance) (Fitzmaurice et al., 2011).

Data were analyzed using MATLAB, 2020 (The MathWorks Inc., Natick, MA, United States) and R (R Core Team, 2019, Vienna, Austria). Due to missing data points, a few datasets were incomplete so that the number of participants varied slightly for different outcome variables at T0, T4, or T12 (see **Figure 2**). Only missing measurements per time point were dropped, allowing to retain the remaining data for each participant. We included all available data because the linear mixed model statistical framework can handle missing data and including all data maximizes the statistical power. For example, it would be unfortunate to reduce statistical power of the T4 vs. T0 comparison by excluding participants that dropped out at T12.

RESULTS

To investigate the potential benefits of mindfulness training on the mental health of pre-retirement employees, we performed a randomized waitlist-controlled trial on 82 (males = 37%, females = 63%) 60–65-year-old workers from the private sector (for details, see Materials and Methods). Self-report measures of mental health and thoughts and feelings experienced during 5-minutes wakeful rest were collected at baseline (T0), and after 4 and 12 months (T4 and T12) (**Figure 2**).

Baseline Scores

The mean baseline scores on the five psychometric measures at the beginning of the study (T0) provided indicators of the total group of participants' mental health status. Most mean scores were within established normal ranges (mean ± standard deviation: PSS = 15.4 ± 7.0, BRS = 3.5 ± 0.7, WHO-5 = 62.2 ± 20.4, SCL-5 = 1.8 ± 0.6, and SWLS = 25.3 ± 6.4). The PSS ratings indicate a high prevalence of stress with 46% of participants falling in the "moderate stress" range (14–26) and 10% falling in the high-level stress range (27–40), which are stress levels that have been associated with both physical and mental impairments (Prior et al., 2016). The average resilience score (3.5 ± 0.7) was in the low end of "normal" (3.00–4.30), and the ratings from 22% of the 82 participants corresponded to "low resilience" (1.00–2.99) at baseline. Twenty-five percent of participants scored below the cut point WHO-5 score of 54, which is considered a threshold for poor well-being. Similarly, 26% of the participants scored above the SCL-5 cut-point of 2, which predicts the presence of mental illness. The average SWLS score (25.3 ± 6.4) falls in the high end of the category "slightly satisfied", hence above "neutral," while 21% of the participants fall in the category "neutral" or below. There was no significant difference in means between the two groups at T0 for each of the five psychometric measures (**Supplementary Table 1**).

We further used the baseline data (T0) of the five psychometric measures from the total cohort to investigate how the measures relate to one another. Albeit the statements asked in the different self-report questionnaires are very different, they all tap into

different aspects of mental well-being and, thus, show moderate to strong correlations (**Figure 4**).

Effects of MBSR on Perceived Stress (PSS), Resilience (BRS), Well-Being (WHO-5), Symptoms of Anxiety and Depression (SCL-5), and Satisfaction With Life (SWLS)

In order to assess the effect of the MBSR training at T4 and T12, we fitted a linear mixed model (LMM) to the five questionnaires *PSS, BRS, WHO-5, SCL-5 and SWLS*. Specifically, we compared the change in mean for the MBRS-intervention group with that of the Control group, which is reflected in the b_3-coefficient of the LMM analyses (Materials and Methods).

We did not observe a significant superior difference in perceived stress, the primary outcome variable of this study (PSS mean change difference −1.94, 95% CI = [−4.52, 0.62], $p = 0.143$, **Table 1**). Nevertheless, we saw a significant reduction in sample-mean PSS scores in the MBSR-intervention group compared to those in the Control group both at T4 (sample-mean difference of PSS = −3.61, 95% CI = [−6.00, −0.42], $p = 0.026$) and at T12 (PSS = −5.26, 95% CI = [−6.08, −0.05], $p = 0.049$) (**Table 1** and **Figure 5A**). The MBSR group showed superior improvements to the Control group in resilience (BRS mean change difference = 0.40, 95% CI = [0.16, 0.65], $p = 0.002$) and well-being (WHO-5 mean change difference = 10.90, 95% CI = [2.86, 18.95], $p = 0.009$) after four months (**Figures 5B,C**). Albeit these effects were less pronounced after 12 months, they remained significant (BRS mean change difference = 0.27, 95% CI = [0.01, 0.54], $p = 0.049$; WHO-5 mean change difference = 9.89, 95% CI = [1.02, 18.74], $p = 0.031$). Importantly, the BRS and WHO-5 showed no significant group differences at baseline (T0, **Table 1**) and no significant differences in the means within groups between T4 and T12, which indicates that MBSR had positive effects far beyond the intensive 8-week training (**Table 1**).

The LMM analysis did not reveal significant effects on SCL-5; nonetheless, the MBSR participants scored lower on the symptoms checklist than Controls both at T4 and T12, reaching statistical significance in sample means difference at T12 (**Figure 5D** and **Table 1**). Before MBSR training, participants in the MBSR group had an average score of 1.8, which decreased to 1.56 at T4 and 1.48 at T12. In comparison, the control group was at 1.88 (T0), 1.72 (T4) and 1.77 (T12). Looking closer at the development around the SCL-5 cut point of 2.0, we note that while the percentage of participants in the MBSR group with a score above 2 changes from 22% (T0) to 11% (T4) to 12% (T12), the analogous numbers in the Control group are 29% (T0), 23% (T4), and 22% (T12), suggesting that especially participants

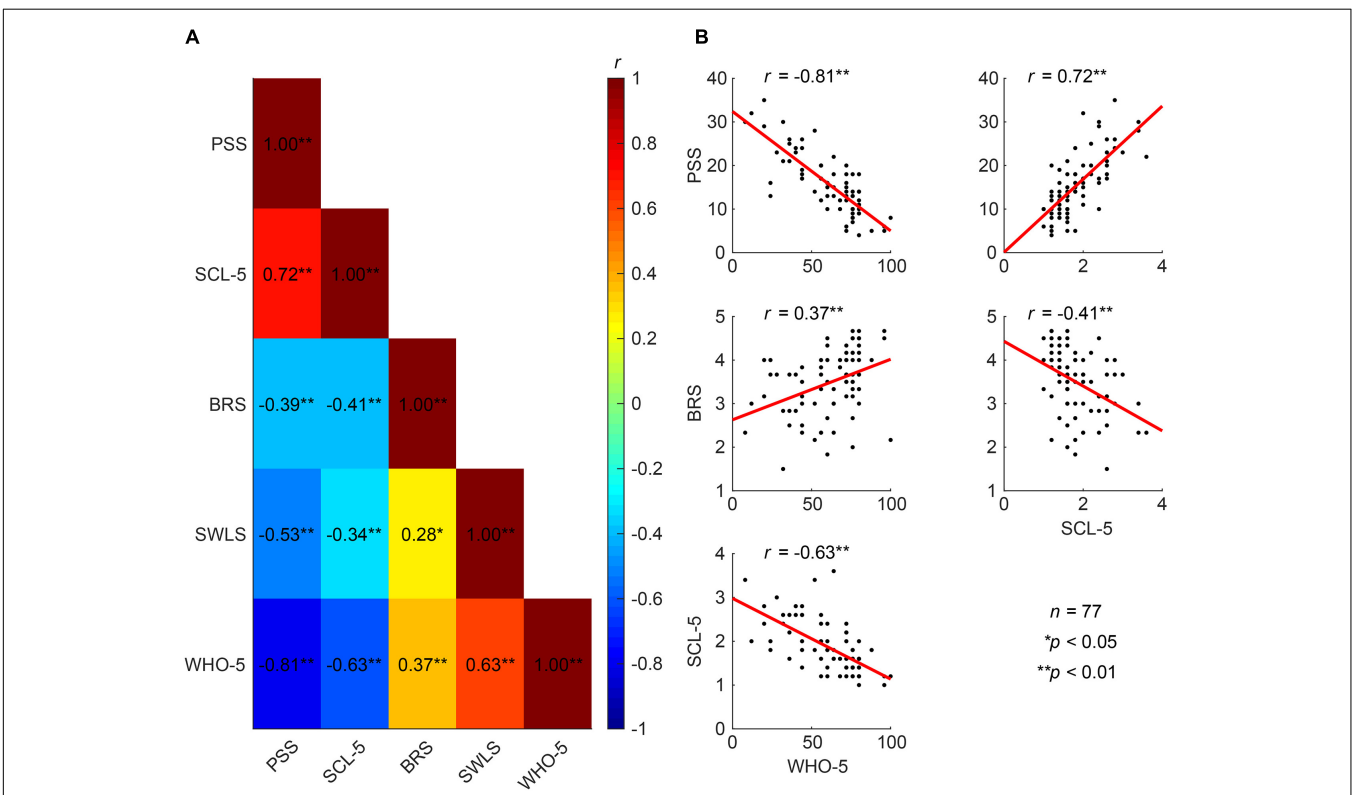

FIGURE 4 | Correlations between different measures of mental well-being. **(A)** Correlation heat map between the five established psychometric scales related to mental health (Pearson correlation coefficients). **(B)** Well-being (WHO-5) exhibits strong negative correlations with perceived stress (PSS) and symptoms of anxiety and depression (SCL-5), and a moderate positive correlation with resilience (BRS). The SCL-5 also shows strong positive correlations with PSS and negative correlations with the BRS.

TABLE 1 | Linear mixed model analyses show superior and lasting improvements in resilience and well-being for the MBSR-intervention group compared to the Control group.

	PSS	BRS	WHO-5	SCL-5	SWLS
T0					
$\overline{X_{T0}}$ (*MBSR*)–$\overline{X_{T0}}$ (*Con*)	14.72–16.05	3.55–3.45	62.40–62.05	1.8–1.88	26.08–24.59
(*p*)	(0.37)	(0.53)	(0.93)	(0.49)	(0.26)
t (*df*)	−0.9(136)	0.6(113)	0.1(144)	−0.7(154)	1.1(113)
95%*CI*	[−4.02, 1.49]	[−0.21, 0.42]	[−7.94, 8.67]	[−0.31, 0.15]	[−1.12, 4.16]
T4					
$\overline{X_{T4}}$ (*MBSR*) –$\overline{X_{T4}}$ (*Con*)	**12.92–16.53**	**3.87–3.34**	**71.47–59.80**	1.56–1.72	27.45–25.13
(*p*)	**(0.026)**	**(0.003)**	**(0.010)**	(0.20)	(0.11)
t (*df*)	−2.2(139)	3.1(119)	2.6(148)	−1.3(160)	1.6(115)
95%*CI*	[−6, −0.42]	[0.18, 0.83]	[2.84, 19.66]	[−0.39, 0.08]	[−0.49, 4.84]
$\beta_{3,T4}$ (*p*)	−1.95 (0.14)	**0.4 (0.002)**	**10.90 (0.009)**	−0.07 (0.56)	0.66 (0.51)
t (*df*)	−1.5(136)	3.2(135)	2.6(140)	−0.6(139)	0.7(137)
95%*CI*	[−4.52, 0.62]	[0.16, 0.65]	[2.86, 18.95]	[−0.31, 0.17]	[−1.29, 2.60]
T12					
$\overline{X_{T12}}$ (*MBSR*) –$\overline{X_{T12}}$ (*Con*)	**12.00–15.26**	**3.90–3.44**	**64.80–56.33**	**1.48–1.77**	26.15–24.20
(*p*)	**(0.049)**	**(0.033)**	**(0.032)**	**(0.027)**	(0.14)
t (*df*)	−1.9(165)	2.2(140)	2.2(176)	−2.2(184)	1.5(136)
95%*CI*	[−6.08, −0.05]	[0.04, 0.71]	[1.06, 19.48]	[−0.55, −0.04]	[−0.69, 4.94]
$\beta_{3,T12}$ (*p*)	−1.80 (0.22)	**0.27 (0.049)**	**9.89 (0.031)**	−0.21 (0.12)	0.60 (0.59)
t (*df*)	−1.5(140)	3.2(137)	2.6(143)	−1.6(144)	0.7(139)
95%*CI*	[−4.62, 1.01]	[0.01, 0.54]	[1.02, 18.74]	[−0.48, 0.05]	[−1.54, 2.75]
T12–T4					
$\overline{X_{T12}}$ (*Con*) –$\overline{X_{T4}}$ (*Con*)	15.26–16.53	3.44–3.34	56.33–59.80	1.77–1.72	24.20–25.12
$\overline{X_{T12}}$ (*MBSR*) –$\overline{X_{T4}}$ (*MBSR*)	12.00–12.92	3.9–3.87	64.8–71.47	1.48–1.56	26.15–27.45
Δ_{Con} (*p*)	−1.01 (0.30)	0.10 (0.27)	−3.84 (0.20)	0.06 (0.51)	−0.67 (0.36)
t (*df*)	−1.0(136)	1.1(134)	−1.3(139)	0.7(138)	−0.9(137)
95%*CI*	[−2.91, 0.89]	[−0.08, 0.28]	[−9.66, 2.00]	[−0.12, 0.24]	[−2.09, 0.76]
Δ_{MBSR} (*p*)	−0.86 (0.43)	−0.03 (0.79)	−4.84 (0.17)	−0.08 (0.43)	−0.72 (0.39)
t (*df*)	−0.8(140)	−0.3(138)	−1.4(146)	−0.8(146)	−0.9(140)
95%*CI*	[−2.96, 1.23]	[−0.23, 0.18]	[−11.61, 1.90]	[−0.28, 0.12]	[−2.34, 0.90]

$\beta_{3,j}=\mu_j$ (*MBSR*) $-\mu_{T0}$ (*MBSR*) $-\mu_j$ (*Con*) $-\mu_{T0}$ (*Con*).
$\Delta_{Con} = \mu_{T12}$ (*Con*) $-\mu_{T4}$ (*Con*), $\Delta_{MBSR} = \mu_{T12}$ (*MBSR*) $-\mu_{T4}$ (*MBSR*).
$\overline{X_j}$ (*MBSR*), $\overline{X_j}$ (*Con*) – *sampling means.*
The table displays the measured sampling means for for each of the five psychometric scales for the MBSR-intervention and Control groups $\overline{X_j}$ (*MBSR*) *and* $\overline{X_j}$ (*Con*), *respectively) at measurements T0, T4, and T12. The LMM-estimated change in mean for the MBSR group compared with that of the Control group is the regression coefficient* β_3. *For all tests, we report p-values (p), statistics (t), degrees of freedom (df), and 95% confidence intervals (95%CI). The last block (T12–T4) shows sampling and estimated differences in means between the follow-up at T12 and post-intervention at T4 for either group. Significant differences and p-values* < 0.05 *are displayed in boldface. The color is used to separate the measured or estimated parameters with their corresponding statistics from each other.*

with high levels of symptoms were helped. Similarly, the MBSR group scored higher on satisfaction with life (SWLS) compared to the Control group but this effect did not reach significance (**Figure 5E** and **Table 1**). In general, group differences between the baseline scores were nonsignificant for each of the five psychometric measures (see block T0 in **Table 1**), with no significant changes in means within the control group between T0 and T4 or T0 and T12 (see b_2-coefficients of the LMM in **Supplementary Table 1**). For a complete report of the LMM analysis, see **Supplementary Table 1**.

Previous Experience, Home Practice and Booster Session Participation

Amid factors that might have affected the observed effect of MBSR was participants' previous experience with yoga and meditation. Thus, we looked into differences between the two categories of participants—with and without previous practice—in the MBSR-intervention group. Overall, 25 participants in the MBSR group indicated to have had previous experience and 16 to not have any experience. Of note, four out of the five scales indicated that MBSR participants with no previous practice presented with significantly better mental well-being at baseline (T0 in **Table 2**) compared to MBSR participants with experience, i.e., symptoms of anxiety and depression were lower, whereas scores on resilience, satisfaction with life, and well-being were higher in MBSR participants without previous experience (sample-mean difference of PSS = −1.69, 95% CI = [−5.49, 2.1], $p = 0.391$; SCL = −0.34, 95% CI = [−0.65, −0.03], $p = 0.035$; BRS = 0.75, 95% CI = [0.38, 1.12], $p < .001$; SWLS = 5.84, 95% CI = [2.55, 9.12], $p = 0.001$; WHO-5 = 15.97, 95% CI = [4.89, 27.05], $p = 0.007$). After the intervention (block T4 in **Table 2**),

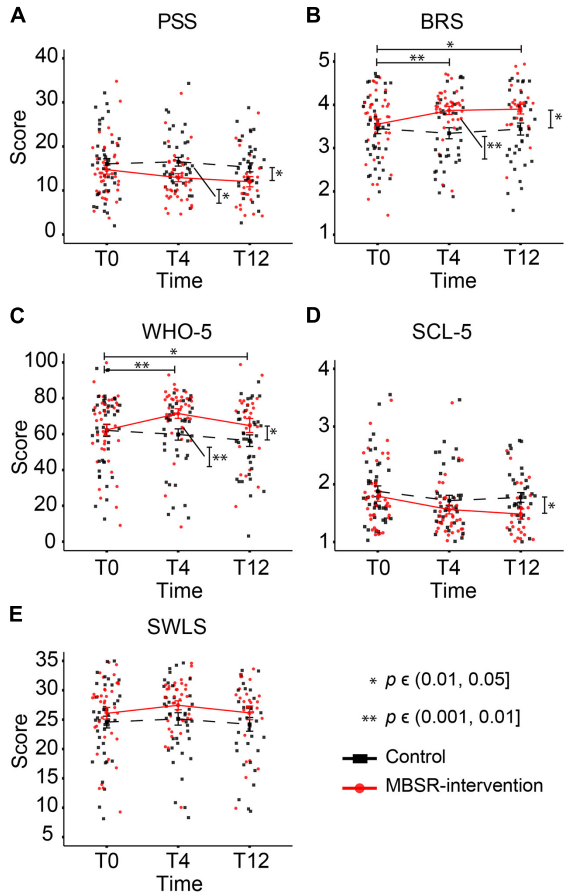

FIGURE 5 | The MBSR-intervention group shows superior and lasting improvements in resilience and well-being compared to the Control group. The individual participant scores and the group-mean scores are shown for each of the five psychometric measures: PSS **(A)**, BRS **(B)**, WHO-5 **(C)**, SCL-5 **(D)**, and SWLS **(E)**. Significant differences in the estimated changes over time in the two groups are shown with horizontal bars and asterisks. Vertical bars and asterisks indicate a significant difference between the group sampling means at each individual time point. All statistics are based on LMM, see **Table 1** for details. T0: baseline measurement. T4 and T12: measurements after 4 and 12 months, respectively.

the scores improved on each of the five psychometric outcomes in both categories of participants, except a slight decrease on SWLS for participants without experience. Overall, the improvements were greater for participants with previous yoga/meditation experience, both at T4 and T12. For a complete report of the LMM analysis, see **Supplementary Table 2**.

To further gauge relevant participant behavior and experienced benefits, we looked at the frequency of yoga or meditation home practice sessions during the preceding week reported by all the participants at T4 and T12. At the follow-up after four months, participants in the MBSR group reported to have exercised approximately 4 times on average during the previous week (mean ± SD: 3.9 ± 3.6), which dropped to 2.7 times after twelve months (2.7 ± 3.5, t-test p-value < 0.001, Cohen's ds = 0.89). As expected, the Control group engaged in less home meditation and yoga practice than the MBSR group both at T4 and T12 (1.2 ± 2.4 and 1.0 ± 1.8, respectively). Our inquiry about participation in MBSR-booster sessions revealed that 2% (n = 1) participated in all sessions, 27% (n = 11) of participants took part in most sessions, 37% (n = 15) in some, and 5% (n = 2) did not attend any booster sessions provided to the MBSR group. Twenty-nine percent of participants (n = 12) did not provide an answer. The participants did not show a clear preference for the session format: 41% favored physical meetings, 24% preferred online sessions, and 35% preferred a mixed setup.

Sick Days, Job Satisfaction, and Sleep Quality

In spite of approximately a quarter of participants scoring in a critical range on the clinical scales at baseline, absence due to sickness was very low with 78% reporting zero sick days in the past month in both groups. This number increased 20 percentage points at T4 in the MBSR group (to 98%) and 5 percentage points in controls. At T12, only 10% (MBSR) and 11% (Controls) reported any sick days. Job satisfaction was generally high with mean scores close to 4 ("satisfied") for both groups throughout the study and no significant intervention effects. MBSR participants reported a significant improvement in sleep quality from T0 to T4, compared to the Controls (Sleep quality mean change difference 0.32, 95% CI = [0.04, 0.6], p = 0.03). For a complete report of the LMM analysis of Sleep quality and job satisfaction, see **Supplementary Table 3**.

A 5-Minute Sample of Resting-State Thoughts and Feelings Correlates With Self-Reported Mental Health—and Can Be Modulated With MBSR

We further tested, looking at the baseline results (T0) from the total cohort of 82 pre-retirement employees, whether thoughts and feelings at rest as reflected in the ARSQ are associated with PSS, BRS, WHO-5, SCL-5 and SWLS scores. Resting-state Comfort correlated positively with life satisfaction (SWLS, r = 0.45, p = 0.01) and mental well-being in recent weeks (WHO-5, r = 0.42, p = 0.01), whereas correlations with perceived stress and symptoms of emotional distress, anxiety and depression were negative (PSS and SCL-5) (**Figure 6**). In agreement with these findings, we observed the opposite correlations for Negative Thought—an experimental dimension developed for the present study (**Figure 6**). Correlations with Discontinuity of Mind and Health Concern also reached significance for the PSS and the latter also for the WHO-5 scale. Interestingly, whereas resilience showed significant improvement after the MBSR intervention, the BRS exhibited no correlation with any of the ARSQ dimensions, perhaps reflecting the circumstance that the items in the BRS denote a certain way of relating to and coping with stressful events, not easily reflected in certain typical thoughts and feelings, such as framed in the ARSQ.

To test specifically whether the MBSR program would alter patterns of thoughts and feelings that were previously found to be reproducible (Diaz et al., 2013), we performed LMM analysis

TABLE 2 | The MBSR-intervention participants with previous yoga/meditation experience show significantly poorer baseline scores on BRS, SCL-5, SWLS, and WHO-5 scores as compared to MBSR-intervention participants without previous experience and improve on these psychometric outcomes after the intervention.

	PSS	BRS	SCL-5	SWLS	WHO-5
T0					
$\overline{X_{T0}}$ (*MBSR/Inexp*)−$\overline{X_{T0}}$ (*MBSR/Exp*)	13.67−15.36	4.01−3.26	1.59−1.93	29.62−23.71	72.00−56.00
(*p*)	(0.391)	**(<.001)**	**(0.035)**	**(0.001)**	**(0.007)**
t (*df*)	−0.86(63)	3.93(67)	−2.14(73)	3.44(62)	2.78(71)
95%*CI*	[−5.49, 2.1]	[0.38, 1.12]	[−0.65, −0.03]	[2.55, 9.12]	[4.89, 27.05]
T4					
$\overline{X_{T4}}$ (*MBSR/Inexp*)−$\overline{X_{T4}}$ (*MBSR/Exp*)	12.2−13.38	**4.20−3.67**	1.49−1.61	29.27−26.26	72.27−70.96
(*p*)	(0.514)	**(0.007)**	(0.512)	(0.087)	(0.789)
t (*df*)	−0.66(64)	2.76(72)	−0.66(77)	1.74(63)	0.27(72)
95%*CI*	[−5.11, 2.52]	[0.17, 0.93]	[−0.42, 0.21]	[−0.34, 6.32]	[−9.71, 12.86]
$\beta_{2,T4}$ (*p*)	−1.87 (0.09)	**0.39 (0.002)**	**−0.32 (0.003)**	**2.46 (0.01)**	**14.67 (<.001)**
t (*df*)	−1.72(63)	3.29(60)	−3.09(64)	2.67(61)	4.08(63)
95%*CI*	[−3.97, 0.22]	[0.16, 0.62]	[−0.52, −0.12]	[0.69, 4.24]	[7.75, 21.59]
$\beta_{3,T4}$ (*p*)	0.4 (0.82)	−0.2 (0.303)	0.23 (0.164)	−2.85 (0.055)	**−14.4 (0.014)**
t (*df*)	0.23(63)	−1.04(60)	1.41(64)	−1.95(61)	−2.54(63)
95%*CI*	[−2.98, 3.79]	[−0.57, 0.17]	[−0.09, 0.55]	[−5.65, −0.04]	[−25.34, −3.47]
T12					
$\overline{X_{T12}}$ (*MBSR/Inexp*)−$\overline{X_{T12}}$ (*MBSR/Exp*)	11.36−12.47	4.00−3.83	1.51−1.47	27.27−25.33	64.80−64.80
(*p*)	(0.693)	(0.219)	(0.632)	(0.309)	(0.863)
t (*df*)	−0.4(81)	1.24(88)	0.48(91)	1.02(78)	−0.17(89)
95%*CI*	[−5.12, 3.37]	[−0.15, 0.72]	[−0.27, 0.45]	[−1.72, 5.61]	[−14.15, 11.79]
$\beta_{2,T12}$ (*p*)	**−2.9 (0.028)**	**0.48 (0.001)**	**−0.49 (<.001)**	2.17 (0.05)	**10.87 (0.011)**
t (*df*)	−2.24(66)	3.44(63)	−4.01(67)	2(64)	2.61(65)
95%*CI*	[−5.39, −0.41]	[0.21, 0.75]	[−0.72, −0.25]	[0.07, 4.25]	[2.82, 18.85]
$\beta_{3,T12}$ (*p*)	0.82 (0.685)	**−0.47 (0.038)**	**0.43 (0.025)**	**−3.89 (0.023)**	**−17.14 (0.011)**
t (*df*)	0.41(65)	−2.12(63)	2.29(67)	−2.34(63)	−2.61(65)
95%*CI*	[−3.06, 4.7]	[−0.9, −0.04]	[0.07, 0.79]	[−7.1, −0.68]	[−29.77, −4.46]

$\beta_{2,j} = \mu_j$ (*MBSR/Exp*) − μ_{T0} (*MBSR/Exp*).
$\beta_{3,j} = \mu_j$ (*MBSR/Inexp*) − μ_{T0} (*MBSR/Inexp*) − μ_j (*MBSR/Exp*) − μ_{T0} (*MBSR/Exp*).
$\overline{X_j}$ (*MBSR/Inexp*), $\overline{X_j}$ (*MBSR/Exp*) – *sampling means.*
The table displays the measured sampling means for each of the five psychometric scales for experienced participants and inexperienced participants in the MBSR group ($\overline{X_j}$ (MBSR/Exp) and $\overline{X_j}$ (MBSR/Inexp), respectively) at measurements T0, T4, and T12. Regression coefficient β_2 is the estimated change in mean for the experienced participants of the MBSR group. The LMM-estimated change in mean for the inexperienced participants of the MBSR group compared with that of the experienced individuals is the regression coefficient β_3. For all tests, we report p-values (p), statistics (t), degrees of freedom (df), and 95% confidence intervals (95%CI). Significant differences and p-values < 0.05 are displayed in boldface. The color is used to separate the measured or estimated parameters with their corresponding statistics from each other.

on the 11 ARSQ dimensions (see Methods and **Figure 3**). Most notably, Comfort scores for the MBSR group showed a significant increase at T4 compared to Controls (**Table 3** and **Figure 7A**), which is in line with the positive correlations between Comfort and WHO-5 (**Figure 6**) and the effect of MBSR according to the WHO-5 scale. We also note that participants scoring low on Comfort at baseline (T0) seemed to benefit the most with the number of participants (scoring below 3 on Comfort) decreasing from 11 to 3. LMM also revealed significant difference in Theory of Mind in the MBSR group compared to Controls at time T4 (mean change difference −0.49, 95% CI = [−0.97, −0.01], p = 0.049) and T12 (mean change difference 0.82, 95% CI = [−1.34, −0.3], p = 0.003, **Table 3** and **Figure 7B**), and a significant increase in Planning for the MBSR group compared to Controls at T12 (mean change difference 0.6, 95% CI = [0.08, 1.11], p = 0.025, **Table 3** and **Figure 7C**). We did not observe any mean change differences between the two groups for the other eight ARSQ dimensions (Figures **7D–K**). For a complete report of the LMM analysis of all ARSQ dimensions, see **Supplementary Table 4**.

DISCUSSION

In the present study, we used five validated self-report questionnaires to investigate the effect of MBSR on perceived stress, resilience, symptoms of emotional distress, anxiety and depression, current well-being, and satisfaction with life in healthy 60–65-year-old pre-retirement employees, compared to a waitlist control group. We build upon and extend the findings on the role of mindfulness interventions in the workplace and argue that there are many benefits that are derived from cost-effective MBSR intervention for pre-retirement employees. In accordance with our prediction, MBSR participants experienced improved resilience and mental well-being, compared to the waitlist, not only at the end of the intervention (after 4 months), but also

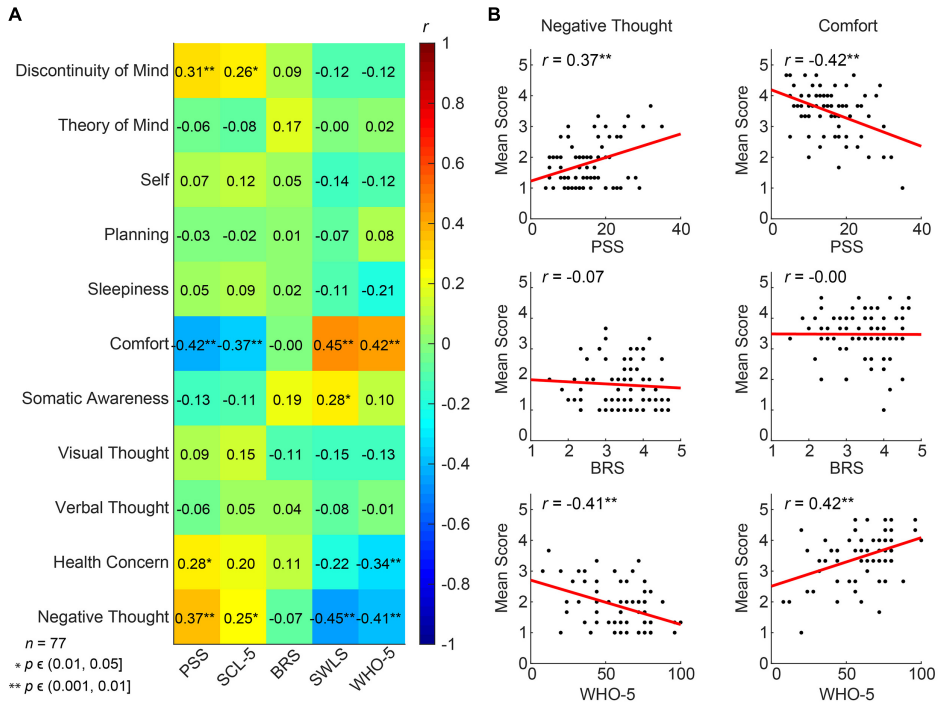

FIGURE 6 | Multiple dimensions of resting-state thoughts and feelings correlate with classical measures of mental well-being. **(A)** Correlation heat map between the 11 ARSQ-derived factors of resting-state cognition and five established psychometric scales related to mental health (Pearson correlation coefficients). Note the strong and opposite correlations between the factors Negative Thought and Comfort and the classical scales. **(B)** Comfort and Negative Thought show opposite correlations with the WHO-5 scale probing mental well-being in the past two weeks, where high scores should be interpreted as good mental health. Similarly, Comfort and Negative Thought show opposite correlations with the PSS, a scale measuring the amount of stress one experienced in the past month. Interestingly, the BRS measure of general resilience shows no correlation with either Negative Thought or Comfort.

at the 12-month follow-up measurement. Futhermore, MBSR participants also showed trends of improvements on perceived stress, symptoms of emotional distress, anxiety and depression, and satisfaction with life. These psychometric variables showed meaningful baseline associations with responses on the ARSQ, which we used to sample thoughts and feelings during a 5-minute eyes-closed rest session. In agreement with our second prediction, the MBSR group increased significantly resting-state Comfort and had improvements in sleepiness. However, MBSR training did not induce decreases in Discontinuity of Mind and Negative Thought which may be due to our cohort not reporting high levels of Discontinuity of Mind or Negative Thought at baseline, which left little room for improvement.

Healthy Pre-retirement Employees Are in Need of Stress Reduction

The participants had an active work life at the time of enrollment. While this status could imply a high level of resourcefulness and no great need for improvement, the questionnaire scores told a different story with 46% of participants experiencing moderate stress and 10% experiencing high stress. Norm scores based on an American population show that PSS scores generally decrease with one point per decade to reach its lowest (11.9) at 55–64 years of age, followed by a rise from age 65+ (Cohen, 1988). Hence, although the mean PSS score (15.7) was well below 18, which has been associated with higher mortality within a four-year period (Prior et al., 2016), our group of participants were on the high end of the expected stress scores for their age. In agreement with the fairly high level of perceived stress, 25% of participants experienced poor well-being (23% of participants showed both moderate to high level of stress and poor well-being).The scales measuring resilience, satisfaction with life, or symptoms of anxiety and depression also identified approximately a quarter of participants to have critically poor scores. Hence, the baseline measures indicated that our group of participants was actually a relevant group with a potential for improvement. This could be explained by self-selection effects, as participants signed up for the study voluntarily. Through the questionnaires, participants—whether they were aware of this or not—revealed a need for intervention.

MBSR Training Leads to Lasting Improvements in Resilience and Well-Being

After MBSR training, the participants reported lower perceived stress levels than Controls both at T4 and T12; however, the difference of the magnitude of change between the two groups did not reach significance in the LMM analysis. Hence, following the MBSR training, we did not observe a superior change in perceived stress, the primary outcome variable of this study. This lack of

TABLE 3 | The MBSR-intervention group shows increased Comfort at T4 compared to the Control group.

	Comfort	TOM	Planning
T0			
$\overline{X_{T0}}$ (*MBSR*)−$\overline{X_{T0}}$ (*Con*)	**3.33–3.67**	2.85–2.56	2.88–3.08
(*p*)	**(0.04)**	(0.17)	(0.32)
t (*df*)	−2.1(160)	1.4(175)	−1.0(167)
95%*CI*	[−0.65, −0.02]	[−0.12, 0.68]	[−0.61, 0.19]
T4			
$\overline{X_{T4}}$ (*MBSR*)−$\overline{X_{T4}}$ (*Con*)	3.78–3.49	2.77–2.98	3.16–3.06
(*p*)	(0.06)	(0.33)	(0.53)
t (*df*)	1.9(167)	−0.9(178)	0.6(170)
95%*CI*	[−0.01, 0.64]	[−0.62, 0.2]	[−0.28, 0.55]
$\beta_{3,T4}$ (*p*)	**0.65 (0.001)**	**−0.49 (0.049)**	0.34 (0.16)
t (*df*)	3.5(129)	−1.9(133)	1.4(131)
95%*CI*	[0.28, 1.01]	[−0.97, −0.01]	[−0.13, 0.81]
T12			
$\overline{X_{T12}}$ (*MBSR*)−$\overline{X_{T12}}$ (*Con*)	3.53–3.65	**2.61–3.21**	3.40–3.07
(*p*)	(0.63)	**(0.024)**	(0.10)
t (*df*)	−0.5(181)	−2.3(193)	1.7(187)
95%*CI*	[−0.44, 0.27]	[−0.99, −0.08]	[−0.07, 0.85]
$\beta_{3,T12}$ (*p*)	0.25 (0.22)	**−0.82 (0.003)**	**0.6 (0.025)**
t (*df*)	1.2(134)	−3.1(140)	2.3(136)
95%*CI*	[−0.14, 0.63]	[−1.34, −0.30]	[0.08, 1.11]

$\beta_{3,j}=\mu_j$ (*MBSR*)-μ_{T0} (*MBSR*)-μ_j (*Con*)-μ_{T0} (*Con*), $\overline{X_j}$ (*MBSR*), $\overline{X_j}$ (*Con*) – *sampling means.*

*The table displays the measured sampling means for the ARSQ Comfort, Theory of Mind (TOM), and Planning for the MBSR-intervention and Control groups ($\overline{X_j}$ (*MBSR*) and $\overline{X_j}$ (*Con*), respectively) at measurements T0, T4, and T12. The LMM-estimated change in mean for the MBSR group compared with that of the Control group is the regression coefficient β_3. For all tests, we report p-values (p), statistics (t), degrees of freedom (df), and 95% confidence intervals (95%CI). Significant differences and p-values < 0.05 are displayed in boldface. The color is used to merely separate the measured or estimated parameters with their corresponding statistics from each other.*

significant differences between groups in the changes over time most likely resulted from the lack of power due to the reduced sample size, which was a consequence of COVID-19 restrictions (see **Figure 2**).

The MBSR intervention also did not induce significant differences between the groups in the changes over time in symptoms of psychological distress, and symptoms of anxiety and depression (SCL-5). At T0, the average scores were lingering below the SCL-5 cut-point (2) above which mental illness can be predicted (Strand et al., 2003). However, the SCL-5 took an upward course in the control group while decreasing steadily in the MBSR group, to reach a significant sample mean difference at T12, which could tentatively be interpreted suggest the workings of a more time-demanding consolidation process.

Importantly, we observed significant and lasting improvements for WHO-5 and BRS. The control group showed trends of worsening symptoms measured by PSS and SCL-5, whereas the MBSR group stayed relatively stable. This may be due to the protection mechanisms offered by the intervention which is shown by the increase of well-being and resilience of the MBSR group. The MBSR group improved their scores of well-being and resilience especially at T4 and stayed significant at T12. Resilience has been demonstrated to have protective capacities that are related to better mental health in the future (Nila et al., 2016), and there is an increasing focus on improvements in resilience with regards to protecting the long-term well-being of employees (Harvey et al., 2014). This perspective, while being relevant to all age groups, carries special relevance to aging employees who are exposed to additional age-related stress and associated lowered resilience to illnesses. MBSR hence offers aging employees a means to maintain a healthy work-life in the last years before retirement.

Several studies have linked the COVID-19 pandemic to increasing psychological distress in the general population, escalating symptoms of depression, anxiety, and stress (Ettman et al., 2020; Xiong et al., 2020). Although the COVID-19 may have decreased the external validity of our results, it is a tempting interpretation that the special extra stressful circumstances induced by COVID-19 may specifically have worked against improvements on the PSS, which emphasize lack of control. However, notwithstanding COVID-19, the control group did not show a significant change of stress levels from baseline, suggesting that the pandemic probably did not act as an aggravating factor. Taking the results at face value, it becomes clear that MBSR participants report selective improvements in stress coping in the sense of being able to not let stressful events get to them, i.e., letting the events pass and move on, another word for this is *resilience*. The MBSR program has consistently been shown to decrease self-reported distress and stress post-intervention (Khoury et al., 2015), perhaps reflecting the predominant use of questionnaires that sample stressful experiences. However, especially noteworthy in the present study is the finding that resilience increases and stays high, while the control group remains unchanged. This suggests that the BRS scale captures a central beneficial outcome of the MBSR program. The items in the BRS collectively emphasize the tendency to bounce back quickly after hard times, and to recover quickly from stressful events with little trouble. The mechanisms involved in the achieved boost in resilience may count, in particular, training of acceptance skills in MBSR, i.e., acknowledging the habitual reactions to stressful situations with a non-judgmental, matter-of-fact attitude, eventually discovering that mindful awareness allows for additional choices in response to stress (Lindsay and Creswell, 2017; Chin et al., 2019). The implied re-perception has been associated with improved self-regulation, clarification of values, and cognitive, emotional, and behavioral flexibility (Shapiro et al., 2006).

MBSR Participants With Previous Yoga/Meditation Experience Drive the Main Effect of the MBSR Intervention

On comparison of the experienced with inexperienced participants (i.e., participants with and without previous yoga/meditation experience at the beginning of the study, respectively) in the MBSR group, we observed greater improvements in the experienced participants after the MBSR intervention. This, however, could be a result of the significantly poorer baseline BRS, SCL, SWLS, and WHO-5

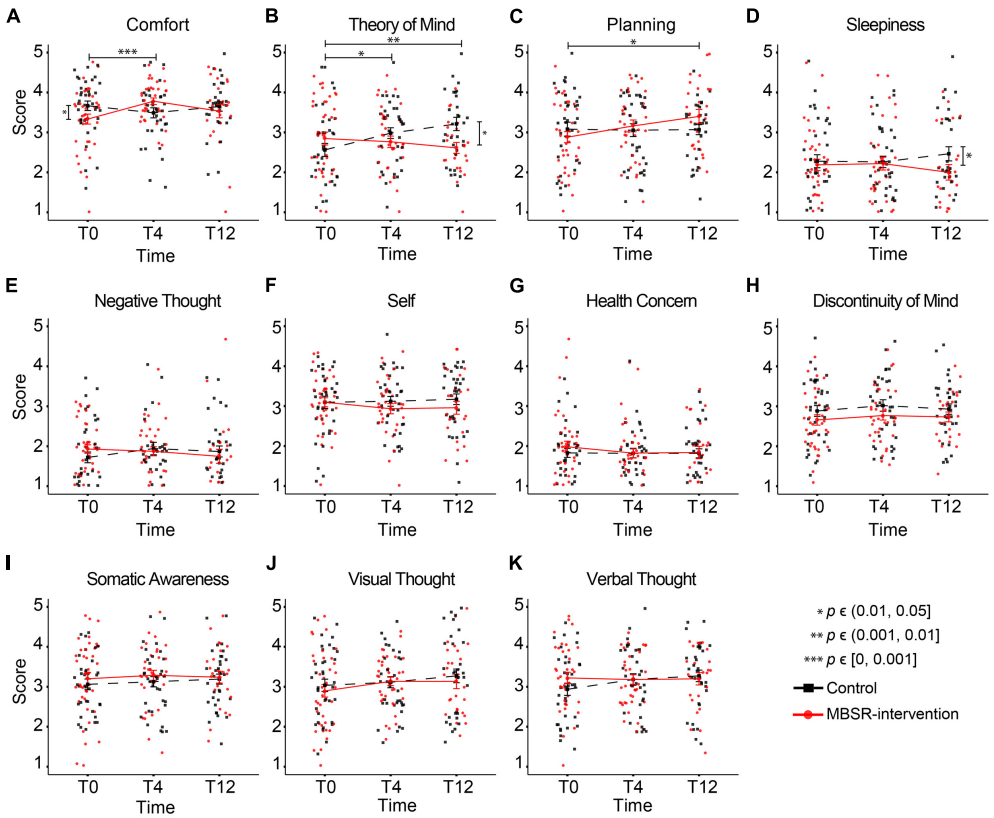

FIGURE 7 | Increasing resting-state Comfort in the MBSR compared to the Control group. Changes in the group-mean responses over time for the eleven ARSQ dimensions **(A–K)** are shown. Significant differences in the estimated changes over time in the two groups are shown with horizontal bars and asterisks. Vertical bars and asterisks indicate a significant difference between the group sampling means at each individual time point. All statistics are based on LMM, see **Table 3** for details. T0: baseline measurement; T4 and T12: measurements after 4 and 12 months, respectively.

scores of the experienced MBSR participants as compared to those of the inexperienced MBSR participants. Consequently, the experienced individuals had simply a greater margin to improve their scores from baseline. We speculate that the poorer baseline scores of the experienced MBSR participants reflect that this group may have been seeking yoga/meditation training previously to counter a wide range of mental of physical problems not measured in the present project and recommend a more thorough screening of such a bias in future research. While the improvement in the wellbeing scales of the experienced participants to some extent may be explained by the lack of a "ceiling effect" (i.e., the margin to improve was larger), it is also conceivable that this group with its prior experience with yoga or meditation was more open to the therapy or better prepared to learn the exercises and, therefore, gained more than the inexperienced participants.

MBSR May Improve Sleep Quality

Since sleep quality is a hallmark symptom of mental health and moderate sleep disturbances in older adults are often associated with deficits in daytime function (Prinz, 1995; McCrae et al., 2005; Ancoli-Israel and Ayalon, 2006), we probed potential effects of MBSR training on sleep. Several studies previously studied the effects of mindfulness on sleep with mixed findings (Winbush et al., 2007; Gross et al., 2011; Hubbling et al., 2014). Our observations showed that the MBSR group had lower sample mean difference in Sleepiness (ARSQ dimension) at T12, and participants' ratings of experienced sleep quality showed significant improvement in mean change difference at T4. Our results are aligned with a recent systematic review and meta-analysis of randomized controlled trials suggesting that mindfulness meditation may indeed be effective in addressing sleep problems (Rusch et al., 2019). We suggest that future studies should include more extensive sleep scales to further probe the effects of MBSR on sleep quality, in particular in this age group.

Does General Well-Being Drive Our Thoughts and Feelings in Every Moment?

Using the full data set at baseline (T0), we observed significant correlations between the dimensions Discontinuity of Mind, Comfort, Health Concern, and Negative Thought and the mental health scales PSS, SCL-5, SWLS, and WHO-5. This is not a trivial finding considering that these classical measures examine weeks to months of time, whereas the ARSQ data refer to thoughts and feelings in a 5-minute eye-closed rest period, suggesting that general mental health impacts our feeling of

comfort and capacity to control the flow of our thoughts *at any given moment*. This is in line with previous studies analyzing associations between the ARSQ dimensions and mental-health scales. Especially low Comfort and a high degree of Sleepiness or Discontinuity of Mind are characteristic of poor mental health as reflected in clinical psychometric scales measuring anxiety, depression, or sleep quality (Diaz et al., 2013, 2014). Thus, it is plausible that at a multitude of biological mechanisms governing mental health bias our thoughts and feelings at any given moment. This raises the intriguing idea that therapeutic interventions targeting such mechanisms impact momentary patterns of what we feel and think. We indeed observed a highly significant increase in Comfort in the MBSR group compared to Controls at T4. This is an important outcome of the intervention because comfort is essential to mental well-being. One must feel comfortable to maintain focus of attention, including to own thoughts as reflected in the strong negative correlations between Discontinuity of Mind and Comfort (Diaz et al., 2013). Several studies using the ARSQ have reported reduced Comfort in clinical cohorts, including insomnia (Palagini et al., 2016), autism (Simpraga et al., 2021), and also health anxiety and obsessive compulsive disorder (Gehrt et al., 2020). Thus, there is a need and our results indicate a potential for MBSR to facilitate a greater feeling of comfort in these disorders.

The MBSR training did not induce decreases in Discontinuity of Mind, which might be related to a floor effect: our cohort did not report high levels of Discontinuity of Mind at baseline, albeit we know little about the norm values of the ARSQ dimensions in this age group. Similarly, Health Concern and Negative Thought were scored low, which left little room for improvement (**Figures 7E,G**). We found a significant effect on the dimension Theory of Mind which decreased in the MBSR group, while increasing in the Control group. Theory of Mind is related to the cognitive aspect of empathy, explained as the ability to infer and reflect upon the mental states that underlie other people's actions (Baron-Cohen, 2000). Theoretic and intervention-based accounts suggest that mindfulness cultivates empathy in a broader sense (Shapiro et al., 1998; Andersen, 2005), also involving affective empathy, which refers to sharing other people's feelings and to feel emotional concern for other people's emotions or experiences (Davis, 1983; Duan and Hill, 1996). In any case, taken at face value, the present results suggest that mindfulness makes us *less* prone to "think about others", "put myself in other peoples' shoes", and "think about people I like". It could be speculated that MBSR participants used the 5 minutes rest of the ARSQ paradigm, which form the basis for the present analysis, to practice moving towards experience, simultaneously moving away from thinking, at T4 and T12, while Controls were not yet familiar with this mindfulness technique. Importantly, this tells little about participants behavior outside the "lab"/ARSQ paradigm.

Booster Sessions Stimulate Continued Practice

It is well-known that home practice during the MBSR course plays a role, significantly influencing the magnitude of the beneficial outcomes that participants report (Carmody and Baer, 2008; Parsons et al., 2017). In our study, to increase the insight into the home practice behavior in self-referred 60–65-year-old work active Danes, we also inquired about this aspect. After the second data collection (T4), participants in the MBSR group kept up a cadence of 4 weekly home exercise sessions. This was reduced to approximately three times per week during the following 8 months (T12), i.e., a relatively modest reduction of 25%. In this same time period (T4 to T12), well-being (WHO-5) dropped, but resilience remained high, and SCL-5 reached significance in sample mean difference at T12.

It has been observed that many MBSR participants find it hard to sustain a practice after the 8-week course has ended (Carmody and Baer, 2008; Parsons et al., 2017). In our study, the new element—monthly booster sessions—may have played a critical role in the positive results observed after 12 months. As it turned out, 29% of the participants took part in all or most sessions, 37% in some, 5% did not follow any booster sessions, and 29% did not respond. Participants showed no clear preferences regarding the session format, although physical meetings were favored over online sessions, and a good third of the participants preferred a mixed setup.

Limitations

Reduced Sample Size and Lack of Long-Term Follow-Up

The current literature examining mindfulness-based interventions for older adults is scarce and lacking randomized controlled studies with sufficiently large sample sizes and long-term follow-ups (Klimecki et al., 2019). The present study was designed to meet these needs, but unfortunately both the sample size and the long-term follow-up were compromised by the COVID-19 pandemic. The sample size of the study was reduced to 82 from originally 192 participants, resulting from a power calculation based on the primary outcome measure PSS with a sensitivity limit set to at least a clinically moderate effect size. Due to the reduced sample size, we did not adjust for multiple comparisons. Still, the observation of moderate improvements in a broad range of effect measures—many of them reaching statistical significance in spite of the loss of statistical power—is promising and makes a strong case for adequately powered follow-up studies. Also due to the reduced sample size, there was also insufficient power to analyze sub-groups.

Booster Sessions Were Added ad hoc, and Did Not Require Participation

In the present study, the booster sessions were added ad hoc as an attempt to keep the MBSR practice active until COVID restrictions were halted and follow-up physiological data collection (including MR brain scans) could again take place. Unfortunately, this opportunity did not arrive within an acceptable time frame, and the study stopped a year before planned. The booster sessions, although offering a very interesting addition to the 8-week MBSR program, could not be tested in the optimal manner by making the sessions mandatory to all participants, due to the ethical problem in adding new elements after participants had already signed up

to the original protocol. An additional analysis comparing the effects of attendance versus no attendance in the booster sessions could reveal if and to what extent these booster sessions had their own effect. Unfortunately, the present dataset does not offer the statistical power to isolate the effects of the booster sessions because only 2 people from the MBSR group did not participate in any of the booster sessions. In a future study the effect of booster sessions should be part of the original protocol and studied in its own right, relying on full, or close-to-full participation.

Multi-Method Approach Was Reduced to Single-Method Questionnaire Approach

The exclusion of physiological data after the initial baseline collection of anthropometric, cardiovascular and morphological and functional brain imaging data limited the present study in a highly regrettable manner, as these measures were included to further our neurobiological understanding of MBSR-induced health benefits in this important but overlooked cohort. Future research should aim to address the aforementioned shortcomings with the inclusion of physiological and morphological or functional brain imaging data that had to be abandoned in the present study due to COVID-19.

Outlook

In spite of the adverse impact of the COVID-19 pandemic on our randomized control trial, we observed promising effects of MBSR on well-being and resilience of 60–65-year-old employees in the private sector. The pandemic stimulated the development of a new booster-session MBSR format, which may have contributed to the lasting improvements on resilience and well-being at the 12-months follow-up. The participants were characterized by high job satisfaction and generally had few sick days from work; however, at least a quarter of the participants scored in a critical range on mental health scales. They gladly signed up for a free 8-week MBSR program and the majority also showed up for monthly booster sessions. Thus, the booster-session format should be considered in the future, not only in scientific studies but also to sustain older working people's engagement, continued practice, and improved health status, which is an important challenge (Masheder et al., 2020). We recommend larger and longer-running studies to investigate whether the health benefits of MBSR would affect how long older employees stay in their work-life. In addition to the overall greater statistical power, a larger sample would also allow for subgroup analyses, such as baseline stratification investigating the profiles of the participants who benefit the most from the MBSR intervention. From a practical and economic point of view—not the least for employers—we noted in our data a considerable potential in this respect.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Danish Research Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

KJP and NH conceived and designed the study and organized and collected the data. KS and MD performed the statistical analysis and created the figures and tables. NH and LF organized the Mindfulness-Based Stress Reduction (MBSR) intervention. KJP, KL-H, KS, MD, and NH wrote sections of the manuscript. KJP, KL-H, KS, MD, LF and NH contributed to manuscript revision, read and approved the submitted version. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.699088/full#supplementary-material

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Give a Man a Fish or Teach a Man to Fish: A Cross-Level Moderated Mediation Model of Cognitive and Performance Responses of Team Members to Help of Team Leaders

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Drawing upon theoretical lenses of social cognitive theory, this study explores whether, when, why, and how the helping behaviors of team leaders influence individual work role performance of team members (in terms of individual task proficiency, task adaptivity, and task proactivity) through self-efficacy of team members. The consequences of different types of help of leaders are uncovered in this study. By proposing a cross-level moderated mediation model and using multisource and multistage data from 303 team members in 39 work teams, autonomy-oriented help of leaders was found to have a differential effect on individual work role performance of members *via* the self-efficacy of the latter when controlling for dependency-oriented help of leaders. Moreover, the multilevel analysis of moderation uncovered that leader–member exchange relationship at the team level engendered a boundary condition for the mediating role of member self-efficacy in the relationship between autonomy-oriented help of leaders and individual work role performance of members in this model.

Keywords: autonomy-oriented help, dependency-oriented help, leader-member exchange, self-efficacy, individual work role performance, cross-level interaction

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INTRODUCTION

Helping behavior, as "an important form of citizenship behavior" (Podsakoff et al., 2000, p. 516), has gained great attention in academia. It is referred to as spontaneously helping others with work-related problems (Podsakoff et al., 2000) and can happen every day through interactions between coworkers (e.g., Alvarez and van Leeuwen, 2011; Koopman et al., 2016) in work teams. However, previous research has focused on help seeking (e.g., Nadler, 1997; Bamberger, 2009; Komissarouk et al., 2017), feedback seeking (Ashford et al., 2003), and help providing (e.g., Flynn, 2006; Maki et al., 2017), but lacked to explore the psychological mechanism of receiving help in depth (for exceptions, see Alvarez and van Leeuwen, 2011, 2015; Halabi et al., 2011; Alvarez et al., 2018).

In work teams, a team leader is responsible for coordination within the team (Zaccaro et al., 2001), helping members with problem solving by providing informational and advisory guidance (Courtright et al., 1989), and ensuring the services delivery of the team and collective goal achievement. In this way, the help and support of team leaders can generate significant impacts on the perceptions and behaviors of team members (Li et al., 2015). However, findings on the

consequences of obtaining leader support are inconsistent for employees. Some studies have examined that leader support can promote several forms of proactive employee behaviors (e.g., Ohly et al., 2006; Parker and Wu, 2014); while others have reported an insignificant relationship between them (e.g., Frese et al., 1999). Further, scholars have appealed that it is necessary to study various types (other than "a simple act," Fisher et al., 2018, p. 1525) of helping behaviors, and investigate the psychological process (such as "who, what, when, why, and how") of specific contents or types of help of leaders on employees' behaviors (Ehrhart, 2018, p. 2; Wu and Parker, 2017). To better address such inconsistency and explore different working mechanisms of receiving help from team leaders, this study explores three aspects: different types of help behavior, the mediating process of help of leaders (why help of leaders is important, how it contributes to employee work performance, whether the effects of different types of help of leaders are differential), and boundary condition (when help of leaders matters).

As the old saying goes, "give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime." Apparently, it involves different types of help and suggests an "either/or" helping solution in life. In the helping literature, researchers have made substantial efforts in the categorization of helping behavior, such as autonomy-oriented help and dependency-oriented help (Nadler, 2002) according to individual needs, necessary help and convenient help (Gross and McMullen, 1983), instrumental help (task-oriented and informational) and emotional help (personal but less task-oriented; Bamberger, 2009), job-related and non-job-related support (Bowling et al., 2005), task assistance and social and emotional support (Mor Barak et al., 2009), reactive helping (other-oriented and prosocial) and proactive helping (helper self-interested; Spitzmuller and Van Dyne, 2013), as well as four types of helping from the perspective of the cost to the helper including causal helping (low cost), substantial personal helping (high cost), emotional helping, and emergency helping (due to close relationships; McGuire, 1994). However, few studies have integrated the categorization of helping behaviors with leader or supervisory support, or have compared the differential effects of different types of leader helping between each other in a work team setting. In so doing, we first investigate two types of helping behaviors of leaders, which are in line with individual needs of employees (Nadler, 1997): autonomy-oriented and dependency-oriented help. Due to their differential impacts on competence, self-esteem, and resource gaining of individuals, these two types of help have received great attention in academia (e.g., Nadler, 1997, 2002; Alvarez and van Leeuwen, 2011, 2015; Alvarez et al., 2018). Specifically, autonomy-oriented help involves "providing the recipients with the tools to solve their problems on own" (Nadler, 2002, p. 491); while dependency-oriented help is short-term information or benefits provided to recipients who will need similar support from help givers again when confronting similar issues (Nadler, 2002; Nadler and Chernyak-Hai, 2014).

Second, we drew on social cognitive theory (Bandura, 1986) and adopted a member-centric approach to uncover *how*, *why*, and *whether* receiving different types of helping behaviors of team leaders might differently affect work performance of team members. In so doing, we propose and examine how different types of helping behaviors of team leaders can generate differential effects on work role performance of team members *via* their sense of self-efficacy. The social cognitive theory posits that self-efficacy ("the belief in one's capabilities to organize and execute the courses of action required to produce given attainments;" Bandura, 1997, p. 3) is the central mechanism of human agency (Bandura, 1997), which can shed light on how the relationship plays out between help of team leaders and work performance of team members. In a team environment, team members with a robust sense of self-efficacy can generate confidence in task execution, boost "intrinsic interest and deep engrossment" in task behaviors, set challenging work goals, adapt to changes or uncertainty, and make persistent efforts toward goal accomplishments (Bandura, 1994, p. 2), which, in turn, facilitate their work performance.

Third, we further explored *when* receiving different types of help of leaders facilitates self-efficacy of team members and, in turn, their work performance. In Chinese society, the quality of leader–member relationship is a critical contextual factor to employee behavior and performance (Yu et al., 2016). The common use of work teams and teamwork in organizations has increasingly stressed the importance of considering team-level stimuli, such as leadership climate on the motivational process of team members (Chen and Kanfer, 2006). Thus, beyond perceiving leader–member exchange (LMX) at the individual level, group-level LMX can be positively associated with leadership climate and team atmosphere (Yang and Tan, 2016), as well as can influence employee work performance especially for Chinese workers who may still work hard for their leaders even if being treated not so well (Rockstuhl et al., 2012). Leveraging the social cognitive theory, we propose that group-level LMX can interact with receiving help of team leaders to influence the improvement of self-efficacy of team members. We also propose that the indirect effect of member self-efficacy is contingent upon the factor of group-level LMX at a cross-level framework.

This study will make four main contributions as follows; first, this study will contribute to the helping literature by improving the understanding of autonomy- and dependency-oriented help and enriching research findings on the consequences of receiving these two types of helping behaviors. Prior research has not yet discovered their effects on employee work performance. Second, it will uncover why, how, and when processes of these two types of helping behaviors of team leaders, and further compare their differential effects. Up to date, few literature has opened this black box. Third, it will contribute to the group-level LMX theory by examining the boundary condition of group-level LMX in the theoretical framework in this research. Few studies have built up a multi-level perspective to explore the potential effects of LMX at the group level. Fourth, this study will also enhance the understanding of antecedents of work role performance, which few studies have examined whether and which certain leader behaviors can facilitate employee work role performance. Finally, this research will further deepen the understanding and applications of the social cognitive theory from a multilevel research framework.

THEORY AND HYPOTHESES DEVELOPMENT

Help of Team Leaders, Self-Efficacy of Team Members, and Their Work Role Performance

As previously stated, some studies have supported the positive role of leader support in enhancing employee performance. The uncertainty and dynamics of the modern work environment urge organizations to establish more requirements for individual work performance of employees (Griffin et al., 2007). However, despite being equipped with sufficient knowledge, skills, abilities, or other resources such as the help of leaders, people make decisions to take actions and perform based on their own sense of self-efficacy (Bandura, 1997). They choose to act when they believe they can (Bandura, 1997). Such global evaluation and judgment about one's own capabilities drive individuals to unfold their agency for work performance (e.g., a total set of roles and responsibilities; see Griffin et al., 2007). Research has theoretically and empirically shown that self-efficacy can trigger positive consequences, such as proactive work behaviors (Wu and Parker, 2017), employee creativity (Liao et al., 2010; Yu et al., 2016), and positive objective performance change (Liu et al., 2017). It is a critical cognitive-motivational construct by impacting "individual choices, goals, emotional reactions, efforts, coping, and persistence" (Gist and Mitchell, 1992, p. 198). Drawing upon the social cognitive theory, a widely recognized theory used to understand human behaviors in a social context (Smith and Hitt, 2005) and the multilevel phenomenon of the impact of leader behavior on perceptions of subordinates (e.g., Liao et al., 2010), self-efficacy is posited as one of the strongest psychological drivers inherent in individual behaviors in various environments (Bandura, 1994, 1997). With such a strong theoretical base, we propose that generally in a team setting, the help behaviors of team leaders may impact the self-efficacy of team members, which, in turn, influence member work role performance. Specifically, we also expect that the potential differential effects of different types of leader helping exist during this process.

Different Types of Help and Similar Constructs

Extensive studies have been conducted on supervisory helping behavior (Hu et al., 2018). The constructs of autonomy-oriented help and dependency-oriented help of leaders show a certain resemblance to perceived supervisory support (PSS). PSS is defined as "the degree to which supervisor value [employees'] contributions and care about their well-being" (Eisenberger et al., 2002, p. 565; Kottke and Sharafinski, 1988). It is regarded as general views or perceptions of subordinates on receiving support from their leader (e.g., Eisenberger et al., 2002; Edmondson and Boyer, 2013; Wang et al., 2014; Chen et al., 2016; Yang et al., 2018). Providing guidance, arranging good assignments and flexible work schedules, and showing consideration are typical examples of perceived supervisory support (Maertz et al., 2007; Yang et al., 2018). However, these are not content-specific forms of leader support. Wu and Parker (2017) proposed a specific type of leader secure-base support (in three form of availability, encouragement of growth, and non-interference) given the different content of leader support may influence the proactivity of an employee in different ways. Consistent with the research of Wu and Parker (2017), this study focuses on the help of team leaders with different contents: autonomy-oriented help and dependency-oriented help. These two constructs are distinguishable from PSS and other similar ones regarding general leader support.

Specifying different types of help can better address more issues in the helping process within organizations (Ehrhart, 2018). From the perspectives of the individual need for autonomy, autonomy-oriented help is identified as a practice in which the help giver provides tools to the help recipient to solve problems, such as similar problems in the future, which is of great educational value (Nadler, 1997, 2002; Nadler and Chernyak-Hai, 2014). The practice has been found to be more self-supporting and self-competent with positive feelings (Alvarez and van Leeuwen, 2011), and positively correlated to empowerment, decision making, and beliefs in personal or family change (Alvarez et al., 2018). In contrast, dependency-oriented help is referred to as helping others by providing a full solution for problem-solving (Nadler, 1997, 2002). This form of help offers high instrumentality to help recipients, so they can solve urgent problems immediately (Alvarez and van Leeuwen, 2011).

Different Types of Help and Self-Efficacy

Bandura (1982) pinpointed a hierarchy of four major and effective sources of self-efficacy in broad areas: (1) mastery experience, an individual's direct experience, and previous successful performance, which is the most direct and influential factor in self-efficacy enhancement; (2) vicarious experience, or the observational learning experiences gained from role models or similar referents; (3) verbal persuasion, in which individuals are verbally persuaded to be able to master certain tasks; and (4) physiological states, which can be referred as the somatic and emotional states that can influence people's assessments of their capabilities. These four sources are not mutually exclusive but interdependent. Mastery experience forms a direct and stable source of self-efficacy; whereas the other three (modeling, verbal persuasion, emotion arousal) are relatively indirect sources. Besides internal determinants of self-efficacy (such as knowledge, skills, abilities, motivation, effort, and performance strategies, which are under personal control), external factors, such as interdependence, resources, and the environment of tasks, as well as the interpersonal environment in an organization, can also impact an individual's assessment of their capabilities of performing work tasks (Gist and Mitchell, 1992). Hence, the help of a team leader may develop the self-efficacy of team members mainly *via* these four cues proposed by Bandura (1982). We expect that both autonomy-oriented help and dependency-oriented help of team leaders can contribute to the self-efficacy of team members. Specifically, the autonomy-oriented help of a team leader may foster member self-efficacy through enactive mastery, social persuasion, and positive physiological states. And the dependency-oriented help of leaders may enhance member self-efficacy through vicarious experience, verbal instructions,

and secure physiological states. Therefore, the two different types of leader helping can accentuate the level of member self-efficacy in different ways.

Autonomy-Oriented Help and Self-Efficacy

Previous studies have stressed the positive consequences of autonomy-oriented help for help recipients. For instance, autonomy-oriented help can improve the sense of self-competence, empowerment, social support, and autonomy of a help receiver (Nadler, 1997, 2002; Alvarez and van Leeuwen, 2011, 2015). The autonomy-oriented help of a team leader can positively change the self-efficacy of their team members in both cognitive and motivational ways. With autonomy orientation, the team leader helps their subordinates learn how to use tools (e.g., knowledge, skills, critical thinking strategies, performance strategies) to analyze and solve problems. In support of the model of self-efficacy determinants proposed by Gist and Mitchell (1992), this leads to a gain in internal self-efficacy sources of team members from abilities (with low variability) to performance strategies (analytical, psychological, behavioral strategies, with high variability). Individual abilities typically act as internal and stable determinants of self-efficacy, which can satisfy a team member's psychological need for autonomy (Alvarez and van Leeuwen, 2011) and self-reliance (Nadler and Halabi, 2015). In addition, performance strategies as the highest variable and internal cues may easily contribute to boosting a positive change in self-efficacy, since they are easy for a person to control. For team members, this can increase the possibility of their repeated successful performance, mastery experience, and, in turn, raise the perceptions of self-efficacy at work (Bandura, 1997; Parker, 1998).

Team members' beliefs in their capabilities can also be strengthened through verbal persuasion by the leader (Bandura, 1997). For example, when providing autonomy-oriented help, a team leader is more likely to express confidence in specific capabilities of subordinates, offer autonomy to them, and verbally persuade and encourage them to take over the task by using the tools to solve problems on their own. Team members are more likely to believe that they are capable (of performing this task) because the leader thinks they can do it. Autonomy-oriented help of team leaders is also often regarded as leaders granting valuable information, resources, and training in core competencies to team members, which makes the latter feel positive at work. Such positive physiological and affective states bolster the self-efficacy development of team members (Bandura, 1997). Furthermore, when receiving autonomy-oriented help, team members may indirectly gain self-efficacy *via* their vicarious experience (Bandura, 1997). For example, the subordinate earns an opportunity to observe how the team leader unfolds and analyzes problems, and to reflect on how to adapt previous knowledge to current difficulties. Therefore, the autonomy-oriented help of a team leader can be positively associated with the self-efficacy of team members.

Dependency-Oriented Help and Self-Efficacy

The extant research on receiving dependency-oriented help has stressed the negative consequences for help receivers, such as the risk of showing inferiority, threat on positive social identity (Nadler, 2002), and lack of independence and resources (Alvarez and van Leeuwen, 2015) in a team. Scholars found that help givers had the propensity to provide dependency-oriented help over autonomy-oriented help to maintain their advantages of status and territory of expertise, as well as to control the dependence of help seekers (Nadler, 2002; van Leeuwen and T?uber, 2010). Dependency-oriented help implies status inequality between similar individuals (Nadler, 1997, 2002; van Leeuwen et al., 2011). However, a high status of the help giver can offset negative impacts on the feelings of the help receiver (Alvarez and van Leeuwen, 2011). For example, if the help giver is an expert or represents authority other than being a peer of the help receiver, the help receiver may not perceive status incongruence or negative feelings when receiving dependency-oriented help. In this case, it can be anticipated that receiving dependency-oriented help from a team leader would not trigger feelings of inferiority compared with receiving help from coworkers (Alvarez and van Leeuwen, 2011). In work teams, team leaders have several reasons to offer dependency-oriented help, depending on the level of member competency (Nadler, 2002), the urgency of business demands (Alvarez and van Leeuwen, 2015), or self-protection purpose of a leader (Nadler, 2002). Despite such varying motivations, we contend that the instrumental helpfulness of the dependency-oriented help of a team leader can positively affect member self-efficacy through the two determinants of self-efficacy: vicarious experience and physiological states.

Particularly, the dependency-oriented help of a team leader can be more directly effective in an urgent business situation than autonomy-oriented help because of its instrumental nature for performers experiencing low self-efficacy in challenging work assignments. Bandura (1997) argued that modeling is effective to promote the self-efficacy of an individual. When a leader offers dependency-oriented help, they provide a full and detailed solution to a problem (Nadler, 1997), such as step-by-step guidance and operating procedures. Such direct informational inputs bridge a channel of modeling for team members. Specifically, when problems are brought to the team leader, the leader asks members for more information to generate a full solution or detailed verbal instructions. Such process acts as a vicarious experience for the subordinates, in which they can observe how the leader comes up with the elaborate approach; further, they can deduce basic performance strategies from the provided solution and apply them to similar issues next time (although they may still need certain support from leaders). In some occasions, team members have already had a solution in mind but they are afraid of trying and failure. These team members can, thus, benefit from the dependency-oriented help of the leader and achieve a sense of self-efficacy through self-verification during the process of being helped. Dependency-oriented help can provide team members with a sense of security and reduce their fear, worries, and anxiety about tackling "no-clue" issues. Moreover, it can indirectly improve the possibility of successful direct performance of team members, especially for low performers. Although those team members may not know the rationale behind the scenario and could not master skills to

solve a similar problem on their own next time, the dependency-oriented help of leaders at least allows them to apply the same solution for the next try, and aids them in "paying help forward" (Alvarez and van Leeuwen, 2015, p. 1). To a certain extent, such work experiences can increase self-efficacy perceptions of team members.

Scholars have argued that people prefer receiving autonomy-oriented help than dependency-oriented help for three main reasons. First, autonomy-oriented help, which drives an individual's growth in competence (e.g., knowledge, skills, abilities), is self-enhancing, empowering, and provides the help receiver with greater need satisfaction, as well as cultivates a closer help giver-and-receiver relationship (Nadler, 1997, 2002; Weinstein and Ryan, 2010; van Leeuwen et al., 2011). Second, it can make a more positive impression within the group compared with receiving dependency-oriented help (van Leeuwen and T?uber, 2010). Third, receiving autonomy-oriented help creates more positive feelings than dependency-oriented help, since autonomy-oriented helper shows respect for the need for autonomy of a recipient (Alvarez and van Leeuwen, 2015). Aside from these factors, people tend to feel more comfortable receiving autonomy-oriented help from "high-status" individuals with authority (e.g., expert, supervisor, manager) than from their peers (Alvarez and van Leeuwen, 2011). By integrating the helping literature and the self-efficacy theory in the work team context, both types of help of leaders can serve as drivers of perceived self-efficacy of team members at work. However, their consequences can be different. Compared with dependency-oriented help, autonomy-oriented help of team leaders can promote the self-efficacy of team members more by contributing to internal determinants (e.g., abilities), direct personal attainments, and other indirect sources. Thus, we propose the following:

Hypothesis 1: Compared with dependency-oriented help, team leader autonomy-oriented help is more positively related to team member self-efficacy.

Self-Efficacy and Individual Work Role Performance

In previous research, individual efficacy has been found to contribute to motivation and performance (Bandura and Locke, 2003), such as academia performance (Chemers et al., 2001), job performance (Stajkovic and Luthans, 1998; Judge and Bono, 2001) and other forms of performance in diverse environments (e.g., school, workplace, hospital, and sports teams). It is highlighted that self-efficacy can play a pivotal role in an individual's interpretation of their work performance. For instance, Liao et al. (2010) demonstrated the connecting role of member self-efficacy between their interpretation of relationship quality and member creativity. Liu et al. (2017) empirically illustrated the mediating role of self-efficacy change in objective performance change through the interpretation of citizenship behaviors from the perspective of social exchange.

In light of social cognitive theory, personal self-efficacy is the foundation of human agency and the key psychological mechanism of individual performance in the work environment (Gist and Mitchell, 1992; Bandura, 1997, 2001). People make attempts at their work tasks only with the support of their propositional sense of self-efficacy (Bandura, 1997). Based on Bandura (2001), there are four essential characteristics of human agency: (1) intentionality with centering on the planning of actions (e.g., goal setting); (2) forethought, by anticipating the consequences of different actions and selecting actions to produce desired outcomes; (3) self-reactiveness, through self-regulation of motivation, affect, and action toward desired goals; and (4) self-reflectiveness, by reflecting the adequacy of one's own capabilities, thoughts, and actions. Thus, the perceived self-efficacy of team members can influence their cognitive, motivational, affective, and selection process to leverage skills, capabilities, and resourcefulness for work performance accomplishments (Bandura, 1994). Specifically, as planners, fore thinkers, self-regulators, and self-verifiers, team members can intentionally set more challenging work tasks and goals, regulate their motivation and affect to implement action plans for desired outcomes, and reflect to evaluate whether they have adaptive mindsets and adequate capabilities for actions at work.

In today's rapidly changing environment, organizations expect more of employee work performance on the adaptability and proactivity besides traditional job task fulfillment (e.g., proficiency). The highly dynamic work environment and changing nature of work in organizations have urged a need to adopt a more overarching way to assess employee work performance. Reflecting such interdependence and uncertainty of the business world, Griffin et al. (2007) proposed an integrated model of employee work role performance, which encompasses three dimensions of work role behaviors: task proficiency, task adaptivity, and task proactivity at three levels (individual, team, and organization). In this research, we focus on the effect of self-efficacy of team members on their individual work role performance in terms of individual task proficiency, adaptivity, and proactivity. Specifically, individual task proficiency involves those behaviors "that can be formalized and are not embedded in a social context," which reflect "the degree to which an employee meets the known expectations and requirements of his or her roles as an individual" (Griffin et al., p. 331). It is closely associated with the expected performance of their own tasks, and it is "fundamentally about the required and expected types of individual performance" (Carpini et al., 2017, p. 547). Besides, individual task adaptivity and task proactivity are also necessarily included to evaluate individual work behaviors about adapting to dynamic environment needs and responding to uncertain changes. Individual task adaptivity is referred to as "the degree to which individuals cope with, respond to, and/or support changes that affect their roles as individuals" (Griffin et al., 2007, p. 331). Individual task proactivity is defined as "the extent to which individuals engage in self-starting, future-oriented behavior to change their individual work situations, their individual work roles, and themselves" (Griffin et al., 2007, p. 332).

When a team member experiences high self-efficacy, they tend to be more motivated in goal setting and put more effort and persistence toward achieving their goals (Bandura, 1997) to meet their role expectations and requirements. Moreover, they can

self-acquire and learn new skills to better adapt to changes when feeling competent (Carpini et al., 2017). Furthermore, being high in the perception of self-efficacy of a subordinate can also drive subordinates themselves to better anticipate the likelihood of proactive actions to reach more desired outcomes, regulate their own motivation and affect, and have more confidence in their capabilities of proactivity, such as conducting new work procedures and proactive problem solving (Griffin et al., 2007). Thus, considering the relationships between these two types of leader helping and member self-efficacy, we propose the following:

Hypothesis 2a: Team member self-efficacy mediates the relationship between team leader autonomy-oriented help and individual work role performance of team members.

Hypothesis 2b: Team member self-efficacy mediates the relationship between team leader dependency-oriented help and individual work role performance of team members.

The Cross-Level Moderating Effect of Leader–Member Exchange

Based on the LMX theory, at the dyad level, a team leader develops different relationships with his or her team members (Liden and Graen, 1980) given the limited time, resources, and energy of the leader (Graen and Uhl-Bien, 1995). Prior research has indicated that LMX was a significant contextual factor influencing employee attitudes (Duchon et al., 1986) and performance (Gerstner and Day, 1997), as well as in how followers interpret leader actions (e.g., Fisk and Friesen, 2012). Mature LMX can be perceived as an important resource channel for employee self-efficacy enhancement (Liao et al., 2010). In the eyes of team members, the team leader has more objective, essential but scarce job information, which is normally considered as a type of valuable job resource (Wang and Zhong, 2011). At the individual level, a low quality of LMX represents that the team member is the out-group person of his or her team leader, which the exchange relationship is limited to formal job descriptions and employment contract. In contrast, a high quality of LMX suggests that the team member is the in-group person of his or her team leader, which the leader–member relationship enjoys a high level of tangible (e.g., economic support) and intangible resources (e.g., mutual trust, well communications, respect, social support, mutual learning, mutual adaption, affection, and other intangible obligations) exchanges between them (Liden et al., 1993; Graen and Uhl-Bien, 1995), especially in the Chinese work context.

Although LMX was originated at the individually dyad level, researchers have appealed to be cautious that LMX effects exist across different levels (i.e., Schriesheim et al., 2001; Omilion-Hodges and Baker, 2013; Zhao et al., 2014). Meanwhile, dynamic needs from external and internal environments drive the common use of teams in organizations (Wang, 2020). In other words, we should not neglect the potential contextualizing effect of LMX at the team level (group-level LMX), which reflects the central tendency and overall level of relationship quality between leaders and members of the team (Liden et al., 2006). Especially, most employees in the Chinese society with a high level of collectivism tend to focus more on how leaders treat "us" well and, thus, are more likely to be influenced by group-level LMX (e.g., Yang, 2020). However, the importance of group-level LMX has not yet been fully paid attention (Yang and Tan, 2016). In the extant literature, the group-level LMX has been shown to be positively related to team potency (Boies and Howell, 2006), team affective commitment (Wang and Sun, 2013), team innovation (Li and Cheng, 2013), team performance (Wang and Sun, 2013), and team information elaboration (Zhao et al., 2014), as well as negatively related to team conflict (Boies and Howell, 2006). Moreover, the group-level LMX has been shown to play a moderating role in the relationship between group-level LMX differentiation and team productivity (Liden et al., 2006; Le Blanc and González-Romá, 2012). Specifically, when the group-level LMX is high, the group-level LMX differentiation would not impact team performance and affective commitment. However, when the group-level LMX is low, the group-level LMX differentiation can be positively associated with team performance and affective commitment. Meanwhile, Stewart and Johnson (2009) found that the group-level LMX can moderate the relationship between the interaction of team diversity and group-level LMX and team performance; as well as the relationship between team diversity and turnover rate. Besides its influences on team outcomes, the group-level LMX can also act as a contextual stimulus to affect the individual psychological processes of employees. For example, Yu et al. (2016) found that the group-level LMX can positively moderate the relationship between individual LMX and employee creative role identification, since group-level LMX can help foster a positive team atmosphere of leader empowerment, support, and interpersonal cooperation.

Apparently, LMX can be viewed as a valuable organizational resource (Omilion-Hodges and Baker, 2013). In a team with high group-level LMX, there is a tendency that leaders and their team members develop good, deep, and intensive exchange relationships with mutual trust, respect, obligations, resource exchange, and more empowerment (Boies and Howell, 2006; Ford and Seers, 2006). Their leaders form "trust, affect, and respect-based relationships" with them, and is more inclusive of them (Bauer and Erdogan, 2016, p. 3), as well as tend to have sufficient resources and present their willingness to share collective resources within their teams (Nishii and Mayer, 2009), and team members are more inclined to form collective identity and more willing to pay attention to the collective work tasks and goals other than personal goals (Omilion-Hodges and Baker, 2013). This can easily form a positive team climate of mutual respect and interpersonal cooperation (Cogliser and Schriesheim, 2000). Such resource distribution can also affect individual perceptions of justice and resource sharing between peers within a team (Omilion-Hodges and Baker, 2013). In turn, team members are inclined to feel more sense of support, autonomy, and empowerment to fulfill their challenging tasks within the team (Wang and Sun, 2013). Previous studies have indicated that the group-level LMX was positively related to member self-efficacy through the leader provision of developmental chances and positive verbal persuasion (Boies and Howell, 2006). In this case, the group-level LMX quality may engender potential

cross-level effects on the relationship between leader helping and member self-efficacy. Specifically, when receiving the autonomy-oriented help of a leader in a team with high group-level LMX, the subordinates feel empowered and are more inclined to recognize the help of their leader as core and valuable resources (e.g., key information and knowledge) because of a high level of trust and respect in such positive team climate. It is also possible for them to receive instrumental resources, verbal encouragement, and other support accompanied with the autonomy-oriented help of their leader (Boies and Howell, 2006). On the other hand, team members tend to perceive more obligations within the team (Settoon et al., 1996; Wang and Sun, 2013) and be more committed to meeting expectations of the leader by acquiring new skills, new strategies, and conducting new ways of thinking to make good use of the autonomy-oriented help of the leader as a form of reciprocity based on the social exchange theory. Consequently, high group-level LMX can accentuate the positive relationship between the autonomy-oriented help of leaders and the self-efficacy of members. In contrast, the effect of the autonomy-oriented help of a leader on member self-efficacy would be weakened if the group-level LMX is low, since the autonomy-oriented help of leaders may not be interpreted as key resources in such teams, and team members are often lacking in developmental opportunities, leader empowerment, valuable resources, and other support. Hence, we propose the following:

Hypothesis 3a: Group-level LMX quality positively moderates the relationship between team leader autonomy-oriented help and team member self-efficacy.

In teams with high group-level LMX, team members can feel a high level of abundant resources from team leaders (Boies and Howell, 2006), and they tend to form nice interactions among each other in such a positive team climate, which encourages mutual trust and cooperation (Wang and Sun, 2013). Thus, the effect of the dependency-oriented help of leaders on the self-efficacy of members would be attenuated, since the functionality of sufficient developmental chances, cooperation of team members, and team-level resource sharing would substitute for the effect of the dependency-oriented help of leaders on the self-efficacy of members. On the contrary, in teams with low group-level LMX, leaders and their team members have much less mutual communication and fewer relational intangible exchanges (Tu and Lu, 2016). Team members tend to simply complete required work responsibilities and receive basic tangible compensation (Graen and Uhl-Bien, 1995). If receiving dependency-oriented help from the leader who directly involves in the problem schema, analyzes, and approaches a step-by-step solution, team members can receive intangible benefits in the form of informational knowledge and earn a good opportunity of observational learning which can raise their efficacious beliefs (Parker, 1998). In other words, in the context of low group-level LMX, team members may regard dependency-oriented help of leaders as additionally scarce resources (such as more information on performing tasks) and important vicarious experience beyond their transactional exchanges to form a higher level of self-efficacy. Consequently, the low group-level LMX may strengthen the positive relationship between dependency-oriented help and self-efficacy. Hence, we propose the following:

Hypothesis 3b: Group-level LMX quality negatively moderates the relationship between team leader dependency-oriented help and team member self-efficacy.

To step forward, we anticipate that team members in a team who experience high group-level LMX perceive a better fit between their expectations and the actual receipt of the autonomy-oriented help of a team leader, which triggers a higher sense of self-efficacy and in turn higher level of work role performance by socially interpreting such help as gaining more support, trust, and unique resources from their leader, and having more opportunities for successful mastery experiences. In contrast, in work teams with low group-level LMX, team members tend to value the dependency-oriented help of leaders as intangible benefits and appraise a higher sense of self-efficacy, which in turn achieves better work role performance. Thus, we propose the following:

Hypothesis 4a: Group-level LMX quality moderates the mediating effect of team member self-efficacy on the relationship between team leader autonomy-oriented help and individual work role performance of team members. Specifically, if the group-level LMX quality is higher, then the mediating effect of member self-efficacy is stronger.

Hypothesis 4b: Group-level LMX quality moderates the mediating effect of team member self-efficacy on the relationship between team leader dependency-oriented help and individual work role performance of team members. Specifically, if the group-level LMX quality is lower, then the mediating effect of member self-efficacy is stronger.

The hypothesized framework for this study is depicted in **Figure 1**.

SCALE VALIDATION

Since there were few well-established scales for autonomy-oriented help and dependency-oriented help, we adopted a scale for each type of leader helping behaviors from the help orientation scale developed by Maki et al. (2017). A back-translation procedure (Brislin, 1986) was followed when using these two scales. A group of experienced people was invited to evaluate the content validity of these two scales, including six academic researchers in organizational behavior or management, eight team leaders or managers, and six front-line team members from different teams in different team-based organizations. First, we explained the definition and meaning of these two types of help to the group of people. With diverse experiences, this group of people understood and also agreed on the definitions of these two constructs from their personal perspectives. Then, each participant received a form containing 16 items (4 items of autonomy-oriented help, 3 items of dependency-oriented help, and 9 items of perceived supervisory support developed by Eisenberger et al., 2010) in a varying order to minimize the order effects (Hinkin and Tracey, 1999). Each form was provided with four categories ("autonomy-oriented help," "dependency-oriented help," "supervisory support," and "unclassified"). Each

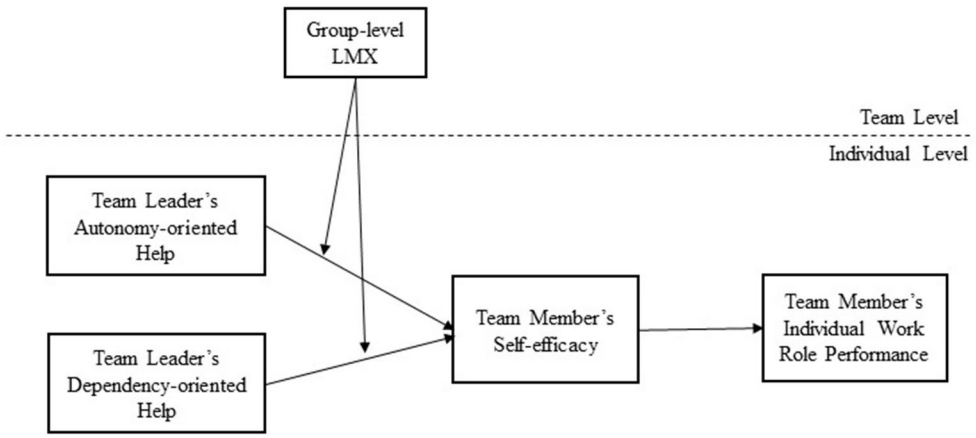

FIGURE 1 | Hypothesized framework.

participant was asked to assign these 16 items into groups as provided. The agreement indices for autonomy-oriented help and dependency-oriented help were satisfactory, which all of these participants can correctly assign scale items. It lent support for the content adequacy of these two measures (Hinkin, 1998). Second, we held a meeting with this group of people to discuss the item fit, item comprehension, and content clarity of autonomy-oriented help and dependency-oriented help scales. People within the group have consistent opinions on the fit, comprehension, and clarity of items for the scale of autonomy-oriented help. However, when evaluating the scale of dependency-oriented help, five leaders and three team members indicated that the item "My team leader helps me to meet my immediate work needs" needs further clarification in Chinese. Thus, we adjusted the Chinese wording of this item for the dependency-oriented help scale and kept the original content of the autonomy-oriented help scale based on the consensus reached in this meeting. Third, we followed the recommendation of Hinkin and Tracey (1999) to invite this group of people to rate the extent to which it is appropriate to measure both constructs (autonomy-oriented help and dependency-oriented help) on a five-point Likert scale from 1 ("not appropriate at all") to 5 ("very appropriate"). In line with the definition of autonomy-oriented help, the ratings of content appropriateness on items of autonomy-oriented help (M = 4.43) are higher than those of dependency-oriented help (M = 1.48). As for the items of dependency-oriented help, content appropriateness scores were higher (M = 4.18) than those of autonomy-oriented help (M = 1.71). We conducted the analysis of variance on the difference between those two groups of scores for each scale, and both were significant (p's < 0.001). In this way, the content of these two scales was validated.

Moreover, we conducted a pilot study for examining the scale validity by collecting data from an independent sample comprising 288 front-line employees from three middle-sized consulting companies in China (53% of the participants were male and 47% were female; 24% were between 20 and 30 years old, 42% were between 31 and 40 years old, and 34% were 41 years old and above). In this pilot study, the instructions of the survey explicitly informed the participants about research purpose and data confidentiality. The participants were requested to respond to the scale ranging from 1 = "strongly disagree" to 5 = "strongly agree" to assess the listed statements about the two types of help provided by their leaders. Cronbach's alpha was 0.72 for the autonomy-oriented help scale and 0.77 for the dependency-oriented help scale. The descriptive statistics and item analysis were shown in **Table A1**. To examine the discriminant validity of the adopted scale, we implemented confirmatory factor analysis for a two-factor model (autonomy-oriented help and dependency-oriented help) and a single-factor model (in which these two types of help were influenced by one latent factor). The results clarified that the two-factor model had a better model fit ($\chi^2 = 27.20$, $df = 12$, RMSEA = 0.07, SRMR = 0.05, CFI = 0.97, TLI = 0.95) than the single-factor model ($\chi^2 = 167.01$, $df = 14$, RMSEA = 0.20, SRMR = 0.11, CFI = 0.72, TLI = 0.57). These results support the reliability and validity of the autonomy-oriented help and dependency-oriented help scales in the Chinese context.

PRIMARY STUDY: METHOD

Sample and Procedures

The sample for this study was composed of 39 work teams from five Chinese companies in China, including several industries of informational technology, telecommunications, finance and investment banking, and vehicle sales. We distributed questionnaires to 365 team members of 40 frontline work teams. In each company, an HR staff helped monitor the entire data collection process to ensure data quality. To minimize potential common method biases (Podsakoff et al., 2003), data were collected in three waves with a one-month interval between each wave on a time-lagged basis. The instructions on the questionnaire clarified that all information would be kept as confidential and that the questionnaire was anonymous.

Additionally, general explanations and examples of autonomy-oriented help and dependency-oriented help were provided within the questionnaire in order to minimize potential confusion of the two constructs. The participants were requested to fill out their demographic information and rate the leader helping behaviors as well as LMX quality with their leaders at Time 1. Then, they rated their perceived self-efficacy at Time 2. We invited the corresponding team leaders to rate the individual work role performance of their members at Time 3. Each participant can receive an incentive (RMB 10 yuan) upon submitting their complete surveys. To further improve the validity of responses, an attention-check question was included in the survey.

We conducted data cleansing procedures suggested by Wen et al. (2018). For example, in the initial data filtering stage, surveys with inattentive and abnormal scores (e.g., all scores are basically the same) were eliminated. Since we obtained high commitment of top management teams of participating companies in this research, 331 team members returned their surveys at Time 1, with a response rate of 90.68%. At Time 2, we distributed surveys to these 331 team members and obtained 303 usable surveys, with a response rate of 91.54%. At Time 3, we distributed leader-version surveys to relative team leaders of 39 teams. All the corresponding team leaders who immediately supervised these 303 team members returned their surveys. We finally collected 303 valid sets of leader–member dyad survey data from 39 work teams, with an effective final response rate of 83.01%. Within the valid sample of team members, 156 participants (51.49%) were male and 147 participants (48.51%) were female; 174 participants (57.43%) were under 30 years old, 110 (36.30%) were between 31 and 40 years old, and 19 (6.27%) were between 41 and 50 years old; 32 participants (10.56%) had a degree of senior high school or below, 212 participants (69.97%) had a college diploma or bachelor's degree, and 59 participants (19.47%) had a master's degree or higher. In terms of job tenure in organizations, 71 participants (23.43%) had worked with their companies for less than a year, 185 participants (61.06%) worked for 1–5 years, 26 participants (8.58%) work for 6–10 years, and 21 participants (6.93%) worked for 10 years or longer. At the team level, each team has an average of 7.77 team members.

Measures

All measures were presented to the participants with a five-point Likert rating scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The questionnaires were administered and data were collected in China. As the same practices in the pilot study, a back-translation process was leveraged based on the recommendations of Brislin (1986). Specifically, these items were first translated from English to Chinese by a management professor and then another management professor helped to translate them back to English. Further, a third management professor was invited to compare and verify the translated version in Chinese against the English version for translation accuracy.

Autonomy-oriented help. With four items, the autonomy-oriented help of team leaders was measured with the adapted scale of providing help orientation developed by Maki et al. (2017). The team members were asked to respond to items, such as "My team leader helps me develop the skill and knowledge to help myself." Scale validity was examined using an independent sample in the pilot study. One item, "My team leader helps me to make sure I can eventually take care of my own needs," was excluded because of its factor loading being not >0.50 in the confirmatory factor analysis. The alpha reliability in the main study was 0.90.

Dependency-oriented help. With three items, the dependency-oriented help of team leaders was measured with the adapted the scale of providing help orientation developed by Maki et al. (2017). The team members were asked to respond to items, such as "My team leader helps me by fixing problems for me." Scale validity was examined in the pilot study as well. The alpha reliability in the main study was 0.86.

Individual self-efficacy. The individual self-efficacy of team members was measured with the eight-item self-efficacy scale developed by Chen et al. (2001). The scale has been tested with good reliability and validity in the Chinese context (e.g., Liao et al., 2010). An example of the items is "I am confident that I can perform effectively on many different tasks." One item, "Even when things are tough, I can perform quite well," was excluded because of its factor loading being not >0.50 in the confirmatory factor analysis. The alpha reliability for team member self-efficacy was 0.94.

Group-level LMX quality. Based on Graen and Uhl-Bien (1995), the LMX-7 is the most suitable scale for measuring the LMX as a unidimensional construct, and its reliability and validity were also empirically examined by Chinese scholars (e.g., Qu et al., 2013; Jiang and Yang, 2014). We measured the LMX quality perceived by team members with the seven-item LMX scale developed by Graen and Uhl-Bien (1995). The team members were invited to respond to items, such as "How well does your leader recognize your potential?" Two items measuring support and understanding were excluded because of their factor loadings being not >0.50 in the confirmatory factor analysis: "How satisfied your leader is with what you do?" "What are the changes that your leader would use his/her power to help you solve problems in your work?" For the five other remaining items, they are still representative to measure leader–member trust, understanding, support, and relationship quality. In this study, the alpha reliability for the LMX scale was 0.91. A one-way ANOVA was performed on LMX as a dependent variable and found that the between-group variance of LMX was significant ($F = 3.43$, $p < 0.001$). Since the team members are nested in different work teams, the within-group interrater reliability [$R_{wg(j)}$] and intra-class correlation (ICC1 and ICC2) scores were calculated to identify whether the individual LMX ratings have between-group variance and whether such ratings can be aggregated to a team level. As the results displayed, the mean $R_{wg(j)}$ of group-level LMX was 0.84 (>0.70), ICC1 = 0.24, ICC2 = 0.71, which suggested that the aggregation criterion was met (Klein et al., 2000). We hereby aggregated the individual LMX data to the team level in this research.

Individual work role performance. The individual work role performance of team members was measured with the nine-item individual work role performance scale developed by Griffin et al. (2007). The scores of individual work role performance

were rated by the corresponding team leaders at Time 3 (two months after Time 1). Examples of items are "This team member carried out the core parts of his/her job well;" "This team member adapted well to changes in core tasks" and "This team member initiated better ways of doing his/her core tasks." Consistent with other studies on work role performance, in this study, we used supervisor ratings of individual work role performance for potentially higher external validity (Hoffman et al., 1991). The alpha reliability for the individual work role performance of the team members was 0.95.

Control variables. Demographic information, such as gender, age, education levels, and organizational tenure of team members were measured as control variables, since they may exert potential impacts on individual self-efficacy and work performance in previous empirical studies (e.g., Seers, 1989; Stajkovic and Luthans, 1998; Erdogan and Liden, 2002; Liao et al., 2010; Liu et al., 2017; García-Chas et al., 2019). In addition, to differentiate the consequences between autonomy-oriented help and dependency-oriented help, the effect of dependency-oriented help was controlled for when testing the hypotheses regarding autonomy-oriented help; and vice versa. We executed all analyses including and excluding control variables (Becker, 2005). The results without control variables were consistent with those containing control variables.

Analytic strategy. First, we conducted analyses of descriptive statistics, correlations, and scale reliability in IBM SPSS 25.0. Second, since the data of the independent variables, mediator, and moderator in this study were self-reported, we evaluated the common method variance of this study by conducting a single unmeasured latent method factor test. Third, confirmatory factor analysis was implemented in Mplus 7.4 (Muthén and Muthén, 1998-2017) to assess the discriminant validity of this model. Fourth, as shown above, the ICC1 value (0.24) for group-level LMX indicates that the between-group variance was significant. Given the collected data of this study was a multilevel structure, we tested the hypotheses with multilevel modeling in Mplus 7.4.

RESULTS

Results of Confirmatory Factor Analysis

Since the variables in this study were measured with scales, we conducted a confirmatory factor analysis (CFA) for discrimination validity test purpose. The CFA results indicated that a five-factor model [$\chi^2 = 882.69$, $df = 311$, root mean square error of approximation (RMSEA) = 0.06, standardized root mean square residual (SRMR) = 0.05, comparative fit index (CFI) = 0.93, non-normed fit index (NNFI) or (TLI) = 0.92] has a good model fit. Moreover, we tested a four-factor model by combining autonomy-oriented help and dependency-oriented help as one latent factor, but the results of the model fit indices were getting worse ($\chi^2 = 1200.43$, $df = 315$, RMSEA = 0.07, SRMR = 0.07, CFI = 0.88, TLI = 0.86). We also tested a single-factor model, and found that the fit indices were unacceptable ($\chi^2 = 3168.88$, $df = 324$, RMSEA = 0.13, SRMR = 0.11, CFI = 0.60, TLI = 0.56). Thus, compared with other alternative models, the hypothesized five-factor model contributed to a better model fit in this study based on the CFA results.

In addition, we performed a single unmeasured latent method factor test (Podsakoff et al., 2003) to evaluate whether there was a potentially serious common method variance. After adding a general method latent factor to the five-factor model, the model did not have significant improvement on data fit ($\chi^2 = 878.83$, $df = 284$, RMSEA = 0.07, CFI = 0.90, TLI = 0.87). Given the chi-square difference test is sensitive to the sample size when >200 (Cheung and Rensvold, 2002), it is appropriate to compare the change in TLI between competing models (Little, 1997). The TLI of the trait/method model was 0.87, which did not have improvement compared with that of the hypothesized five-factor model (TLI = 0.90). Thus, these CFA results of the discriminant validity and a single unmeasured latent method construct approach indicated that the common method variance was not serious in this study.

Results of Descriptive Statistics and Correlations

The means, standard deviations, correlations, and reliability for the variables are presented in **Table 1** below. The variables (e.g., autonomy-oriented help, dependency-oriented help, self-efficacy, LMX, and individual work role performance) were significantly correlated ($p < 0.01$), which provided the foundation of hypotheses testing in this study.

Hypotheses Testing

We leveraged the multilevel modeling to test the hypotheses of this study. With recommendations from Preacher et al. (2010), the Monte Carlo Method was adopted to validate the mediating and moderated mediation effects of this multilevel model and 95% confidence intervals were used to evaluate the effect significance. The results are presented in **Tables 2**, **3**. First, as shown in Model 1 of **Table 2**, upon controlling for demographic variables, leader autonomy-oriented help was positively associated with member self-efficacy ($\gamma = 0.30$, $p < 0.001$), while the effect of leader dependency-oriented help on member self-efficacy was marginally significant ($\gamma = 0.06$, $p = 0.08$). Thus, H1 was supported. Second, as shown in Model 3, autonomy-oriented help was positively correlated with individual work role performance ($\gamma = 0.16$, $p < 0.001$) when the effect of dependency-oriented help was considered ($\gamma = 0.12$, $p < 0.01$). Third, when including both autonomy-oriented help and self-efficacy into Model 4, the self-efficacy of members became positively associated with their individual work role performance ($\gamma = 0.64$, $p < 0.001$) when the direct effect of autonomy-oriented on work role performance was controlled for and, in turn, became insignificant ($\gamma = -0.05$, *n.s.*). It provided support for the mediating role of self-efficacy in the relationship between autonomy-oriented help and work role performance. Further, the results of the Monte Carlo method (20,000 replications) in **Table 3** show that the indirect effect of autonomy-oriented help on work role performance through self-efficacy was significant and positive, and the 95% confidence interval (CI) did not include zero (indirect effect = 0.21, CI = [0.11, 0.32]). Thus, member self-efficacy mediated the relationship between leader autonomy-oriented help and the individual work role performance of members. H2a was hereby supported. On the other hand, given

TABLE 1 | Means, standard deviations, correlations, and reliability.

Variables	Mean	Standard deviation	1	2	3	4	5	6	7	8	9
1. Age[a] (T1)	–	–	–								
2. Gender[b] (T1)	–	–	0.06	–							
3. Education[c] (T1)	–	–	0.06	0.16**	–						
4. Tenure[d] (T1)	–	–	0.53**	0.12*	0.36**	–					
5. Dependency-oriented help (T1)	3.31	1.11	0.09	0.03	−0.16**	−0.03	(*0.86*)				
6. Autonomy-oriented help (T1)	3.97	0.95	0.10	−0.19**	−0.21**	−0.07	0.59**	(*0.90*)			
7. Self-efficacy (T2)	4.26	0.64	0.15*	−0.08	−0.08	0.02	0.32**	0.50**	(*0.94*)		
8. Work role performance (T3)	4.06	0.60	0.14**	−0.12*	−0.14*	−0.02	0.34**	0.40**	0.69**	(*0.95*)	
9. LMX (level 2; T1)	3.89	0.48	0.12*	−0.12*	−0.13*	−0.01	0.37**	0.53**	0.33**	0.29**	(*0.91*)

*$p < 0.05$, **$p < 0.01$ (two-tailed). $N = 303$ at the individual level (variables 1–8); $N = 39$ at the team level (variable 9). T1, T2, and T3 represent Times 1, 2, and 3, respectively. [a]Age included four levels, which were (1) below 30 years old, (2) 31–40 years old, and (3) 41–50 years old, (4) 51 years old and above. [b]Gender was coded as 0 (male) and 1 (female). [c]Education included three levels, which were (1) senior high school degree and below, (2) college diploma or bachelor's degree, and (3) masters' degree and above. [d]Tenure included four levels, which were (1) below 1 year, (2) 1–5 years, (3) 6–10 years, and (4) above 10 years. The scale reliabilities are italicized as presented in the diagonals.*

TABLE 2 | Unstandardized coefficients of the hypothesized model.

Variables	Self-efficacy (Level 1; T2)		Work role performance (Level 1; T3)	
	Model 1	Model 2	Model 3	Model 4
Control variables (level 1)				
Gender	−0.001	−0.04	−0.09	−0.09
Age	0.12	0.06	0.12**	0.06
Education	0.07	0.01	−0.03	−0.08
Tenure	−0.01	0.04	−0.04	−0.03
Independent variable (level 1)				
A-Help[a] (T1)	0.30***	0.41***	0.16***	−0.05
D-Help[b] (T1)	0.06†	0.01	0.12**	0.09**
Mediator (level 1)				
Self-efficacy (T2)				0.64***
Moderator (level 2)				
LMX (T1)		0.45***		
Cross-level interactions				
A-Help × LMX		0.22***		
D-Help × LMX		0.14†		

†$p < 0.1$, **$p < 0.01$, ***$p < 0.001$ (two-tailed). $N = 303$. [a]Autonomy-oriented help; [b]Dependency-oriented help. T1, T2, T3 represent Time 1, 2, and 3, respectively.

there was a positive relationship between dependency-oriented help and work role performance, we continued to examine the indirect effect between each other (Wen and Ye, 2014). As **Table 3** indicated, the Monte Carlo method (20,000 replications) indicated that the 95% CI included zero (indirect effect = 0.04, CI = [−0.005, 0.10]), which means that the indirect effect of self-efficacy between dependency-oriented help and individual work role performance is insignificant and H2b was not supported.

Instructed by Hofmann and Gavin (1998), the data of autonomy-oriented help and dependency-oriented help (as the independent variables) were group-mean centered, and the data of group-level LMX (as the moderator) were grand-mean centered. The results of Model 4 indicated that the interaction of autonomy-oriented help and group-level LMX was positively and significantly related to self-efficacy ($\gamma = 0.22$, $p < 0.001$). Thus, H3a was supported. Further, we conducted a simple slope test to better illustrate the interactive effect of autonomy-oriented help and group-level LMX on self-efficacy (see **Figure 2**). Specifically, the relationship between autonomy-oriented help and self-efficacy was stronger with high group-level LMX; while such relationship was weaker with low group-level LMX. However, the interaction of dependency-oriented help and group-level LMX was insignificantly related to self-efficacy ($\gamma = 0.14$, $p = 0.06$). Thus, H3b was not supported.

In order to further explore the effects of the mediating role of member self-efficacy on the relationship between the

TABLE 3 | Indirect effects of leader helping on member work role performance.

Effect	Mediation path	Estimate	SE	95% CI	
Indirect effect	Autonomy-oriented help → Self-efficacy → Work role performance	0.21***	0.06	0.11	0.32
	Dependency-oriented help → Self-efficacy → Work role performance	0.04†	0.02	−0.005	0.10

†$p < 0.1$, ***$p < 0.001$ (two-tailed). $N = 303$.

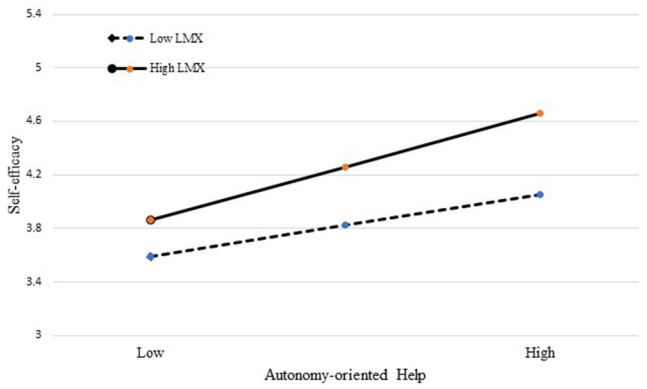

FIGURE 2 | The interactive effect of autonomy-oriented help and group-level LMX on self-efficacy.

TABLE 4 | Moderated mediating effect of self-efficacy on the relationship between autonomy-oriented help and work role performance at different LMX levels.

Group-level LMX	Indirect effect	S.E.	95% CI	
High	0.28***	0.05	0.18	0.38
Low	0.16***	0.05	0.07	0.25
Difference	0.11**	0.05	0.01	0.21

**$p < 0.01$, ***$p < 0.001$ (two-tailed). $N = 303$.

autonomy-oriented help of team leaders and the individual work role performance of team members, we integrated and tested the moderated mediating effect of this model by utilizing the analytical techniques recommended by Edwards and Lambert (2007). The Monte Carlo method (20,000 replications) was utilized. The results are shown in **Table 4** below. As illustrated, the indirect effect of autonomy-oriented help on individual work role performance was significant with high group-level LMX, and the 95% CI was zero excluded (CI = [0.18, 0.38]); while such indirect effect was significant with low LMX (CI = [0.07, 0.25]; zero excluded). Further, the indirect effect was significant at the level of LMX difference (CI = [0.01, 0.21]). Thus, H4a was supported. However, H4b was not supported. Specifically, the indirect effect of self-efficacy in the relationship between dependency-oriented help and work role performance was significant with high group-level LMX (95% CI = [0.02, 0.13]), but insignificant at both levels of low LMX (95% CI = [−0.08, 0.06]) and LMX difference (95% CI = [−0.003, 0.17]).

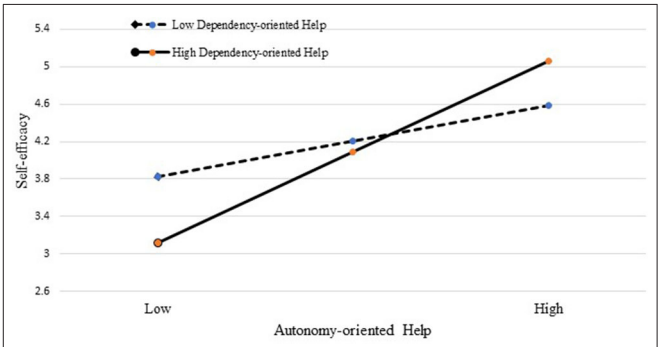

FIGURE 3 | The interactive effect of autonomy-oriented help and dependency-oriented help on self-efficacy.

Supplementary Analyses

In order to further explore whether the relationship between autonomy-oriented help and dependency-oriented help are synergistic or compensatory, we also examined the interaction effect between these two types of helping on individual self-efficacy and in turn work role performance at the individual level. The supplementary analyses revealed that the interaction of autonomy-oriented help and dependency-oriented help was positively and significantly related to self-efficacy ($\gamma = 0.28$, $p < 0.001$). Accordingly, **Figure 3** and the simple slope test indicated the moderating role of dependency-oriented help in the relationship between autonomy-oriented help and self-efficacy, and the indirect effect of autonomy-oriented help on individual work role performance *via* self-efficacy was significant at a high level of dependency-oriented help and the bias-corrected bootstrapping CI was zero excluded (95% CI = [0.49, 0.94]); while such indirect effect was also significant at a low level of dependency-oriented help (95% CI = [0.19, 0.48]; zero excluded). Further, the indirect effect was significant at the level of dependency-oriented help difference (95% CI = [0.16, 0.55]). Therefore, it is interesting and of academic value to find the relationship between the two types of help of leaders is not contrasting but synergistic when forming self-efficacy of employees, in turn, influencing their work role performance.

DISCUSSION

Based on the social cognitive theory (Bandura, 1997), this study investigates the mechanism of individual self-efficacy between the help of team leaders (in terms of autonomy-oriented help and dependency-oriented help) and the individual work role

performance of team members. The research also explored the moderating role of group-level LMX and the moderated mediating effect at different LMX quality levels through data analysis on 303 valid responses. The results indicate, first, that these two types of leader helping exert different influences on member self-efficacy. Specifically, the autonomy-oriented help of team leaders is positively and significantly related to the self-efficacy of team members, while dependency-oriented help of leaders does not significantly contribute to individual self-efficacy. The explanation for such findings is that autonomy-oriented help, a form of help representing educational value (e.g., Nadler, 1997), is more likely to foster higher self-efficacy of team members compared with offering them dependency-oriented help. This is consistent with the findings of prior research. Dependency-oriented help of leaders can serve as instant input on the work role performance of members but fails to sufficiently empower them. This also can explain why there is a positive relationship between dependency-oriented help and work role performance other than self-efficacy in this study. Interestingly, it brings new insights to the dependency-oriented help literature by suggesting a bright side for team members when receiving dependency-oriented help, especially for newcomers who confront the uncertainty and variability of the organizational environment.

Second, the indirect effect of member self-efficacy between the autonomy-oriented help of team leaders and member work role performance is significantly stronger than that for dependency-oriented help of leaders. To be more specific, compared with dependency-oriented help, the autonomy-oriented help of leaders can engender a differential positive effect on the self-efficacy of members toward their individual work role performance through their cognitive, motivational, and selection processes (Bandura, 1994). However, the effect of the dependency-oriented help of leaders on the work role performance of members is not mediated by the self-efficacy of members, which implies that alternative mechanisms may exist. That occurs because employees cognitively use many cues from different perspectives (e.g., internal cues, such as personal abilities, efforts, luck, and motivation; external cues, such as task characteristics, task resources, and group interdependence) to analyze and form efficacy self-appraisals (Gist and Mitchell, 1992). For example, an individual routinely judges their self-efficacy with increasing experiences on tasks; otherwise, they may consider "the task demands," situational constraints, available resources, personal attributes, and feelings to assess their self-efficacy when meeting a new or challenging task (Gist and Mitchell, 1992, p. 191). In other words, it is possible that employees evaluate other social cues and job factors to assess their self-efficacy when perceiving the dependency-oriented help of leaders, especially in a demanding situation. Moreover, the employees who participated in this study are highly educated and work in industries that are knowledge-intensive. The initial level of self-efficacy of survey respondents may be relatively high and stable. In this way, the dependency-oriented help of leaders may not be a primary factor to influence the self-efficacy of members or, in turn, their work role performance.

Third, the group-level LMX quality can positively moderate the effect of autonomy-oriented help and self-efficacy on individual work role performance, but not that of dependency-oriented help. One explanation of these results may be the cultural factors of LMX exist in this study (Rockstuhl et al., 2012). In the Chinese context, team members are more likely to work hard for their leaders even if they do not receive adequate or expected resources from their leader (Chen et al., 2009). Thus, when receiving dependency-oriented help of leaders, which may be of less long-term educational value, team members tend to proactively secure other types of job resources to obtain a certain level of self-efficacy for work role performance regardless of the level of group-level LMX in the team. In contrast, team leaders high in LMX are more likely to act similarly by providing their members with abundant resources, leader support, and important tasks across different cultures (Rockstuhl et al., 2012). Team members across cultures similarly need and cherish these resources for good work performance (Rockstuhl et al., 2012). Thus, the self-efficacy of team members can be further enhanced by leveraging the autonomy-oriented help of their leaders in conjunction with other job resources from leaders and colleagues in a positive team atmosphere from high group-level LMX. In turn, team members are more likely to feel capable and motivated to take actions in terms of task proficiency, adaptivity, and proactivity to achieve outstanding individual work role performance. Therefore, the indirect effect of self-efficacy on the relationship between the autonomy-oriented help of leaders and the self-efficacy of members is contingent on the factor of group LMX quality.

Finally, it is worth noting that the synergistic (rather than compensatory) interaction of the autonomy-oriented help and dependency-oriented help of leaders can influence the self-efficacy of members and further their work role performance at the individual level. Inspired by the supplemental analyses in this study, autonomy-oriented help can synergistically work with dependency-oriented help on individual work role performance *via* self-efficacy. The reason may be that both types of leader helping provide members with sufficient support of instrumentality and sustainability, which fuels great power to member work performance through their self-efficacy enhancement.

IMPLICATIONS AND CONCLUSIONS

This study contributes to the literature in several ways. First, this study integrates and contributes to the organizational citizenship behavior (OCB) and helping literature. Helping was put as a simple act in prior OCB literature and few researchers conducted studies on different types of help as well as their differential mechanisms. Ehrhart (2018) appealed that more academic attention should be paid across "various types of help and levels of analysis" of the helping process (p. 1). In addition, most studies on autonomy/dependency-oriented help have mainly focused on psychological consequences in individuals rather than behavioral outcomes. By exploring the deeper meaning of helping (a critical form of OCB), this study illustrates the indirect impacts

of the autonomy-oriented help and dependency-oriented help of team leaders on the work performance of members *via* the psychological mechanism of personal self-efficacy and the boundary condition. It theoretically and empirically enriches research findings on different types of help and responds to the appeal of exploring the "how, when, and why" of the helping process, as described by Ehrhart (2018).

Second, drawing upon the social cognitive theory, this study investigates different indirect effects of leader helping behaviors on individual work role performance of members through their self-efficacy. The integrative framework of two different types of help provides an interesting perspective to understand further that helping is not just about "lift and shift" work (dependency-oriented help) but also about transforming work (autonomy-oriented help). The research finding on receiving autonomy-oriented help is consistent with prior studies. However, it is encouraging that dependency-oriented help can play a positive role in promoting individual work role performance. Compared with prior studies with emphases on negative impact, this study empirically investigates the bright side of dependency-oriented help for the help recipient. It also suggests that these two types of help can function together on perceptions and behaviors of team members to a certain degree.

Third, few literature has uncovered the boundary conditions of autonomy-oriented help. This research provides insight on the social contextual factor of LMX and demonstrates the moderating effect of group-level LMX and the moderated mediating effect of self-efficacy at various LMX levels; which stresses a deeper understanding of the consequences of leader helping behaviors in a cross-level setting. Fourth, this study improves the understandings of the work role performance. It addresses the dispositional and contextual factors of work role performance at the individual level by elaborating on "mechanisms through which the characteristics of people and situations influence behaviors within the specific subdimensions of the model" (Griffin et al., 2007, p. 343). In addition, this study presents the cognitive and motivational working process of leader helping with the self-efficacy perceptions of members. This makes a critical contribution to the literature of self-efficacy and responds to the appeal of systematically and empirically understanding different effects of determinants of self-efficacy (Gist and Mitchell, 1992).

Further, this study also highlights several practical implications: (1) helping can be leveraged as a management strategy to improve leadership effectiveness at the individual level. This study implies that in organizations it may not be a one-fit-all solution for managers to "teach people how to fish" instead of simply giving them fish. Managers should leverage the differential effects of different types of help for their team members. They may have theoretical references for learning when and how to provide a fish (dependency-oriented help) or a fishing tool (autonomy-oriented help). Although providing a fish cannot significantly enhance personal self-efficacy, managers are not necessary to teach members how to fish in all circumstances. Giving someone a fish can sometimes turn to be beneficial to their work performance given the task attributes and situational constraints. When choosing whether to offer dependency-oriented help or autonomy-oriented help, a team leader also needs to consider the contextual factor, such as group-level LMX. Furthermore, a team leader should balance the short-term and long-term effects of dependency-oriented help. Although the performance of team members can be enhanced because of the dependency-oriented help of leaders in a short run, it may make members become highly dependent on the long-term help of leaders, which is possibly detrimental for both leaders and members. (2) Aside from the quality of exchange relationship in a team, managers may need to account for task attributes and characteristics. For novel but not urgent work tasks, it would be a good training opportunity to provide autonomy-oriented helping as an aid in long-term sustainability, since employees would leverage personal and situational resources to enhance their self-efficacy and, in turn, explore solutions, especially in a high LMX team climate. For interdependent or time-limited work tasks, it is acceptable for leaders to use a dependency-oriented helping strategy to meet work demands, which can at least instantly benefit member work performance. Sometimes it could be effective to apply a dependency-oriented helping strategy to newcomers to facilitate their socialization and adaptation processes within a team. However, as the employee work experiences increase, managers should leverage the art of the combination of both types of helping to maximize their positive impacts on the work role performance of subordinates through lifting their self-efficacious belief level. (3) Further, team leaders and managers can enhance the general LMX quality of their teams by providing more communication, autonomy, empowerment, and other supportive resources to members. (4) Employees (or as team members) need to cherish the value of autonomy-oriented help and should not underestimate the value of dependency-oriented help toward their work performance, since receiving either type of help of leaders can generate distinguishable influences. Employees can also proactively ask for autonomy-oriented help from their supervisors if the situation is not urgent.

This study has some limitations. First, the data collected are cross-sectional because of practical constraints. Although we conducted the time-lagged measurement method (Podsakoff et al., 2003), future research can implement a longitudinal research design with multiple sources and multiple studies of data collection to minimize potential common method bias. Second, future studies should also consider the time horizon into the research design. Since the bright side of the dependency-oriented help of leaders is instantly helpful and instrumental to employee performance, it is necessary to study the long-term effects of dependency-oriented help on individual work performance across time. Third, the Chinese employees "respect the authority associated with hierarchical positions" (Chen et al., 2014, p. 812), given the nature of Chinese society. Receiving help from leaders has a much greater impact than that from other sources (e.g., co-workers) in the Chinese context. Thus, we did not measure the help of coworkers, although it may be an alternative predictor of the self-efficacy of an individual. However, future research may include peer support as a control variable to

see whether there are interesting findings. Fourth, individual differences may exert potential moderating roles, since some personal traits (e.g., the influence of self-esteem on self-efficacy, and openness to change as a factor of work role performance) were examined to have an impact on perceived self-efficacy (Brockner, 1979) and work role performance (Griffin et al., 2007). Future researchers should consider incorporating dispositional variables into the framework for exploring other possible moderating roles of the relationship between the help of leaders and the self-efficacy of subordinates. Finally, the supplementary analyses found that the dependency-oriented help can play a positive moderating role in the indirect path between autonomy-oriented help and work performance. The reason may be that help of instrumentality and information can serve as instant resource input for knowledge-intensive workers especially in the challenging era of today. Furthermore, this study was conducted in China. The generalizability of the conclusions may be limited in other countries. Future researchers can collect data from different countries or different cultures to obtain more interesting cross-cultural insights.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

YZ developed the theoretical model and wrote the manuscript, with the contribution of LZ. YZ, LZ, and YG reviewed the literature. LZ revised the manuscript. YG participated in the overall discussion on the project and manuscript revision. All authors contributed to the article and approved the submitted version.

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APPENDIX

TABLE A1 | Analysis of autonomy-/dependency-oriented help scale items.

Items	M	SD	Corrected item-total correlation	Factor loading
Autonomy-oriented Help (Cronbach's α: 0.72)				
1. My team leader helps me to make sure I can eventually take care of my own needs.	3.90	0.91	0.43	0.52
2. My team leader helps me improve my abilities to fix my own problems.	4.08	0.84	0.58	0.83
3. My team leader helps me learn how to solve my own problems.	4.13	0.85	0.54	0.75
4. My team leader helps me develop the skill and knowledge to help myself.	4.19	0.83	0.47	0.74
Dependency-oriented help (Cronbach's α: 0.77)				
1. My team leader gets involved in taking care of my problem.	3.01	1.13	0.69	0.86
2. My team leader helps me by fixing problems for me.	3.27	1.17	0.65	0.83
3. My team leader helps me to meet my immediate work needs.	3.32	1.14	0.60	0.78

M, mean; SD, standard deviation. N = 288.

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Exploring Well-being at Work—An Interview Study on How IT Professionals Perceive Their Workplace

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The workplace is particularly important for promoting well-being at work and general life satisfaction, as performing a professional activity can be perceived as satisfying and motivating. In addition, employment opens up opportunities for individual development that employees may be perceived as fulfilling. By conducting an interview study with IT professionals of a German medium-sized company, we investigate which factors of the individual work environment are perceived as conducive to the performance of everyday job duties and thus increase well-being at work. Furthermore, we analyze the extent to which participants are satisfied with the implementation of the factors that are important to them, whether socio-demographic differences are relevant, and whether the perception of the work environment has an effect on employees' commitment. Results show that interpersonal factors in particular are considered to be important in everyday working life. About individual factors, a mixed picture emerged, whereby sociodemographic differences play only a minor role. Furthermore, there are indications of a positive relationship between the perception of the work environment and the IT professionals' commitment. In-depth analysis of the employee statements helps to determine which aspects of the work environment should be implemented, developed, or promoted. In the long term, this can support individual learning and development paths and generates a work environment that sustainably promotes employees' well-being at work and fosters long-term employment relationships.

Keywords: well-being at work, perception, work environment, commitment, IT professionals, interview study

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INTRODUCTION

For most people, work is a prominent part of their lives. Not at least because they spend a large proportion of their available time at the workplace. It is therefore important that employees feel good in their work environment. This state is achieved when employees have a positive perception of their work environment (Buffet et al., 2013). More specifically, well-being at work is an individual's assessment of his or her work environment, in which the individual positively evaluates the conditions that shape the respective work environment. A high level of satisfaction with workplace conditions is meaningful because it can have several positive effects on the individual. For instance, studies show that full-time employees rate their life satisfaction as better than the unemployed (Eiffe et al., 2016; Mousteri et al., 2018). Moreover, high subjective well-being

has a positive impact on health and life expectancy (DeNeve et al., 2013). Happy and satisfied individuals also benefit in terms of interpersonal relationships, as they are particularly collaborative and cooperative (DeNeve et al., 2013). Furthermore, happy employees seem to be more productive in comparison to their unhappy counterparts (Peiró et al., 2019).

Given that barely one-third of well-being is attributed to genetic predispositions, nearly two-thirds of well-being can be caused by environmental influences (Diener et al., 2018). Thus, workplace interventions can help to improve employees' well-being. Factors from the work environment that are potentially conducive to influence well-being can be grouped into three categories (empirical findings on the effects of the respective factors are presented in the section on conducive factors to well-being at work): Category 1 concerns factors of the social environment. It includes interpersonal relationships in the work context, characteristics of the work climate, opportunities for internal and external collaboration, and employees' relationships with colleagues and supervisors. Category 2 addresses work characteristics. In addition to the opportunity to take on responsibility and act independently, the relevance of the work and its holistic nature as well as the variety of tasks and feedback also play a role. In addition, the psychological, cognitive, and quantitative requirements of the work and general working conditions are crucial for promoting employees' well-being. Finally, employer characteristics are of relevance (Category 3). These cover aspects of work organization, such as processes and information flow, as well as culture-related topics, such as opportunities for professional and personal development, work-life balance programs, and leadership style. Whether or not employees perceive their work context positively depends largely on how they experience and assess the factors that shape their work environment (Fisher, 2010). Accordingly, employees may benefit in different ways from the available resources of their workplace (Louws et al., 2016). Employers should therefore find out which factors are relevant from the employee's point of view. By aligning the work environment with the needs of their employees, it is more likely that employees will feel comfortable in the respective work environment.

Especially in times of a shortage of skilled workers, employers need to be perceived as attractive. This is especially true for the IT sector. Since IT specialists are currently in high demand, it is particularly easy for them to change employers. Mainly large employers offer extensive benefits to make themselves attractive to skilled personnel. Medium-sized employers—who usually have fewer resources at their disposal—are therefore faced with the challenge of retaining their employees. By creating a work environment that is satisfactory from the employee's point of view, it is possible to successfully stand out from the competition and achieve long-term personnel ties.

Against this background, we want to learn more about how the employees of a medium-sized IT service provider in the financial sector perceive their work environment. We investigate which aspects IT professionals perceive as conducive to the performance of their everyday work since employees' perception influences the use and application of (learning) resources (Hoekstra et al., 2009; Louws et al., 2016). Using semi-structured interviews, we provide in-depth insights into the employees' perception of their work environment and contribute to better understand how employee perceptions can lead to satisfaction and well-being at work. This understanding can help sustain employees' well-being at work and overall life satisfaction in the long run.

In the following section, we present the theoretical background and address the underlying empirical findings as well as our research model. This is followed by a description of the methodology and data sample. Next, we outline the results of the semi-structured interviews and classify them in the existing literature. The paper closes with a discussion of the limitations and scientific significance of the study.

ON THE RELATIONSHIP BETWEEN ONE'S WORKPLACE AND WELL-BEING AT WORK

Conceptualizing Well-being

By now, researchers from different disciplines (e.g., psychology, sociology, or economics) have turned their attention to the construct of well-being. Together, they share a common understanding of well-being, which can be characterized by the following three features: First, well-being is the result of a global judgement and its degree expresses an overall evaluation of life (Wright and Bonett, 2007; Diener et al., 2017). Second, affect and emotion play a role in assessing one's life. This indicates, that well-being is strongly influenced by how individuals perceive their environment (Bowling et al., 2010; Diener et al., 2017). Third, an individual's global judgement is influenced by various factors, which can be assigned to different life domains (Eiffe et al., 2016). Such domains are, for instance, one's living conditions, health, and education. Also, the work environment represents a subdomain that influences an individual's well-being evaluation. Taken together, an individual's well-being results from the subjective overall assessment of various domains of life. This understanding of well-being is referred to as part-whole theory and is based on findings demonstrating the link between job satisfaction and well-being (recently confirmed by Cannas et al., 2019, for an overview and comparison to other theoretical approaches, see, e.g., Bowling et al., 2010). Following the part-whole theory, there is a hierarchical order between one's satisfaction with a specific area of life and overall well-being, which comprises a total of three levels. Thereby, overall well-being forms the highest level. The middle level is composed of the satisfaction scores for various life domain. Finally, the third level comprises the evaluation of all factors that make up this particular life domain. Considered in summary, the part-whole theory is based on a very broad conceptual understanding of well-being, according to which many different factors plus their perception needs to be taken into account (details are explained in the section on the relevance of employee perceptions).

Within the scope of our research project, we follow the part-whole theory and focus on the subdomain work. In this context, well-being is often specified as well-being at work or well-being at the workplace, which is about creating a work environment that is perceived as positive by employees (Buffet et al., 2013). More specifically, it is about enabling "safe, healthy and productive

work in a well-led organization by competent workers and work communities who find their job meaningful and rewarding and see work as a factor that supports their life management" (Buffet et al., 2013, p. 14). In this way, employees should be allowed to unfold their potential in the best possible way (Schulte and Vainio, 2010) to reach an "optimal psychological functioning and experience at work" (Gruman and Saks, 2013). Based on these arguments, it becomes clear that well-being at work is an individual assessment of the work environment, which depends on the subjective perception of the conditions forming this setting.

Hence, by focusing on the design of the work environment employers can positively influence the well-being of their employees in two respects. On the one hand, this "conditional approach" (Pot, 2017, p. 96) aims at preventive action. Accordingly, all features of the work environment should be designed in such a way that they promote well-being at work (primary prevention, Pot, 2017). This means that the factors which positively influence employees' well-being are specifically promoted and, at the same time, potentially negative influencing factors are reduced. Implementing such an approach can primarily reduce employee strain by protecting employees from the consequences of low well-being at work (e.g., exhaustion, inefficiency, and stress as consequences of burnout; Patel et al., 2018). Moreover, if primary prevention succeeds, initiatives to support employees in coping with low well-being (secondary prevention, Patel et al., 2018) become obsolete. On the other hand, examining the work environment can lay the foundation for the sustainable development of an organization and its employees. This perspective is introduced as the psychology of sustainability and sustainable development by Di Fabio (2017). The aim here is to implement the reflection of prevailing working conditions as a fixed process so that design potentials for a work environment conducive to well-being at work can be derived continuously. Referring to the part-whole theory, it, therefore, seems a promising starting point for organizations to focus on factors shaping the work environment—and thus the lowest of the three levels—to promote employees' well-being at work.

Conducive Factors to Well-being at Work

Research shows that a variety of factors influence well-being at work. Concerning this connection, we have conducted literature research and identified a total of 24 factors, which—roughly speaking—can be divided into three categories, namely aspects related to either the social environment, work characteristics, or employer characteristics. The category *social environment* refers to interpersonal relationships in the work context and comprises work climate characteristics, opportunities for internal and external cooperation, as well as employees' relationship with colleagues and supervisors. In this respect, positive influences such as social inclusion and support as well as negative influences such as bullying or discrimination play a role. For instance, work climate characteristics such as the feeling of being understood and accepted in the team, as well as social support, help employees cope with stress and heavy workload (Aalto et al., 2018), decrease the risk of burnout and foster job satisfaction (Van der Heijden et al., 2020). Moreover, work engagement is positively influenced by a collaborative and constructive team climate (Albrecht, 2012), which also reduces bullying (Olsen et al., 2017). A workplace free of bullying in turn promotes job satisfaction (Olsen et al., 2017) and reduces the risk of burnout (Steffgen et al., 2020). Also, the opportunity of making friends at work has a positive effect on job satisfaction (Morgeson and Humphrey, 2006). While these findings apply to relationships at the same hierarchical level and within the organization, other studies proved that relationships with supervisors (Chang and Cheng, 2014) as well as interaction with external cooperation partners (Morgeson and Humphrey, 2006) also affect employee job satisfaction.

Concerning *work characteristics*, studies pointed out their positive influence on employees' satisfaction (e.g., Hackman and Oldham, 1974) and well-being (e.g., Karasek, 1979; Siegrist, 1996; Bakker and Demerouti, 2007) since decades. In this regard, characteristics of the work tasks, as well as requirements associated with the occupational activity and technical-organizational framework conditions to fulfill one's job duties, are decisive. Motivational design parameters such as autonomy or participation in decision-making processes can have a favorable effect on employee engagement (Albrecht, 2012) as well as on employees' job satisfaction and commitment (Uribetxebarria et al., 2020). The same applies to the meaningfulness of one's work tasks (Van der Heijden et al., 2020) as well as their variety and feedback through work (Morgeson and Humphrey, 2006). In addition, basic conditions for performing the job, such as available technologies and equipment or room temperature and spatial design, can have a positive effect (Morgeson and Humphrey, 2006). However, the work environment is considered unfavorable when psychological, physical, and quantitative demands become excessive from the employee's point of view, causing burnout and physical problems in the worst case (Van der Heijden et al., 2020; Bianchi et al., 2021). In summary, responsibility and autonomy, the significance of the work and its holistic nature, task variety and feedback on the job, in addition to psychological, cognitive, and quantitative demands and general working conditions, are decisive work characteristics for promoting well-being at work.

Finally, characteristics that have an organization-wide impact can also affect employees' well-being. About *employer characteristics* that apply across departments and activities, cultural, and work organization aspects are particularly important. For instance, an organizational culture defined by openness, fairness, and support has a positive impact on employees' engagement, commitment, and extra-role behavior (Albrecht, 2012). Furthermore, the health awareness of supervisors plays a role in employees' well-being, as it is reflected in their leadership style and can positively condition employees' mental health (i.e., depression and anxiety symptoms; Vonderlin et al., 2021). In addition, employees seem to be more proud, motivated, and overall satisfied when their employer has a positive reputation (Tanwar and Prasad, 2016). Similarly, development opportunities promote job satisfaction and commitment to the employer (Uribetxebarria et al., 2020) and have a positive impact on subjective well-being (Eiffe et al., 2016). Increased well-being could also be linked to informal

learning activities in the workplace (Jenkins and Mostafa, 2015; Jeong et al., 2018). At the same time, opportunities to acquire new skills and knowledge reduce the risk of burnout (Bianchi et al., 2021). In contrast, burnout is promoted when family and work are difficult to reconcile (work-life conflict, Steffgen et al., 2020; Bianchi et al., 2021). Stress is also increased when employees perceive their job or specific job features as being at risk (quantitative and qualitative job insecurity, Chirumbolo et al., 2017). In addition to cultural aspects, employee satisfaction is also conditioned by work organizational aspects. For example, a well-functioning information flow provides access to information, resources, and mutual support, as well as development and learning opportunities. All these features shape an environment in which knowledge is shared. This fosters individual skill development and increases satisfaction (Trivellas et al., 2015). Finally, internal and external process quality also plays a role. Smooth and efficient work processes make it easier for employees to perform their tasks. This reduces the workload and makes employees more satisfied with their job (Chiang and Wu, 2014).

Well-being and Commitment

If an employer succeeds in creating a work environment in which its employees feel good, both parties can achieve further positive effects. For example, research suggests that high levels of well-being and job satisfaction are associated with an increased commitment to the employer (Jain et al., 2009; Aggarwal-Gupta et al., 2010; Culibrk et al., 2018) and employees with high levels of commitment show lower turnover intention (Agarwal and Sajid, 2017). This is positive from an employee's perspective in that it avoids the negative consequences of changing employers for those who stay with their current organization. On the one hand, these can be monetary burdens, such as application or relocation costs. On the other hand, a change of employer can have negative psychological consequences, e.g., social pressure caused by integration efforts in the new work environment or stress that can arise with the emerging intention to quit. The employer also benefits from highly committed employees. With low turnover, there are no direct costs for replacement, training the new hire, or productivity losses. At the same time, indirect costs are avoided that can arise from spill-over effects on other employees or declining motivation among the remaining workforce (O'Connell and Kung, 2007; Kuhn and Yu, 2021). All in all, staying with the current employer allows avoiding unpleasant consequences while maintaining a positive state of high well-being and commitment. To support long-lasting employment relationships, studies point to the need to focus on the organizational context and how it is perceived by employees, as this is significant for retention (Koslowsky et al., 2012) and organizational commitment (Herrera and De Las Heras-Rosas, 2021).

The Relevance of Employee Perception

By defining well-being at work as an individual's assessment of the work environment depending on the subjective perception of the conditions forming this work environment, we have emphasized that employee perception plays a crucial role in promoting well-being at work. As Fisher (2010) notes "it is important to remember that happiness and positive attitudes are not directly created by environments or events [. . .], but rather by individuals' perceptions, interpretations, and appraisals of those environments and events" (p. 396f.). This implies that employees of the same organization do not necessarily benefit equally from the prevailing working conditions, because they perceive available resources of their work in different ways (Louws et al., 2016).

The perception of environmental conditions is an important field of research in different diciplines (e.g., artificial intelligence, robotics, marketing, pedagogic, or psychology). For the question addressed in this paper, it is worthwhile to take a closer look at psychological research. For example, researchers from environmental psychology, a subdiscipline of industrial and organizational psychology, are addressing the relevance of perception. The focus is on the interaction between the environment and the individual, and the work environment is one among many fields of research (Bell and Sundstrom, 1997; DeYoung, 2013). To analyze the interactions between the environment and the individual, environmental psychology takes a holistic approach that aims to gain insights into factors that influence human behavior and well-being (DeYoung, 1999, 2013). In relation to well-being at work, such insights can help to identify drivers of well-being in the workplace. By considering these insights, work environments can be designed to best meet the needs of their employees. Other psychological approaches also support the finding that perceptual processes are of paramount importance. The interaction of individual factors and environmental factors as well as their perception is also analyzed within the framework of the theory of action regulation (Hacker, 1973, 2003, 2020; Volpert, 1983). It is assumed that the execution of an activity is conditioned by environmental and individual factors, and the perception of the employees is considered crucial for the processing of the environmental factors. Environmental factors are, for example, economic, social, work-organizational, or technical conditions that unfold within organizational structures and can give employees leeway to regulate their activities (Hacker, 2020). Individual factors refer to factors that employees bring to the work environment. These include physical prerequisites as well as education, cognitive abilities, and motivational aspects (Hacker, 2020). Finally, psychological processes (perception, thinking, remembering, motivation, emotion, and volition), representations of memory (mental models including norms and goals used to guide future actions), and psychological characteristics (especially competencies) of employees are crucial to the process of action regulation. In the context of well-being at work, action regulation theory illustrates that processing influences from the work environment start with employees' perceptions.

Studies on employees' perceptions of learning opportunities at the workplace underline the relevance of individual perceptions in assessing the work environment. For instance, Hoekstra et al. (2009) use the example of teachers to show that equal working conditions lead to different learning activities. While one teacher perceives the provided degree of autonomy as an opportunity for development and uses this freedom to try out different

working styles, a colleague in the same school finds it a lack of guidance. The same applies to participation in reflective dialogues and feedback. One teacher perceives the context as a chance to develop one's performance and actively seeks feedback and exchange. The colleague experiences feedback as unpleasant criticism and avoids such situations and, thus, tends to stay in his or her comfort zone. More recent findings also show that it "is not so much the objective conditions that support or impede professional learning but the way teachers perceive those workplace conditions that influence teachers' learning" (Louws et al., 2016, p. 770). Once participants perceive the prevailing structural and cultural conditions positively, they are more likely to engage in continuous professional development, take on responsibility, and tend to be more self-directed (Louws et al., 2016). In contrast, perceptions of a constraining work environment can lead to focusing on task-related goals without having a broader perspective (Louws et al., 2016). Thereby, experienced support is crucial here, with colleagues, supervisors, and mentors being all relevant (Fox et al., 2010). Bryson et al. (2006) confirm this for employees of a winery. Their study indicates that access to and take-up of professional development opportunities depend on employees' managers. Van der Rijt et al. (2013) come to similar conclusions in the case of employees in various commercial departments. Although they speak more generally of expertise providers, participants report that perceived quality and access to expertise as well as trust in the expertise providers are decisive in determining whether and how often they ask for help.

At this point, it should be noted that differences in the perception of the work environment can also be explained by socio-demographic factors. For example, discrimination has a greater impact on job satisfaction among younger and older employees than among middle-aged employees (Taylor et al., 2013). While younger employees tend to find satisfaction in the significance of their tasks, older employees benefit from the opportunity to exert influence (Van der Heijden et al., 2020). In addition, the risk of burnout decreases for older employees the more support they experience at work (Van der Heijden et al., 2020).

Research Model and Research Questions

The findings discussed regarding employees' well-being at work and their perception of the work context are consistent with the part-whole theory and our reasoning regarding factors conducive to well-being at work, emphasizing that employees' perceptions of the work environment is influenced by a variety of factors. Against this background, we have combined the outlined theoretical considerations into a research model, taking into account the empirical findings on well-being at work (see **Figure 1**). In addition to factors that promote well-being at work, we consider employees' perception, well-being at work, and employees' commitment. According to action regulation theory, the influencing factors are composed of environmental and individual factors. Related to our research project, these are factors conducive to well-being at work. The social environment, work characteristics, and employer characteristics together shape the work environment and are classified as environmental factors. The socio-demographic factors are classified as individual factors. Employee perceptions trigger the process of action regulation and determine the subsequent development of well-being at work (output), which affects the level of engagement (outcome).

As illustrated in the research model, the entire context in which work is performed plays a crucial role in promoting employees' well-being. As such, it is necessary to look at the work environment from a holistic perspective to determine factors influencing well-being in the workplace. With this study, we aim to do so and provide deeper insights into how employees perceive their work environment. We want to learn more about how employees experience various aspects of their work environment when they consider their work environment as a whole. Respectively, research question one addresses employees' perception of the work environment and is surveyed via two questions. First, we wanted to know:

> RQ1.1: What aspects of the individual work environment do employees perceive to be conducive to carry out their work tasks?

Furthermore, we wanted to ascertain which specific circumstances lead to a positive perception of particular work environment factors. Such insights could reveal whether there are differences in the perception of the work environment within an organization and what causes them. Knowledge about different perceptions within an organization could help to identify best practice and problematic situations. Corresponding research activities such as ours could contribute to developing suggestions for designing a satisfactory work environment. To this end, we further investigated:

> RQ1.2: To what extent perceive employees specific factors of the work environment as realized in their daily work context?

To account for the influence of socio-demographic factors in our study, we additionally analyzed the following question:

> RQ2: Does employees' perception of factors of the work environment differ for distinct socio-demographic groups?

Finally, we investigated the extent to which employees' perceptions of the work environment are related to their commitment, asking:

> RQ3: Is there a relationship between employees' perception of the work environment and their commitment to the employer?

METHOD

Context of the Study

The study was conducted with a medium-sized IT service provider operating in the financial sector in Germany. The company offers its customers IT solutions that include the development of software as well as its implementation and operation. To work in a customer-oriented manner, the employees strive to develop innovative solutions that account for the customers' needs. In doing so, the employees have to deal

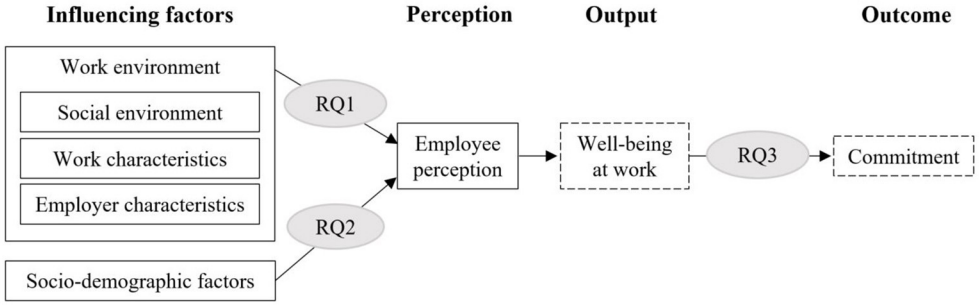

FIGURE 1 | Research model.

with frequently changing demands. New demands result from the dynamic change of the (technical) development within the industry, which causes innovations in the company's processes and products. Furthermore, customer requirements can change (at short notice), so that flexible adjustments to ongoing project work are commonplace. These conditions make frequent changes in work tasks and processes characteristic of everyday work for the consulted IT professionals. Accordingly, it is particularly important for employees to work in an environment they perceive as positive and which encourages them in the performance of their daily tasks. In this way, a contribution can be made to their well-being at work. To understand the prerequisites of building such a work environment, the present study aims to find out which specific aspects cause a positive perception of those factors shaping the consulted IT professionals' work environment.

Instrument

In attempting to determine how the well-being of IT professionals can be supported by the design of their daily work routine, we are interested in how employees perceive certain aspects of their work context. As noted above, research has shown that employees' perception of these relationships is highly subjective. Qualitative research methods allow depicting such subjective phenomena (Yin, 2018) because they are particularly suitable for capturing individual experiences and placing them concerning the participants' reality of life (Patton, 2015). In this context, open-ended questions provide the opportunity to gain in-depth and context-related insights into the phenomena of interest (Patton, 2015; Yin, 2018). For this reason, we have decided to conduct semi-structured interviews to ask the IT professionals about aspects of their work environment, which they perceived to be conducive to carry out their job duties. We encouraged participants through six questions to provide in-depth insights into how they perceive a total of 24 factors we have identified in the literature as influencing factors (the factors were introduced in the section on the relationship between one's job and well-being at work). The first question concerned the general conditions of work, and thus covered the category employer characteristics. Questions two to six were related to work tasks, the scope of work, emotional experience, professional requirements, collaboration, and communication, and covered the category work characteristics. Aspects of the category social environment were addressed by all questions but in particular by the questions touching on emotional experience, cooperation, and communication. Each question started with a short introduction that prompted the participant to focus on the work context. Afterwards, the interviewer asked about supporting factors within that field. Due to the rather general nature of the questions, we decided to give two examples per question to guide the participants. This seemed reasonable, considering the potential range of factors and differences in individual perceptions. For example, the question relating to general conditions of work was as follows: "Please think about your workplace: Which general conditions at your workplace do you find particularly conducive to carry out your work tasks? How important are these points to you? Consider the following aspects—for example, career and development opportunities or the compatibility of work and family life." The examples were identical for all participants, and that meant the participants' statements could be compared (Nohl, 2013). Before the next question was asked, the interviewer summarized the top three factors to which the participant attached particular importance while responding. Participants either confirmed or corrected this summary and finally weighted it. This resulted in an individual ranking of the three most important factors per question and an additional check whether the interviewer had correctly recorded the participant's answers.

Additionally to the perception of the work environment, we asked the IT professionals at the end of the interview to assess how committed they feel to their employer. The question was taken from the KUT questionnaire for assessing commitment (Klein et al., 2014) and reads, "How committed are you to your employer?" Since the question is again open-ended, we formulated two hints to help participants answer the question, as we did in the previous questions. Both hints are based on items from Mowday et al. (1979) questionnaire on organizational commitment and read "Think of statements such as the future of my employer is important to me, or I am proud to work for this employer." We tested the instrument's comprehensibility and practicability within a pre-test ($N = 3$).

Data Collection and Sample

To obtain the sample, the entire workforce of the IT service provider was informed via the company's intranet. For this purpose, we introduced the study briefly in an information letter. All employees were invited to participate via the information letter and it was explicitly pointed out that participation was voluntary and answers will be processed anonymously. In case the employees were interested in participating, they were asked to share their socio-demographic data via an online link presented in the information letter. Thereby, we aimed to recruit a sample that best represents the IT service provider's workforce. Additionally, the IT professionals were asked to share their contact details via this link so that we could contact them to arrange an interview appointment.

The final sample ($N = 61$, see **Table 1**) was drawn from 89 valid responses, representing a response rate of 23%. The majority of the participants were male (74%), which reflects the actual gender distribution in the company. Employees aged 30 or younger (18%) were over-represented, while older employees (51–60 years) were under-represented (33%). Nevertheless, the total sample shows a relatively balanced distribution across the age groups. More than half of the participants had 21 or more years of professional experience (59%) and had been working for this employer for more than 10 years (55%). In total, the sample represents all organizational units and all three locations of the IT service provider. Due to the high proportion of younger participants, of whom 73% were in a qualification phase, trainees and students (training and development) were overrepresented with 14%.

TABLE 1 | Sample (all figures in percent, $N = 61$).

Criterion	Expression	Sample	Company's workforce
Gender	Female	26	25
	Male	74	75
Age	≤30 years	18	8
	31–40 years	15	16
	41–50 years	25	28
	51–60 years	33	42
	>60 years	10	6
Professional experience	None	11	Not available
	<5 years	7	
	5–10 years	8	
	11–20 years	15	
	21–30 years	34	
	31–40 years	25	
Seniority	≤5 years	30	25
	6–10 years	16	13
	11–20 years	20	25
	21–30 years	20	29
	>30 years	15	8
Location	Location 1	43	36
	Location 2	26	28
	Location 3	31	36
Organizational unit	Training and development	14	3
	Insurance systems	15	18
	Central systems	19	20
	Corporate management	8	8
	Order management	19	15
	Customer/Partner service	15	14
	Operations	10	22

Data Analysis

More than 42 h of interview material were recorded, with interviews lasting between 18 min and 1 h 15 min. After data collection, the interview material was transcribed. In the course of transcription, linguistic details such as pauses in speech, dialect, or rephrasing were smoothed in favor of reading fluency (Mayring, 2014). This procedure is legitimate, as linguistic details did not play a considerable role in answering the research questions (Oliver et al., 2005). To test for objectivity and reliability of the codings, Cohen's Kappa coefficient was calculated by double coding 20% of the data ($N = 12$). Results were above 0.80 suggesting high reliability of the codings (κ influencing factors = 0.83; individual ranking: κ weighted = 0.81, κ unweighted = 0.83; κ commitment = 0.91).

We applied qualitative content analysis (Mayring, 2015) to analyze the data material. Hereby we deductively coded the statements of the participants with a coding system derived from the literature (**Figure 2**). The coding system contains codes for the six questions on employees' perception of the work environment and the question concerning their commitment. Interview statements addressing the participants' work environment were first assigned to one of the six codes for the respective interview question (level 1) and one of the three categories of conducive factors to well-being at work, namely employer characteristics, work characteristics, or social environment (level 2). This was followed by coding which factor was specifically addressed (level 3). For each influencing factor on level 3, we provided further codes to distinguish whether the factor was identified by the participants themselves (i.e., unprompted statement) or whether the participant referred to an example given in the question; these examples were considered to have been prompted. We argue that unprompted statements point to a potentially higher subjective relevance than those that were prompted by the interviewers. Combined with data on the participant's perception of each influencing factor (realized or not realized), this approach led to four coding possibilities per statement (level 4). Interview statements about participants' commitment were first assigned to the homonymous code for the associated interview question (level 1). Subsequently, the intensity of commitment was assessed using a three-point scale

(level 2). For this purpose, the original five-point scale of the KUT questionnaire (Klein et al., 2014) was compressed as follows: The two lowest levels of the scale, "not at all" and "slightly," were combined to form "1: low." Here, negative statements such as "I would not recommend the company to my children" (interview 3.08[1], line 64) were assigned. The two highest scale levels, "quite a bit" and "extremely," were combined to form "3: high." Here, agreeing statements such as "I identify with the company. [It] is more than my employer, almost my life" (interview 1.21, line 74) were coded. The medium level remained but was renamed "2: moderate" for consistency in wording.

After encoding the transcribed data with the coding system, the resulting codes were examined in six analysis steps. Step one serves to answer the research question concerning influencing factors of the work environment (RQ1.1). Therefore, the total number of codings per influencing factor was evaluated on the assumption that participants were more likely to address factors that were important to them. Statements that were made several times were critical, as they could potentially distort the ranking. Such a bias could have resulted from influencing factors being addressed in more than one question (e.g., information flow in the question about general framework conditions, cooperation, and communication). To test the data for bias due to mentioning a factor more than once, we adjusted the number of codings per participant for repeated mentions of a factor. In step two, the individual rankings were analyzed. For this purpose, the rankings were considered both unweighted (UR) and weighted (WR). By weighting the ranking, we acknowledged that the participants expressed the perceived relevance of a factor by determining the ranking order. Weighted and unweighted rankings were analyzed for all six questions together and for each question separately. Next, an index was calculated that combined the number of codings with the weighted ranking scores (step three). With this approach, we considered that some factors may have been addressed often without having been ranked by the participant.

To find out how well the participants perceived the influencing factors as having been realized in their daily work environment (RQ1.2), the statements were subdivided into the four coding options resulting from the standardized coding frame (step four). The distinction between realized and not realized aspects provided information about how well the participant perceived them as having been realized. The distinction between prompted and unprompted statements illustrates how important the individual aspects were for the participant (subjective relevance). By combining these four coding options it was possible to derive four recommendations for action about potential innovations in the workplace[2]: Aspects mentioned without a prompt should be *promoted* if they were coded as realized, or require *optimization* when coded as not realized. Aspects referring to a prompt and coded as not realized should be *observed*. Those coded as realized should be *retained*.

Socio-demographic differences (RQ2) were examined in step five of the analysis. Information on gender, age, professional experience, seniority, and type of employment were gathered through the online survey we sent out with the information letter. Analogous to research question one, the number of codes per sociodemographic group and per influencing factor was determined.

To investigate whether there is a link between employees' perception of the work environment and their organizational commitment (RQ3), we calculated a degree of realization for each participant and related it to their statements on commitment. The degree of realization indicates the percentage of a participant's statements in which aspects of the work environment were addressed as positively implemented either by themselves (unprompted) or in response to an example given by the interviewer (promoted) (step six). Hence, the four coding options from analysis step four serve as the basis for calculating the degree of realization.

RESULTS

Based on the different analysis steps, the following results can be reported from the interview study:

> RQ1.1: What aspects of the individual work environment do employees perceive to be conducive to carry out their work tasks?

Concerning the research question concerning factors of the work environment conducive to fulfill one's job duties (RQ1.1), the ranking that resulted from counting the number of codings (step one) gave a first indication of the factors' relevance (**Table 2**). The results were led by information flow with a total of 200 codings, followed by internal cooperation (195 codings), and work climate (132 codings). Evaluating the number of codings adjusted for the participants resulted in slightly different ranking order. The adjusted number of codings reflects how many participants mentioned an aspect, regardless of how often a participant addressed the respective aspect. Now, internal cooperation and work-life balance ranked first (57 participants mentioned these aspects), followed by information flow (mentioned by 55 participants), work climate, and internal process quality (54 participants each). Nevertheless, the same factors remained in the top three places. The better ranking position of work-life balance could be explained by its functioning as an opening example for the question relating to general framework conditions. Giving examples of specific factors could have caused a so-called priming effect, leading to an overestimation of these factors (Vitale et al., 2008). However, since work-life balance was the only factor for which such a change was observed, a general priming effect can be denied.

Evaluating the perceived relevance of influencing factors using the individual rankings (step two) showed a comparable result (**Table 2**). This applied to the analysis of both the unweighted ranking (UR) and the weighted ranking (WR). For

[1]All interviews were named with a code. The number before the dot indicates the location where the interview was conducted. The two numbers after the dot indicate the consecutive interview number, e.g. 3.08 for interview 8 at location 3.

[2]The distinction in four recommendations for actions closely resembles Henderson's BCG-matrix (1979)—a widely used instrument for strategic product management. For this purpose, products are classified into the matrix according to market share and market growth, from which recommendations for further sales can be derived.

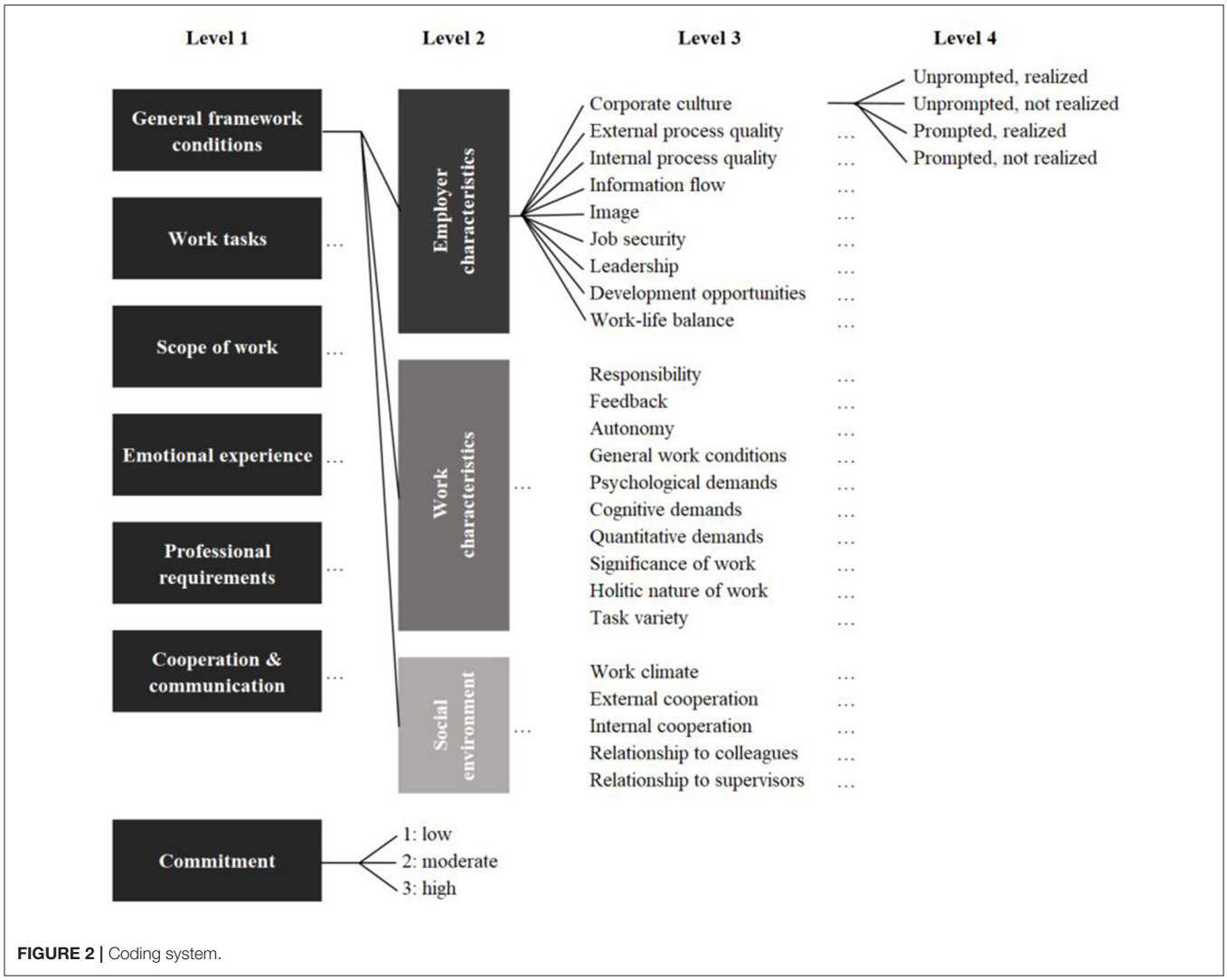

FIGURE 2 | Coding system.

both assessments, it could be observed that internal cooperation now came first (UR = 137, WR = 325), information flow second (UR = 113, WR = 235), and work climate third (UR = 100, WR = 231). However, considering the rankings for each of the six questions separately, other factors achieved higher rankings for individual questions. Nevertheless, an aggregated view of the rankings seemed appropriate, since no systematic pattern could be identified, and our research was focused on the evaluation of the work environment as a whole. Finally, calculation and analysis of the index (step three) resulted in the same three factors on top, led by internal cooperation (520 points), followed by information flow (435 points), and work climate (363 points). Taken all together, RQ1.1 can be answered as follows: Employees perceive *internal cooperation*, *information flow*, and *work climate* as the three most conducive factors for fulfilling their work tasks.

RQ1.2: To what extent perceive employees specific factors of the work environment as realized in their daily work context?

To answer the research question on how the factors are experienced in the daily work context (RQ1.2), the four possible coding options were considered first (step four). Depending on the perceived realization of a presage factor as well as its subjective relevance for the participant, a statement could be coded either as unprompted-not realized, prompted-not realized, prompted-realized, or unprompted-realized. **Figure 3** shows that the realization of most factors was considered to be positive: The majority of the statements were perceived as having been satisfactorily realized. In addition, a large proportion of them was mentioned without prompt (see e.g., internal cooperation, work climate, work-life balance, and feedback). This shows the comparatively high importance of these factors for the participants. At the same time, some aspects were considered to not have been realized satisfactorily. Here, too, statements without prompt had greater subjective relevance. It is noticeable that about one-third of the statements concerning the organization's internal process quality were assigned to this

TABLE 2 | Quantitative analysis of statements sorted by index.

Influencing factors	Number of codings ($N = 58$)[†]		Individual ranking ($N = 61$)[‡]					
	Total	Adjusted for participant	Rank 1	Rank 2	Rank 3	Un-weighted[$]	Weighted[$]	Index[$]
Internal cooperation	195	57	66	56	15	137	325	520
Information flow	200	55	28	66	19	113	235	435
Work climate	132	54	46	39	15	100	231	363
Professional development	93	52	17	34	17	68	136	229
Leadership	109	49	13	28	20	61	115	224
Internal process quality	123	54	8	27	16	51	94	217
Work-life balance	96	57	25	14	11	50	114	210
Feedback	91	48	16	29	9	54	115	206
Autonomy	74	46	19	17	12	48	103	177
Quantitative demands	78	50	14	19	10	43	90	168
Working conditions	94	49	6	20	14	40	72	166
Relationship to colleagues	72	48	15	21	7	43	94	166
Cognitive demands	66	41	18	16	5	39	91	157
Psychological demands	73	43	7	13	7	27	54	127
Variety	49	42	13	15	3	31	72	121
Significance	57	47	8	5	14	27	48	105
Corporate culture	52	39	6	4	8	18	34	86
Responsibility	33	33	7	13	5	25	52	85
Relationship to supervisor	44	33	1	5	1	7	14	58
Holistic nature	41	36	3	3	2	8	17	58
Image	45	39	1	1	3	5	8	53
Job security	29	28	4	3	1	8	19	48
External process quality	21	16	2	4	2	8	16	37
External cooperation	14	13	0	2	1	3	5	19
Total:	1,881	–	–	–	–	–	–	–

[†] *58 of 61 participants gave permission for tape recording.*

[‡] *Inclusion of the entire sample is possible as the ranking results were also recorded in handwriting.*

[$] *Exemplary calculations for internal cooperation: unweighted ranking: (66 + 56 + 15) = 137; weighted ranking: (3 * 66 + 2 * 56 + 1 * 15) = 325; index: 195 + (3 * 66 + 2 * 56 + 1 * 15) = 520.*

code category (43 of 123 statements). The score for quantitative demands was 42 %. In summary, it can be stated for RQ1.2 that the participants assessed the realization as satisfactory for the majority of the presage factors. Nevertheless, participants identified strengths and deficits for the same factors.

To shed more light on the specification of presage factors discussed by the IT professionals, we classified the statements on the three most relevant factors—internal cooperation, information flow, and work climate—into overarching categories (e.g., exchange, work atmosphere, teamwork, see **Figure 4**). Subsequently, each category was assigned to one of four recommendations for action—namely retain, promote, observe, or optimize—according to its subjective relevance and perceived implementation level. Based on these recommendations for action, suggestions for innovations in the workplace can be derived that take into account the needs of the interviewed IT professionals as well as the perceived workplace conditions per topic category. It should be noted that a category could potentially be assigned to several recommendations for action. This is because several aspects were summarized under one category (e.g., information transfer and contact persons are both aspects of the category exchange). In addition, different participants might have considered the same aspect differently well-implemented or differently relevant, resulting in different recommendations for action for the respective aspect.

For example, the category *exchange* was assigned to each of the four recommendations for action. Some employees valued, and frequently mentioned, intra- and inter-divisional knowledge sharing, which should be promoted accordingly. Regarding intra-divisional knowledge sharing, one IT professional reported that knowledge within the team is actively shared by its members so that the team's functionality is guaranteed at all times: "In our unit, everyone knows everything and can replace every one. We don't have anyone who is completely isolated with a specialized area of expertise" (interview 1.03, line 68). Also lauded were the exchange of experience, prioritization of tasks, availability of information, and documentation of knowledge in an always-accessible repository. In this context, another professional emphasized that the team members exchange

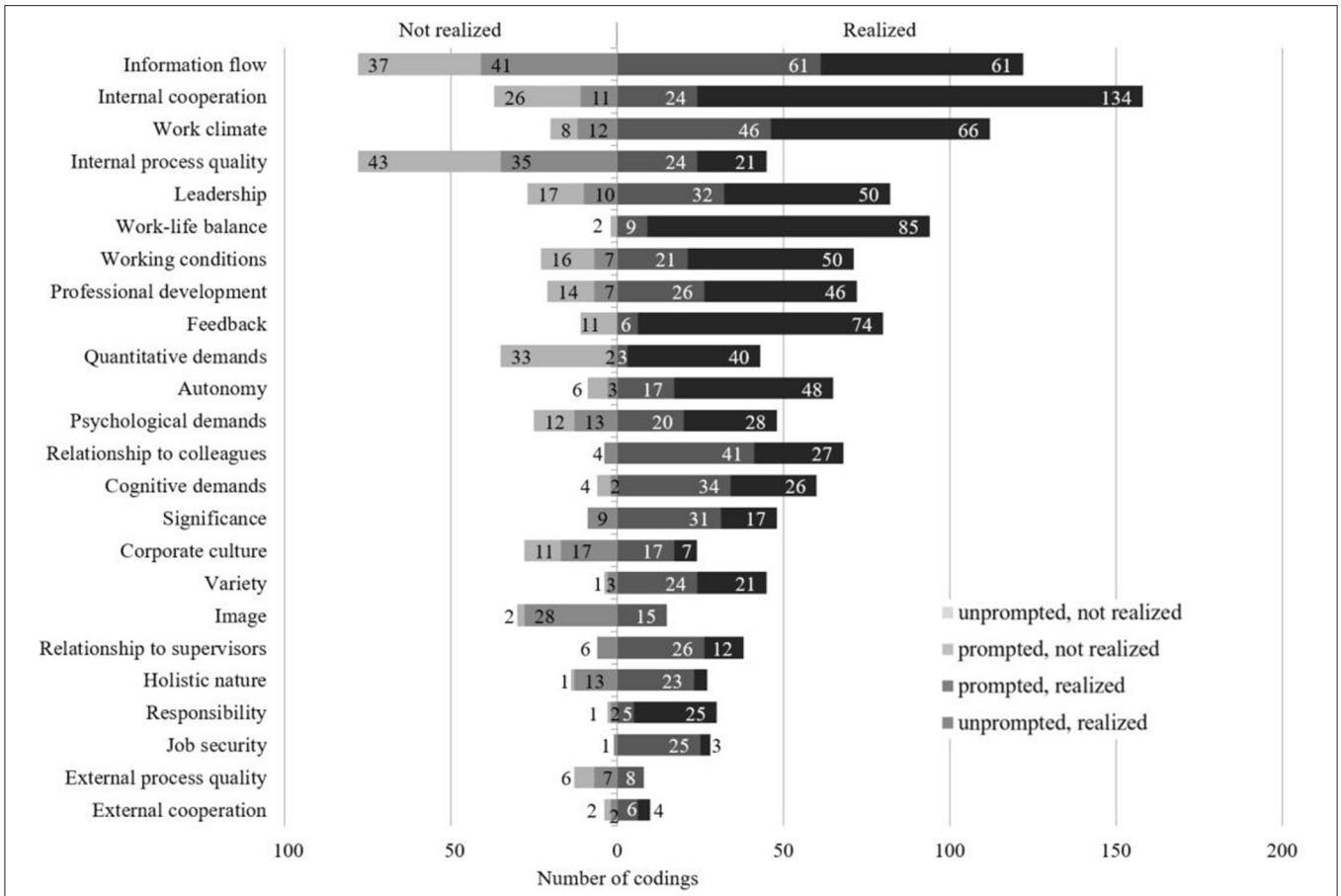

FIGURE 3 | Quantitative analysis of subjective relevance and perceived implementation per influencing factor.

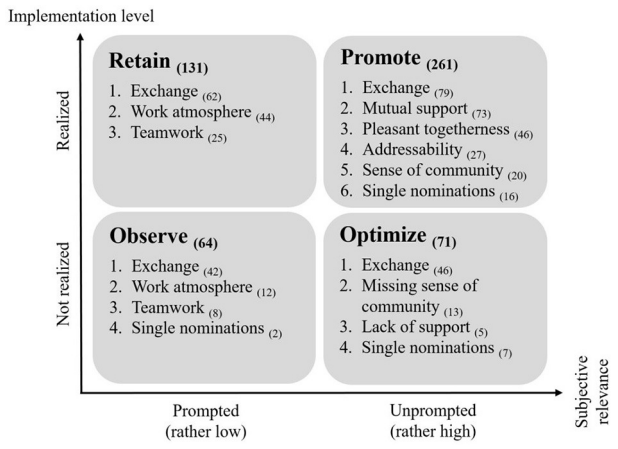

FIGURE 4 | Recommended actions for aspects of internal cooperation, information flow, and work climate, sorted by number of codings.

information, especially regarding problematic issues: "We talk to each other within the department—where problems arise, where developments do not run properly" (interview 1.26, line 61). In contrast, others criticized intra- and inter-divisional knowledge sharing due to heterogeneous knowledge levels, outdated or delayed information, poor transparency, and prioritization, as well as an insufficient information flow (optimize). According to one employee, job duties are often assigned at short notice, leaving little time for adequate preparation and processing: "Most of the time, things are put in front of you that you have nothing to do with and that usually come very spontaneously and are best completed by the day after tomorrow. So of course I don't have time to get exactly into it [and prepare] thoroughly" (interview 3.02, lines 145–147). For some, exchange was less important. They only addressed the above-mentioned aspects in response to questions from the interviewer. For instance, the availability of information was deemed satisfactory (retain): "Well, I think you always have the information you need for your job. Some things would be nice to know, but it doesn't affect my work" (interview 1.23, line 32). The quantity of information, however, was criticized, but at the same time, the concerned employee explained that they had come to terms with the abundance of information material: "The information flow is there, but sometimes too much. I don't always need to be on the mailing list if it's none of my business. [...] 80 percent of

my colleagues don't read it either. I know what I have to do and if I don't, I get the information elsewhere" (interview 1.03, lines 53–57) (observe).

Work atmosphere and teamwork were also mainly discussed in response to questions from the interviewer. One professional, for example, described a positive *work atmosphere* characterized by a harmonious and collegial climate between the team members: "The work atmosphere with us and in our environment [...] is very good. And it's a pleasure to work when you know that your colleagues are able or willing to help you if you have any problems. And you don't have to beg, but one shout is enough and there are three people ready to do something for you" (interview 2.06, line 7; retain). Worth observing are instead tensions in the team and a lack of a sense of community, which other professionals criticized. Similarly, with *teamwork*, some participants reported departmental differences and needs for improvement on the operational level (observe), while others had a positive perception of teamwork, praising the reliability of their colleagues, and their constructive ways of working (retain).

However, two facets of work atmosphere and teamwork also appeared in the recommendation option optimize. On the one hand, this concerned a *missing sense of community*. Participants reported on competitive and hierarchical thinking, a lack of mutual understanding, and lines of demarcation between the company's three locations. For one employee, this becomes particularly clear when working across divisions: "[then] our sense of community is limited and I'm not always sure whether we're all pulling in the same direction. Individual interests come to the fore and, if something doesn't work, people try to find someone outside their ranks to blame" (interview 1.23, line 58). On the other hand, some mentioned a lack of support in solving work-related problems. Either because "people don't help you as much to get ahead themselves" (interview 2.12, line 6). Or, because there is simply no other employee who is familiar with the respective topics: "I am alone with my area and I have to find a solution alone. I also don't have a representative" (interview 3.08, line 43).

Despite these improvement needs, half of the statements were assigned to the recommended action promotion. This proved a satisfactory implementation of the presage factors with high subjective relevance for the sample. One topic most participants rated as positive was *mutual support*. They appreciated good coordination of tasks, professional support from colleagues and supervisors, and constructive discussions, and cooperation to increase productivity. An employee described the collaboration as follows: "What I find very beneficial is the collegial behavior. [. . .] You discuss things very openly and directly, but it's never personal. I find that very conducive to the work atmosphere and of course that also has an impact on our output when the team harmonizes well" (interview 1.04, line 6). This statement also illustrates the *pleasant togetherness* that results, among other things, from respectful and familial interaction. Moreover, *the addressability of colleagues and supervisors* seemed to be important for some participants. They emphasized that "in terms of addressability, there is always someone there" (interview 1.20, line 53) and "conversations [are] also possible across hierarchies" (interview 1.26, line 8). Overall, the prevailing *sense of community* scored highly, allowing participants to perceive their work environment as a place of common goals and interests.

RQ2: Does employees' perception of factors of the work environment differ for distinct sociodemographic groups?

The research question on sociodemographic differences (RQ2) was examined by evaluating the number of codings per polled sociodemographic factor (step five). Results showed that the factors internal cooperation and information flow occupy the first two places in almost all sociodemographic groups (see **Table 3**). Here, it is noticeable that internal cooperation was ranked higher by female IT professionals and older employees. The picture is reversed for information flow, which was considered more important by male IT professionals and younger employees. Another point worth mentioning is that employees with long seniority value internal process quality more highly than all other groups. The third most important factor was work climate; ranked on position three by nine out of 20 groups. In the other groups the factors internal process quality (9x), leadership (3x), working conditions (1x), feedback (1x), internal cooperation (1x), and professional development (1x) ranked third, revealing a more mixed picture compared to the first two ranking positions. Overall, the influence of sociodemographic factors can be classified as rather low for our sample, despite the fluctuations described.

RQ3: Is there a relationship between employees' perception of the work environment and their commitment to the employer?

Regarding perceptions of the work environment, the results for RQ1.2 are mirrored, as shown by the average degree of realization of 75.2% ($SD = 12.7$). Specifically, more than two-thirds of the interviewed IT professionals perceived their work environment as satisfactory. Another nine IT professionals even experienced their workplace as particularly positive. Concerning commitment, it is noticeable that a predominantly positive assessment was also made here ($M = 2.72$; $SD = 0.073$). This seems understandable, as organizational commitment and turnover intention correlates negatively (Koslowsky et al., 2012; Agarwal and Sajid, 2017). Thus, employees who feel little commitment to their employer are more likely to switch. Accordingly, employees with high commitment remain.

Findings on the link between employees' perceptions of the work environment and their commitment (RQ3) are shown in **Figure 5**. The horizontal axis depicts employees' perception of the work environment. The vertical axis displays their commitment. Regarding employees' perception of the work environment, we distinguished three groups—negative, satisfactory, and positive. This allowed clustering of the participants and subsequent comparison of the groups. To build the three groups, a standard deviation (12.7) was subtracted from the average degree of realization (75.2%) and added, respectively. Employees with a degree of realization below 65.52% were thus assigned to the group with a negative perception, employees with a degree of realization between 65.52 and 87.92% to the group with satisfactory perception, and employees with a degree of realization above 87.92% to the group with a positive perception.

TABLE 3 | Influencing factors' ranking positions (upper two quartiles, sorted by sociodemographic factor).

Sociodemographic factor	Gender		Age (in years)					Professional experience (in years)						Seniority (in years)				In training and development	
Specification (No. of participants)	Female (16)	Male (45)	≤30 (11)	31–40 (9)	41–50 (15)	51–60 (20)	> 60 (6)	None (7)	<5 (4)	5–10 (5)	11–20 (9)	21–30 (21)	31–40 (15)	≤5 (17)	6–10 (11)	11–20 (12)	21–30 (12)	> 30 (9)	Yes (8)	No (53)
Influencing factors (sorted by index)																				
Internal cooperation	**1**	2	2	2	2	**1**	**1**	2	2	**1**	**1**	2	**1**	2	**1**	**1**	**1**	3	2	**1**
Information flow	2	**1**	**1**	**1**	**1**	2	2	**1**	**1**	2	**1**	**1**	2	**1**	**1**	2	2	**1**	**1**	2
Work climate		3	3					2	3			3		3	3	3			3	
Professional development								3												
Leadership				3					3	3	2				2					
Internal process quality	3			3		3	3			3	3		3			3		2		3
Work-life balance																				
Feedback					3															
Autonomy																				
Quantitative demands																	3			
Working conditions																				
Relationship to colleagues																				

Ranks were placed twice if more than one factor scored equal index values. Rank position 1 are indicated in bold.

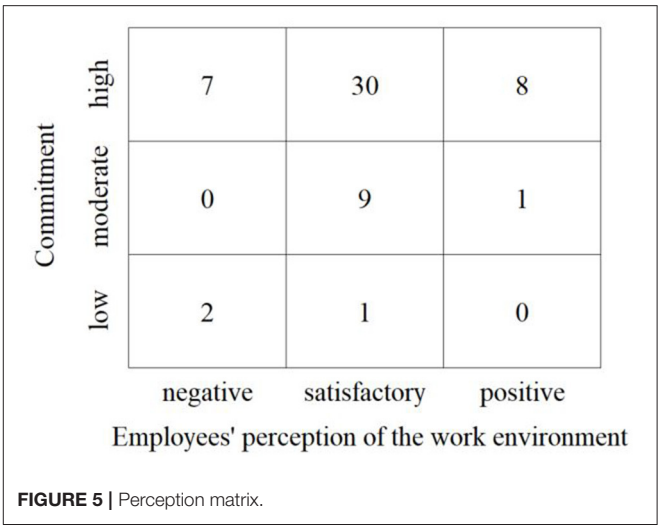

FIGURE 5 | Perception matrix.

In combination with the statements on commitment (low, medium, high), this resulted in a matrix of nine fields showing the extent to which the perception of the work environment and perceived organizational commitment are linked. Based on their statements concerning the work environment and their commitment, the interviewees were located within this nine-field matrix.

There are indications of a positive relationship between the perception of the work environment and individual commitment. Although only a weak and non-significant relationship could be found between the IT professionals' commitment and their degree of realization (Spearman's Rho = 0.089), a Kruskal-Wallis test showed that the degree of realization differed significantly across the three commitment levels (Kruskal-Wallis-H = 7.317, $p = 0.026$). Subsequent *post-hoc* tests (Dunn-Bonferroni tests) revealed significant differences in the degree of realization between participants with low and medium commitment ($z = -2.676$, $p = 0.007$, $r = 0.74$) and participants with low and high commitment ($z = -2.480$, $p = 0.013$, $r = 0.36$). Participants who rated their work environment positively also rated their commitment to their employer positively. This applies to eight IT professionals. Based on the two participants who rated their work environment most positively (degree of realization each about 96%), it can be exemplified where this particularly good assessment stems from. On the one hand, they were satisfied with the factors of their work environment to which they attached particular importance in the performance of their work. On the other hand, they also had a positive perception of the other factors that play a role in their day-to-day work. For a comparably large group of 30 IT professionals, a satisfactory perception of the work environment was observed with the same high level of commitment. The two participants whose assessment of the work environment was closest to the mean (degree of realization 74 and 77%, respectively) were noticeably more deficient than the participants in the first group (positive perception and high commitment). And this applied both to the factors that are

most important to them and the rest of the factors shaping their work environment. In particular, the two participants expressed potential for optimization for the factors to which they attached the greatest importance in their day-to-day work. Conversely, it was found that participants who criticized some aspects of their work environment (negative perception) also indicated low commitment. The more the degree of realization decreased, the more likely factors were rated as unsatisfactory. The two participants with the lowest degree of realization (each about 49%) reported, for example, that aspects of their work environment that were particularly important to them were inadequately realized. Moreover, they were also not satisfied with other factors that make up their work environment. A surprising result was shown by the seven participants who indicated a high level of commitment despite a rather negative perception of their work environment. Comparable to the participants with negative perception and low commitment (lower left box), they criticized the factors of their work environment that are particularly important to them in everyday working life. At the same time, they identified optimization potential for other factors, whereby a mixed assessment was observed here, i.e., both negative and positive statements were made.

Concerning RQ3, it can be stated that there seems to be a positive relationship between employees' perception of the work environment and their commitment. The perception of the overall work environment appears to be decisive, especially if, from the employee's point of view, those factors that are particularly important to them in their everyday work are not implemented satisfactorily. Consequently, if an employer succeeds in designing the work environment in such a way that employees perceive it as conducive to the performance of their work, this favors the relationship between employees and employer and promotes long-term employment relationships. Nevertheless, results also indicate that there may be other factors besides the perception of the work environment that lead to high commitment.

DISCUSSION

Taken together, the findings of the interview study show that—from an employee perspective—three of the well-being-promoting factors have proven to be especially relevant. Employees experience particularly interpersonal relationships as conducive to fulfilling their work tasks. Furthermore, interpersonal relationships are crucially important in respect of how one assesses the individual work environment: First, they contribute to an environment in which employees feel safe and affiliated. This may lead to a comfortable state in which each of the parties concerned feels valued and indispensable. Second, these interpersonal relationships are the basis of an organization-wide network. This is of particular importance concerning knowledge acquisition and skill development. Results also show that there can be differences in the perception and implementation of certain influencing factors, making one-fits-all solutions not very promising. Moreover, employees seem to benefit most from informal learning opportunities, such as sharing experiences or receiving ad hoc support from colleagues, for performing everyday work tasks. Finally, employees' perceptions of the work environment appear to have a positive relationship with their commitment, whereby the perceived realization of the individually most relevant influencing factors seems to play a crucial role.

When interpreting our findings, however, the limitations of the study must also be taken into account. First, the subjective relevance of specific factors for the assessment of the work context may vary over time. Changes in the relevance of single factors would possibly be reflected in changes in well-being at work. This may be caused by changes in the work environment, such as new tasks and colleagues, or changes in other areas of life, such as a new family constellation or a new place of residence. Future research projects should therefore be designed as panel studies to investigate whether the identified influencing factors are constant in the long run. This could help to differentiate between stable and variable factors conducive to well-being at work.

Second, qualitative research projects have limitations that are inherent in the method and provide starting points for complementary quantitative research efforts. For instance, a questionnaire study could be developed from the present results, containing scales on the influencing factors (independent variables), their perception (possibly moderator or mediator variables) and the outcome variables well-being at work and commitment. In this way, the relationship between the perception of the work environment and commitment could be investigated in more detail. It would also be interesting to see whether the factors considered being conducive to well-being at work compensate for deficits in other factors. For example, high quantitative requirements or unfavorable internal processes could be compensated by the support of colleagues. Moreover, the influence of personality traits could be investigated. These were not considered in our study. However, some evidence suggests that a positive evaluation and satisfaction with the tasks can only develop if the requirements match the personality characteristics of the employee (Christiansen et al., 2014). For example, playful characters and employees who are open to experience can benefit from the independent design of their work tasks. Integrating fun and competition into daily tasks can increase their creativity and commitment (Scharp et al., 2019). In addition, agentic employees tend to adapt their work environment to their individual needs and expectations (Goller, 2017).

Third, the study design's focus was on the individual employee. This does not take into account that the organizational work context requires a great deal of interaction, and thus employees hardly act in isolation. The results support this assumption in that they prove the importance of interpersonal interactions. Thus, group discussions could serve to offer deeper insights concerning the dynamics of social interactions within the work context (Krueger, 1999). Therefore, it would be interesting to further analyze organizational units to investigate how their daily work is organized. Studies of this type could also help to elucidate the relationship between well-being and performance at the group level for which evidence has been scarce. More research efforts are therefore needed that can shed light on the causality and reciprocity between the two variables (García-Buades et al., 2020). It would also be interesting to compare

the extent to which employees' perception corresponds with the perception of the employer. Differences in the perception of the work environment could hinder effective interventions to improve working conditions. Hence, future studies should survey the perception of the employer in addition to the individual perception of the employees.

Fourth, the generalizability of our results is limited, as organizational and industry characteristics may have influenced employees' perception of the work environment. Therefore, the results require validation through studies in other organizations and industries. Furthermore, it is possible that selection effects arising from sample recruitment, e.g., through overrepresentation of particularly satisfied and committed employees, could have affected the findings. The same would apply to the possibility of socially desirable response patterns and the avoidance of specific sensitive issues, such as relationships with supervisors. However, as the results show a quite differentiated evaluation of the work environment, concerns about selection effects and social desirability can be discounted. And finally, it has to take into account that we only report data from one company with specific characteristics concerning the profession, age structure, and gender. This is due to the rather difficult conditions of field access. This further reduces the generalizability of the results. It is therefore essential to follow up with further studies in other companies to corroborate the results reported here.

Overall, the findings of our research are in line with other research showing that employees perceive positive relationships with colleagues and support from the team and supervisors as particularly useful and helpful to cope better with challenging phases (Alegre et al., 2016; Van der Heijden et al., 2020). In such contexts, employees are more committed, and at the same time their willingness to learn and exchange increases (Zboralski, 2009; Huang et al., 2016; Frazier et al., 2017). To strengthen interpersonal relationships, organizations could implement team-building activities. This would address mutual trust and reliability. In addition, information on the responsibilities and competencies of colleagues would help to find appropriate contact persons and to build up a professional network. For implementing knowledge sharing as part of the daily work routine, employers should create appropriate conditions on the organizational level, such as providing the necessary tools and resources (Lancaster and Di Milia, 2014), and anchor knowledge sharing and teamwork in the organization's corporate culture (Jeong et al., 2018).

Particular emphasis should be placed on encouraging informal learning opportunities, such as sharing experiences or *ad hoc* peer support, as employees benefit most from these practices, according to our study. Discussing best practices and lessons learned in meetings at the team or department level could also be a viable path in this context. Employers should also offer retreats for undisturbed exchange between employees. To communicate experiences across departments and locations, they could be published in a tweet-like format on the organization's intranet. Overall, increased communication of individual experiences would boost employees' visibility and convey a feeling of appreciation. This should be taken into account when designing the work environment, e.g., by using flexible communication tools and providing time capacities for mutual exchange. At the group level, feedback, internal and external networking, and the quality of interpersonal relationships are all crucial (Schürmann and Beausaert, 2016; Jeong et al., 2018). These aspects at the group level have been identified as largely implemented, which indicates a supportive work environment at least in some parts of the company (best practice). Such concrete indications for designing a work environment in which employees feel socially embedded can help to boost sustainable well-being at work.

At the same time, our findings highlight the need for employers to examine how employees experience and perceive implemented measures to ensure that beneficial factors, such as communication tools or training opportunities, have positive effects on employees' well-being at work. To this end, employees' perception should be evaluated regularly. In teams in which the exchange is already functioning well, evaluations can be carried out as needed and bilaterally. In teams in which the exchange has not worked well so far, evaluation should be introduced based on predefined evaluation questions and with predefined appointments (e.g., in annual reviews or team meetings). A regular evaluation of the perception of the work environment could—as the results show—help to identify unfavorable developments and initiate appropriate countermeasures to design a well-being-friendly work environment. In case the work environment is not yet optimally designed from the employees' perspective, job crafting interventions can be helpful. Through systematic training, employers can show their employees how to make self-directed and targeted changes to the resources and requirements of their work environment (Van Wingerden et al., 2017). If employees succeed in adapting work demands according to their individual needs (job crafting), they benefit from more professional development opportunities as well as increased self-efficacy, better performance, and enhanced well-being (Van Wingerden et al., 2017).

Overall, this organizational context shows the characteristics of an expansive work environment. Such environments enable employees to exchange knowledge and experience, acquire new knowledge, and further their skill development. Moreover, an appreciative and innovative atmosphere is typical of an expansive work environment (Fuller and Unwin, 2004). In summary, our approach has provided a detailed overview of workplace conditions that can influence employees' professional development and potentially impact their well-being at work. Furthermore, we identified which specific aspects of the work environment can induce positive perceptions of the work environment. Results show that IT professionals especially perceive interpersonal relationships in a positive way. If they experience these as positive, employees benefit from a good flow of information, good internal cooperation, and a pleasant work atmosphere in performing their everyday work tasks. The in-depth analysis of employees' statements helped to determine which aspects of the work environment should be implemented, developed or promoted. In the long run, this can support individual learning and development paths and generate a work environment that sustainably promotes employees' well-being at work. Thus, employers can respond

to employees' needs by analyzing the subjective significance of certain influencing factors and uncovering the potential for their implementation.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because making the generated datasets available requires the agreement of the cooperating institution from which the data were collected. Requests to access the datasets should be directed to wipaed2@mail.uni-mannheim.de.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SZ and JS contributed equally to the conception and theoretical development of this work and to the elaboration of the models used. SZ has collected the data on which this work is based. She was supported by student assistants. All authors have seen and approved the final version of the manuscript.

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Smashing, Shaming, or Polite Fun and Joy? How Workplace Humor Influences Positive Well-Being in South Korean Workplaces

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Humor is contextual, ambiguous, and varies within cultures but is widely associated with positive outcomes such as well-being and happiness. While humor is universal and enhances interpersonal relationships which can benefit psychological well-being, we argue that humor can also be diminish psychological well-being in Confucian-based, South Korean workplaces. Our research questions asks: *how do hierarchical workplace relationships influence shared humor and positive well-being in Korean workplace contexts?* Our contextual, ethnographic research includes in-depth field observations and semi structured interviews in three Korean organizations. Traditional Confucian-based cultures value face-saving, trust, and harmony while emphasizing formality and hierarchy. Korean honorifics maintain harmony, hierarchy, and politeness which creates benefits for group processes and influences the sharing of humor. Humor is enacted in accordance with workers' hierarchical status which has a significant impact upon the types of humor shared and the responses available to subordinate employees. Investigating these dimensions in Korean workplaces we argue that honorifics and hierarchy influence humor interactions in complex ways that have implications for psychological well-being.

Keywords: humor, psychological well-being, hierarchy, honorifics, Korea

INTRODUCTION

Humor is a contextual phenomenon that exists in most cultures (Berger, 1987). Intercultural competence is globally important, ambiguous, and nuanced (Deardorff, 2015). Humor is similarly ambiguous, nuanced and inconsistent which means that it may vary in forms, performances, and motives. Often perceived as a positive interaction, humor may help people to develop interpersonal relationships (Cooper, 2008), and shared laughter may help to establish similarity and familiarity with others (Brown and Levinson, 1978). Humor is seen to promote psychological well-being (PWB) as it can be a coping mechanism to reduce stress and provide relief from everyday tensions (Freud, 1960) and is beneficial in defusing emotional events (Ridanpää, 2019). However, humor is complex and may be interpreted differently by the actors involved. It is also culturally specific and contextual, therefore humor may only be perceived as *funny* when it is deemed appropriate for the context. Although humor is generally considered beneficial to PWB, it may also be "tendentious" (Freud, 1960), provocative, cause emotional harm, and even damage workplace relationships

(Plester, 2016; Kim and Plester, 2019). Therefore we argue that it is important to research and analyze humor within its cultural context to understand the situational nuances and dynamics that cause it to flourish or fail with varying impacts on PWB.

In our contextual study, we focus upon the Confucian-based culture that underpins South Korean organizations and is based on complex language structures that reflect status differences between communicators (Brown, 2011). While honorifics and specific titles may be used to help Koreans to communicate more respectfully in accordance with their relational status (McBrian, 1978), hierarchical structures are complex and communication protocols can be ambiguous within organizations. Our paper examines how the Confucian based values of hierarchy, formality, and polite respect may influence humor interactions in Korean organizations and impact upon PWB. We focus on hierarchical organizational relationships as we enquire: *how do hierarchical workplace relationships influence shared humor and positive well-being in Korean workplace contexts?* Our contribution is in emphasizing cultural meanings and significances (Hatch, 2012) of organizational humor that have significant implications for PWB in modern Korean workplaces.

PSYCHOLOGICAL WELL-BEING

The *absence* of psychological disorders (such as anxiety and depression) and the *presence* of positive attributes creates PWB (Ryff, 1989; Ryff and Keyes, 1995). Eudaimonic well-being extends the definition of well-being "beyond feeling good to include functioning well" (der Kinderen et al., 2020, p.1). PWB is particularly salient to workplace functioning and performance and is linked to success and health (Robertson and Cooper, 2011). The basic structure of psychological well-being is centered around the "distinction between positive and negative affect and life satisfaction" (Ryff, 1989, p. 1,070). Ryff established six long term dimensions of PWB, these being: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life; and personal growth and these reflect enduring life challenges. Ryff (1989) does warn however, that demographic differences such as culture ethnicity, history, and class may lead to different and even competing conceptions of well-being.

While many factors of PWB are established and understood, the relationship between humor and PWB humor is nascent but studies are emerging showing that humor has a positive relationship with PWB as it can generate benefits in self-efficacy, self-concept, positive affect, optimism while simultaneously reducing stress, depression, and anxiety (Martin et al., 1993; Crawford and Caltabiano, 2011). Such effects are not firmly established in humor studies linked with PWB. It is the complexity and contextual nature of humor coupled with a variety of humor styles [see Martin et al. (2003) and Ruch and Heintz (2018)] and personalities that can produce ambiguous results and prompts calls for further research examining humor's influence upon PWB.

HUMOR AND PWB

The multifaceted nature of humor includes cognitive, social, emotional, and behavioral aspects (McCreaddie and Payne, 2014). Psychological literature dating back to Freud (1960) has established that humor is a coping mechanism that can relieve stress, and Freud's early work underpins a key group of humor theories that focus on humor as a beneficial relief and release from everyday tensions. Freud argued that laughter is liberating both physically and psychologically. Building on Freud's work, psychologists have identified that good humor creates positive effects that strengthen self-esteem while reducing levels of depression and anxiety (Lefcourt and Martin, 1986; Martin, 2006). Psychologist Martin (2006) argues that increased levels of humor enhance positive self-concept and self-esteem and that this also occurs when people experience extreme negative life events. The benefits of alleviating anxiety, stress reduction, and mitigating existential threat can all improve PWB (Martin et al., 1993). Therefore, humor can be a beneficial coping mechanism to deal with highly emotional interactions, which assists PWB especially in times of crisis (Ridanpää, 2019). Sustaining a humorous perspective about life's vagaries and crises helps to create stability that improves resilience and PWB (Plester, 2009; Cann and Collette, 2014). The relationship between managers and employees influences humor use and PWB. In a study of 2,498 Australian employees, Wijewardena et al. (2017) found that high quality manager- employee relationships prompted more positive humor use and supported healthy emotional regulation at work.

However, while these positive influences on PWB make for popular findings and are commonly assumed, there are also a variety of maladaptive elements of humor that can be self-defeating and hostile (Plester, 2016). Hostile humor tends to focus on other people, it may be aimed or targeted and therefore does not enhance well-being (Kuiper et al., 2004). Humor can disparage, belittle, debase, demean, humiliate, and victimize others (Zillmann, 1983; Billig, 2005) and such unpleasant aspects of humor can have detrimental effects on those who may be the target of this type of joking. Freud (1960) also acknowledged that "tendentious" (controversial) humor can allow an expression of an idea or viewpoint that might be normally "unsayable." While this might offer an amusing release to the joker, victims of this type of humor are likely to suffer negative emotions and reactions. Therefore effects on PWB may differ between different actors in humor instances, depending on their role or position in the humor exchange.

Bitterly et al. (2017) argue that humor is risky because unsuccessful humor can harm a persons' status at work whereas successful humor can imply both confidence and competence which may increase a joke teller's status. They note the important role of humor in shaping hierarchy and interpersonal relations within groups. Gender also plays a role in workplace humor. Gender stereotypes influence workplace humor in that males who use humor at work are awarded higher status than those who do not use humor. Conversely, females who use humor at work are ascribed lower status than females who do not use humor (Evans et al., 2019).

Workplace research has established that banter (Plester and Sayers, 2007), clowning and practical jokes [see Plester and Orams (2008)] and the dark side of humor (Plester, 2016) involve complexity and ambiguity and evoke a range of responses and feelings. Investigating both positive and dark features of humor illuminates some specific contextual factors that strongly influence humor and PWB for workers and managers. Contextual factors may include the physical environment in which humor is enacted and/or the characteristics of those involved in the humor. Therefore context is an important factor in determining whether or not humor is well-received and works toward increasing PWB; whether humor may have the opposite effect and degrade PWB, or whether it may actually achieve both of these at the same time. A key contextual dimension to humor, and highly pertinent to this current study, is the cultural context for humor. The cultural context incorporates norms, values and relational factors that guide and influence humor participants (Marra and Holmes, 2007) and effects their PWB.

CULTURAL CONTEXT AND WORKPLACE HUMOR

Workplace humor can be a positive experience (Ruch, 2008) that creates a sense of commonality (Alden et al., 1993) and happiness among people (La Fave et al., 1976). However, humor use and interpretation is highly contextual and based on the underlying cultural values of the society and the interacting work group (Marra and Holmes, 2007). Humor is a multifaceted term which includes the mental process, creation, and emotional responses of, and toward funny or laughable gestures and words (Martin and Ford, 2018). This can vary between different cultures and Tanaka (2018) illustrates that shared laughter in Japanese contexts may signal interactional issues that need to be resolved rather than amusement.

Humor may help to increase innovation and creativity (Isen et al., 1987), assist interpersonal communication processes within the workplace (Holmes, 2000), achieve resilience (Cheung and Yue, 2012), and describe individual differences (Ruch et al., 2018). Therefore, organizations often encourage employees to use humor but may not consider that there may be potentially negative impacts (Morreall, 1983). Workplace humor may exclude some people (Plester and Sayers, 2007), or can be interpreted negatively creating conflict and workplace disruption (Plester, 2016).

Both organizational culture (Plester, 2016) and the society in which the organization is based may influence humor significantly (Davis, 2016). This is especially significant in globalized workplace contexts where people from different cultures interact and work together. Cultural differences have a strong impact on humor perception and those from Eastern cultures do not favor humor or use it as a coping strategy compared with workers from Western contexts (Jiang et al., 2019). Although inquiry into national culture may generate a stereotype of a culture, it can also provide a useful initial framework to explore and refine a particular culture's characteristics (Gale and Vance, 2012) that may explain everyday workplace practices and behaviors.

Cultures influenced by Confucian philosophy may approach the idea of humor differently to those from Western contexts (Yue et al., 2016). Humor in Confucian cultures may be perceived as a threat to the authority of organizational power-holders and therefore be seen as inappropriate (Kim and Plester, 2019). People exchanging humor interact from their normative orientation and background which influences the humorous relationship and the management of "face" is particularly important in Korean contexts (Kim, 2018). Harmony is also psychologically important in collectivist cultures (Yamagishi et al., 1998). Therefore, workplace humor studies must be situated and examined through an appropriate cultural lens that appreciates how cultural behaviors are shaped by national traditions (Azevedo, 2020) and we now turn to Confucianism's influence in Korean workplaces, significant to our current study.

CONFUCIANISM IN KOREAN WORKPLACES

Korea is one of the East Asian countries that is considered to be strongly influenced by Confucian practices and values, affecting the daily behaviors and PWB of Korean people (Deuchler, 1992; Choi, 2010). Confucianism is a philosophy of ethics that emphasizes the importance of interdependency and harmony within the society, derived from the ancient Chinese scholar Confucius (Deuchler, 1992; Yao, 2000). It is perceived that *hierarchy* maintains beneficial societal harmony and individuals are expected to adopt relational roles based on age and family-based relationship structures that prescribes unequal power between individuals (Yao, 2000; Lun and Bond, 2006). Harmonious relationships are important in Korean society and workplaces and have also been positively linked with improved PWB particularly for older people (Chiang et al., 2013).

While Confucianism is traditionally a Chinese philosophy, other countries such as Korea, Vietnam, and Japan are also influenced by Confucian values (Duncan, 2002). This is also supported by Hofstede's (1984) study, where Korea shares similar cultural characteristics with other East Asian cultures that embed Confucian-based values. However, Confucian values and how these values are reinforced through rituals, rites, and communication, may differ across Asian cultures, therefore cultural ideas or concept may be interpreted differently in the variety of Confucian contexts (McSweeney, 2002).

Confucian values are embedded in Korean society and reflect its traditional authoritarian rule (Rowley and Bae, 2003) including expectations of respect, hierarchy in interpersonal relationships, and collective attitudes that prioritize group goals and harmony. Interdependence and harmony is encouraged, where "superiors" are expected to perform a duty of care (to subordinates) and subordinates must display respect and obedience in familial, societal and workplace relationships (Yao, 2000) in order to prioritize the harmony expected in most Korean contexts.

Societal and relational communication structures transfer to organizational contexts (Rowley and Bae, 2003). In Korea, communication processes between employees of different hierarchical status at work are also significantly influenced by societal Confucian values. Subordinate employees are restricted in their communication modes and silence is particularly preferred as it signals obedience (Lim, 1999). A system of honorifics that denote relational social positions is commonly used in society and at work and this is considered a form of respect that reinforces the status of higher-ranked people (McBrian, 1978; Hwang, 1991).

CONFUCIAN POLITENESS, HIERARCHY, AND HUMOR

Much of the extant literature on the relationship between culture and humor has a westernized focus. Western organizational research (Holmes, 2000, 2006; Holmes and Marra, 2002; Plester and Orams, 2008) has emphasized the reduction of hierarchical levels when humor is shared at work. Cooper (2008) suggests that humor influences the quality of interpersonal relationships between people regardless of their hierarchical differences. While humor still occurs in Confucian contexts, including Korea (Kim and Lee, 2009; Jung, 2014), hierarchical dynamics in humor interactions are not fully investigated in Confucian contexts (Jung, 2014). The Western tradition of using workplace humor that reduces hierarchical differences may be less relevant to Confucian-based cultures with hierarchical structures that prioritize collective identity and harmony.

Within Confucian societies, age is revered and influences relational interactions (Yao, 2000) creating a family-like, often patriarchal relationship where people must behave in accordance with their prescribed hierarchical status (Deuchler, 1992). This means Korean workplace relationships intersect with Confucian societal expectations guiding behavior and formal or informal interactions. Relational hierarchy is important to maintain harmonious organizational life in Korean workplaces and hierarchy also influences communicative norms (Shim et al., 2008). Language is governed by specific titles of address and the appropriate form of address for a superior or a subordinate is highly dependent on their relational status. For example, the word "nim" (direct translation, "sir" or "madam") may be the most appropriate title to use toward an organizational superior, rather than the less formal mode of address—"ssi" that translates to "Miss" or "Mr" in English.

In line with formal protocols for addressing colleagues at work, the use of humor is carefully considered in Korean organizational communication. The indirectness of humor creates ambiguity which is a feature of humor (Wood et al., 2011). It seems that the indirectness of humor can help to maintain some forms of politeness (Brown and Levinson, 1978) which is important in Korean society where politeness is interlinked with using honorifics (House and Kasper, 1981; Upadhyay, 2003). With relational Confucian notions of hierarchy and politeness at the fore, we explore workplace humor and its impact upon PWB within a specific cultural context. We reflect cohesive cultural identifications while simultaneously exposing problematic humor aspects within an evolving modern (Korean) culture increasingly impacted by Western workplace influences. Our study analyses humor and its effect upon workplace relationships and PWB in Korean organizations underpinned by Confucian cultural traditions. With this objective we investigate: *how do hierarchical workplace relationships influence shared humor and positive well-being in Korean workplace contexts?*

METHODOLOGY

Multi-Voiced Interpretivist Approach

In order to explore the complex relationship between organizational humor and PWB associated with Confucian values in Korean workplaces, we adopt a qualitative, interpretive approach (Creswell, 2003). Such an approach allows us to understand meaningful social action in context (Denzin and Lincoln, 2005) and permits multi-voiced, multiple participant realties to generate rich, nuanced interpretations (Alvesson and Sköldberg, 2000). As organizational humor may be subjective and interpreted differently by everyone (Holmes, 2006) our multi-voiced interpretivist approach (Alvesson, 2010; Cunliffe et al., 2014) helps us to investigate diverse contextual interpretations of humor and to present different voices for analysis. This helps to understand the complex relationships within studied organizations by providing rich stories and descriptions of the studied phenomena (Bryman and Bell, 2015). In keeping with our interpretivist methodology, we make no claims of generalizability of our findings.

Data Collection Methods

We collected data from three different Korean companies using participant observation and semi-structured interviews to represent the interpersonal and subjective nature of organizational humor. The empirical observations and interviews took place over 4 months (March to June 2014). We selected three different companies to extend our learning (Stake, 2013) and our participant companies vary in work characteristics and size. These companies were recruited through the researcher's personal networks, where the researcher was introduced to managers of potential participant companies (thus initially not directly connected or personally related to the participant companies). This method of recruitment is an important part of gaining research access within Korean organizational context, as interpersonal relationship (based on collectivistic ideals) is valued. Each company's Chief Executive Officer was provided with a detailed information sheet and consent form prior to the research, to explain about the research process and assure confidentiality. These documents were reviewed and authorized by the Human Ethics Committee of the researcher's institution. Furthermore, individual participants were also provided with information sheet and consent form prior to the research. The three companies operate in Information Technology (IT), online gaming, and manufacturing industries. We assigned the pseudonyms *Truscene, Mintrack,* and *Wisepath*, to preserve confidentiality and also gave interview participants pseudonyms. Summative

TABLE 1 | Participant companies.

Company	Industry	Size	Number of levels of hierarchy	Age range
Truscene	Information technology	49	7	20–40's
Mintrack	Online gaming	33	8	20–60's
Wisepath	Manufacturing	63	10	20–60's

TABLE 2 | Interview participants.

Company	Truscene	Mintrack	Wisepath	Total
Gender				
Female	5	4	2	11
Male	20	10	5	35
Age group				
20's	12	7	0	19
30's	9	6	1	16
40's	4	1	1	6
50's	0	0	3	3
60's	0	0	2	2
Organizational position				
Sawon (entry-level)	10	6	4	20
Juim (Manager)	5	1	0	6
Daeri (Deputy section chief)	3	2	0	5
Gwajang (Section chief)	3	3	0	6
Chajang (Deputy department manager)	2	1	0	3
Bujang (Department manager)	1	1	0	2
Isa (Deputy managing director)	0	0	2	2
Jeonmu (Managing director)	0	0	1	1
Bu-sajang (Vice-CEO)	0	0	0	0
Sajang (CEO)	1	0	0	1
Tenure				
0–2	17	9	3	29
3–4	0	3	0	3
5–6	3	0	1	4
7+	5	2	3	10

tables are provided below, detailing participant companies (**Table 1**) and individual interview participant's demographic details (**Table 2**).

One researcher fully immersed in each company for a period of 1 month in order to contextualize employees' experiences and perceptions. Observation was conducted 5 days per week, and sometimes during weekends if the participants invited the researcher to join extra company and/or social activities. Participant observation focused on language and humor interactions between organizational members and affective behaviors and responses. Detailed field notes were recorded throughout the research. The researcher engaged in organizational activities during working and non-working hours, and undertook work tasks such as assisting in writing company reports, translating documents (from Korean to English), serving beverages at company events, and engaging in factory work in order to assimilate to company life. The researcher also participated in afterhours drinking with participants, and weekend social gatherings to observe participant behavior diverse situations. To further understand the subjective experience and implications for employees, both formal and informal (impromptu) interviews were used. Our field researcher is ethnically Korean and Korean language was used in all interviews, being the most comfortable language for our participants (Welch and Piekkari, 2006). Forty-six semi-structured interviews were conducted, and all participation was voluntary. Approximately 1–2 h were used to conduct each interview, and hand-written notes and voice recorder was used to collect interview data. After the research period, participants were provided with a summary of their data, and were given the opportunity to provide further information through member check method.

Analysis

Thematic analysis was used to understand patterns and themes within the data providing flexibility and appropriate for the exploratory nature of this project (Braun and Clarke, 2006). Our analysis concentrates on individual and group humor interactions, reactions, responses, and emotive aspects that may contribute to PWB. In particular, Confucian values, ideals, perceptions and their impact on employees in humor instances are investigated in detail and we include employee interpretations of their significance and meaning to their well-being. Relevant synonyms and key words in transcripts and observation data were analyzed carefully (Auerbach and Silverstein, 2003). Observations and interview excerpts were coded into categories and further categorized into themes.

Analysis comprised multiple phases, from initial data collection and first categorisations to an all-encompassing review of combined data. Data were stored and organized using NVivo 12 Plus. Our four different stages of analysis include:

Stage 1: Initial analysis- during data collection period
Stage 2: After data collection- analysis within each company
Stage 3: Coding and codes from all companies combined
Stage 4: Combined analysis arranged and recoded into themes

FINDINGS

Contextual Information

Context is important for humor and workplace relationships, therefore findings detailing the three companies are presented first. Confucian-based values of hierarchy, politeness and respect were apparent in all of our observation data and we analyzed language, honorifics, gestures, and non-verbal actions. Participants from all companies engaged in humor in their everyday interactions. Interview data extended our observations through capturing participants' perceptions of their organizational humor and its influence upon their workplace relationships and PWB.

Understanding of Confucian notions of hierarchy and levels of formality emerged through analyzing our observational data of interpersonal interactions and language used by

participants. Korean language conveys different degrees of formality and relative hierarchical status is signaled through honorifics and personal titles (similar to other cultures that utilize diverse linguistic forms depending on the speaker's relational status). Korean workers assess their relative (hierarchical) position to others in an interaction and consider this context before engaging in communicative exchanges (McBrian, 1978). Organizational position and age of other people are important factors in determining the relational status or position of the communicators. Our participants used different titles for each other based on organizational position as well as age-based societal titles such as "*ssi*" ("mr." or "miss"), "*nim*" ("sir" or "madam") followed by the addressee's last name and first name. Managers (or those with "superior" status) from all three companies used more casual language (than subordinates) and had more freedom in addressing subordinates. Examining the different cultural practices and the language used by the participants helps to identify relational hierarchy which emphasizes the underlying Confucian-based value of maintaining harmonious relationships necessary for PWB.

Organization One: Truscene

Truscene is an Information Technology (IT) company with 49 employees. Only eight employees are female and workers' ages range from 20 to 40's, with most of the senior management aged over 40. Truscene has a seniority system that promotes workers based on organizational tenure, which is common in Korean organizations. Of the three companies, Truscene displayed the most complex organizational culture. The cultural behaviors and cues that we observed, differed from the managerially endorsed and espoused organizational culture [see Schein (1985) and Schein (2004)]. Furthermore perceptions of organizational culture from senior managers contradicted clarifications from junior employees. Most of the senior managers claim that Truscene has a horizontal, non-patriarchal culture but this is not confirmed by subordinates. Observational data that included verbatim recording of interactions, showed that subordinate employees use strict honorifics and titles adhering to the formal structure that includes the managers' full name and organizational position using the formal Korean address- "nim." In contrast, managers mostly addressed subordinates informally using the subordinates' first name- "ssi" or their last name and organizational position. We interpret this as a power signal demarking the hierarchical differences between workers- where managers get to be casual in their address while subordinates must use formal structures denoting hierarchical "superiority." This junior worker explains the need to use formal language:

> *In Truscene, it's different to the overseas (Western) cultures. We need to address seniors formally, like their organizational positions should be used, full organizational positions, and they care a lot about age and hierarchy. So I think it's quite strict in that way.* (Carnelian, 24, Truscene).

Carnelian identifies the difference between Truscene and Western organizations. She also explains that seniors "*care a lot about age and hierarchy*" signifying the importance of adhering to strict, formal communication toward her superiors and suggesting that workers' age is a key factor. Elders are highly revered and respected in Korean culture and honoring traditional values important to seniors is an important factor in fostering collective workplace harmony and well-being.

Organization Two: Mintrack

Mintrack is a small online gaming company with 33 employees and only four female (administrative) staff. On average, workers are aged 20–30, while senior managers range from 40 to 60 years. Mintrack has a looser organizational system with a high degree of individual freedom. For example, organizational members are able to decide on their work hours (either a 9 or 10 am start), and freely shift their work stations, to engage in work tasks and team meetings as needed. Workers use casual language and managers use their subordinate's first name or "ssi" to address them. Subordinates use personal appellations such as "*hyung*" ("older brother") used by younger men toward senior men. Interview participants describe this casual language and work atmosphere:

> *I would feel icky if people call me that (middle manager), plus it makes me look old. So unni is enough [laughs].* (Citrine, 33, Manager).
> *We're just really casual. I call everyone hyung (older brother) and it's all good here.* (Garnet, 29, Subordinate).

Both Citrine and Garnet explain that casual language is preferable to formal organizational titles, and reflects a less-hierarchical culture and warmer relationships within this organization which is perhaps more typical in gaming companies worldwide. This fosters a less traditional organizational culture and the informality allows casual workplace interactions that include more humor that enhances PWB for the younger workers.

Organization Three: Wisepath

Wisepath is a recycling company that handles diverse precious metal. Wisepath employs 63 workers with only seven female employees. Most workers are 40–50. The company has two divisions—factory and office. The office has nine hierarchical levels while the factory has two levels. Wisepath displayed strong Confucian values and traditional organizational culture and advertises its collective culture on the company webpage, emphasizing cooperation and collaboration. Organizational members use strict forms of language (honorifics and titles) in accordance with their relational hierarchy to reinforce subordinate or superior organizational status. This conversational extract exemplifies the formal hierarchical relationship acknowledged through titles:

> *Coral (64, female): I worked for quite some time, and I'm the oldest staff here I think.*
> *Morgan: Yes, she is two years older than me, and senior. She's the manager. Just a two person team but she's the manager so I call her "manager"- being respectful, careful [laughs].* (Wisepath, May 30th: Observation notes).

Although these participants are lighthearted about the formality it is closely adhered to and important to relational dynamics in this company.

Themes and Categories

For the purpose of guiding the observation process, initial coding schemes were developed prior to data collection (Sharpe and Koperwas, 2003) based on organizational humor and Confucianism literature. Key ideas from the literature were used to construct a schedule for semi-structured interviews. In analysis, our coding scheme included 17 categories denoting types of humor, direction of humor use, hierarchical relationships, and types of language (such as formal language or honorifics) and emotional responses. Novel observations found during the data collection period were organized by new codes and categories as they emerged (Braun and Clarke, 2006). Our coded categories generated three key themes.

- ***Relational hierarchy*** was created from three categories including: 1a. *organizational hierarchy; 1b. societal hierarchy*; and *1c. status ambiguity*. This theme incorporates the influence of relational and societal hierarchy on humor use and is derived from participant perceptions of organizational humor and the ambiguity they perceive in their status when humor is used at work. This ambiguity has varying impacts on their perceptions of their personal PWB particularly the dimension concerning 'positive relations with others' (Ryff, 1989)
- ***Language and hidden meanings*** is derived from categories including: 2a *honorifics* and *2b politeness*. This second theme focuses on the incongruity and indirectness of humor in interactions and the complex layers of decoding needed in interpreting humor between organizational members. In particular, the use of honorifics and different titles used in humor may convey different (and sometimes conflicting) meanings, and may reflect different interpretations toward being "polite." This also has varying bearings on PWB for workers as it impacts their autonomy and has positive, negative, and ambiguous impacts.
- ***Saving face*** derived from categories of: *3a chemyon (face)* and *3b shame* that encapsulates how humor may protect or damage the *chemyon* (face) and that shame is a factor in some humor. Saving or damaging face has some significant impacts on PWB and can create anxiety, shame and tension. Data extracts within each theme is presented below.

Relational Hierarchy

Our data indicates that participants approach humor interactions differently according to the relational hierarchy between workers. Observations across the three participant companies recorded 163 humor instances where managers instigated and engaged subordinates in humor, and just 40 instances where subordinate employees instigated humor to a manager.

In an interview, Jet explains the nature of humor interactions from his subordinate perspective:

> *Of course, I respond actively (laugh) to the boss. But it's not really that funny… well, if the same joke is shared with people my own age or position, and comparing the same joke shared with people positioned higher than me… it's different.* (Jet, 28, Mintrack).

This extract suggests that subordinates are expected to respond "*actively*" to a superior's humor, regardless of whether the joke is funny or not. Jet also implies that it is important to consider the relational status differences ("*people positioned higher than me*") in responding to humor interactions at work. Jet's response indicates that his responses to humor are dependent on relational aspects determined by hierarchical differences and that he will force laughter to please his boss. Therefore Jet potentially sacrifices his own PWB in ensuring that his boss saves face, potentially increasing the boss' PWB, through having his joke seem successful (invoking laughter).

Participants emphasized ambiguity in determining their relational status with others, especially when sharing humor. For example, Jet is uncertain whether it is age or hierarchical position of the superior that influences his response to his CEO's humor:

> *I think it's because he is the CEO. CEOs are difficult you know, since I'm just a low-level employee. But then again, it might be the age difference… he is much, much older than me. I think it's the age.* (Jet, 28, Mintrack)

Jet's confusion about organizational position or age determining his humor response may arise from the traditional Korean seniority system where age and hierarchical status are linked in organizational status. In this company the seniority system operates in a manner whereby organizational tenure, age and position are parallel, that is, senior roles are held by those with the longest tenure—who are also older. Therefore, social interaction by employees is influenced by parallel effects that consider age, organizational position, and tenure which guide responses to everyday interactions such as joking. In other words, respect is given for age, tenure, and role and this influences subordinates' response to humor. Any response other than polite laughter might be considered disrespectful. Jet has prioritized his interpersonal work relationship which may increase his PWB (Johnson et al., 2018) but at the same time the dissonance experienced in faking laugher and humor may diminish his PWB (Sosik et al., 2017).

While Jet adjusts his humor reaction in accordance with organizational hierarchy, Larimar, a manager, emphasizes the importance of age-based (societal) hierarchy when engaging in humor with other organizational members:

> *Young people these days don't like old-fashioned stuff. When I'm with young ones, I have to adjust to their interests. But when I'm with my own age group, I can joke about the concerns that we have at our age.* (Larimar, 55, Manager Mintrack).

Larimar's comment suggests difficulties in intergenerational communication and emphasizes that colleagues in the same age group have similar concerns but when he interacts with younger employees, he makes adjustments. This highlights that workers of different ages are may find it more difficult to share humor successfully. However, there are no clear divisions demarking

"young" and "old" groups which makes age-related interactions ambiguous and complicates humor between those in different age demographics. According to Larimar his humor with others in his age group is successful as he can joke about "age concerns" but he perceives difficulties when sharing humor with "*young people*."

While it is difficult for subordinate employees to differentiate between age-based and role-based effects on their humor response, managers see humor exchanges as helpful in maintaining hierarchical roles:

> *I would joke around and be nice to the factory workers, people around my age. It helps me to be closer, like friends. When they slack off, I also joke to put them into shape. I am the senior manager, so I need to do what I need to do*. (Jasper, 47, Manager, Wisepath).

Jasper suggests that he uses humor to perform the role of both friend and manager in the workplace. He perceives his own humor to enhance relationship-building but at the same time he believes that he uses humor as a corrective [see Butler (2015)] designed to—"*put them into shape*." Thus, Jasper balances dichotomous roles by using humor as he aspires to be friends and boss simultaneously. It seems that this is a useful strategy for enhancing his own PWB as he feels more comfortable managing through humor. We cannot here get a sense of his employee's responses but even if they respond with laughter, as done by Jet (above), this could be through respect for his role rather than actual friendship and similar to Jet, his subordinates may experience dissonance that impacts their PWB. The ambiguity of humor and responses to humor may help managers to both "manage" and "be friends" by mitigating the tension that occurs when there are status differences between workers. However, managing factory workers of a similar age to himself compels Jasper to treat subordinates notionally as "*friends*" while maintaining control over performance. Humor gives him a vehicle to achieve both simultaneously—at least in his own perception.

In this theme it appears that humor can mitigate hierarchical differences and display friendship but what seems more compelling in these Korean organizations is that humor serves to *emphasize* hierarchical imbalances. Humor is used as a corrective to shape behavior and humor must be respectfully accepted, acknowledged, and responded to appropriately by subordinates compelled to laugh at the bosses' jokes. Our discussion will debate the impact on PWB from these conflicting influences.

Language and Hidden Meanings

Our participants indicated that they took care with language use in humor interactions. Interview participants stressed the need to maintain politeness within Korean society and this extended to workplaces. These participants emphasize politeness and respect, even in humor:

> *When it comes to communicating with a superior, you need to be careful. In Korea, you need to respect elderly people. Be polite. Things like that are considered important. And I agree… so I do things carefully. Including humor.* (Emerald, 28, Mintrack).
> *Traditionally we emphasize ourselves as people from the "Eastern nation of politeness." Thing like… respecting your elders are so important in Korea. So, I think this would influence (humor) quite a bit.* (Citrine, 33, Mintrack).

Emerald implies that humor all communication with "superiors" need to be constructed carefully, and humor may be considered disrespectful when it is exchanged with an older person. Citrine links politeness and respect to Korean cultural norms and notes the influence of such norms on humor. Her phrase "*Eastern nation of politeness*" suggests she values Korean culture and highlights that respect and politeness toward elders are culturally significant. Therefore the positive release/relief effects that can be generated through shared humor are not available to these workers who must be constrained and careful that their humor maintains the harmony and respect required in their workplaces. Again this seems to indicate a dichotomous impact upon PWB, both enhancing it through relationally appropriate behavior that is harmonious, while reducing PWB through caution, constraint and the anxiety of possibly being impolite.

We also note differences from Western cultures. Nearly half of our interview participants felt that *politeness norms* created a boundary to humor and that the notion of *politeness* had a strong influence on everyday behavior. Park (1993) identified *rules of politeness* as a Korean societal norm and our study shows this cultural norm permeating behavior and humor at all hierarchical levels. As politeness is so strongly endorsed societally, workplace humor interactions become risky as they may contravene rules of politeness and be perceived as impolite - especially when enacted by someone in a subordinate role, creating anxiety and tension around humor reactions and experiences for subordinate workers.

While most of our participants emphasize that politeness considerations should supersede humor, the use of honorifics in humor appeared to generate varied interpretations. Linguistically, honorifics is a form of indirect language in Korean society that helps to maintain politeness (Brown, 2011; Brown et al., 2014). A few participants suggested that humor may still be considered polite but only if honorifics were fully used:

> *There's a formality, or a hierarchical system that needs to be maintained here… It was my first time to drink with company people […] I called everyone unni (older sister) and obba (older brother) instead of using their organizational positions to address them […] Senior managers didn't like the way I was joking around, not using honorifics and stuff.*
> (Aquamarine, 20, Truscene).

Aquamarine suggests that senior managers did not approve of her joking and it seems that the lack of "*honorifics*" was part of their disapproval. While honorific use is expected for subordinate employees, managers are permitted to joke and tease without using honorifics which demonstrates differing degrees of autonomy in using humor depending upon hierarchical status.

Although using honorifics is seen as an indicator of politeness especially when used by subordinate employees, it does not always convey politeness. The following (observed) interaction shows honorifics may in fact be used in an *impolite* way in a humorous interaction. This linguistically polite (full use of

honorifics and titles) humor interaction actually delivers a very pointed barb:

> *Moonstone stands up from his chair, and starts to pack up his items from his work desk. He holds onto two neatly folded shirts (uniform), turns around, and bows to other workers in the office.*
> *Moonstone: Thank you all for taking care of me for the last one month. I'm sorry to leave at such short notice, but I really appreciate the time I have spent here, and I will definitely cherish all of what I have learned from here. Thank you.*
> *Moonstone bows his head deeply. Onyx and Bronze stand slowly, look at Moonstone frowning.*
> *Onyx: Hey Bronze, look, our sir "young and rich soon to be CEO" (of a different company) is holding onto our uniform. I hope he's returning it, because our small company needs that shirt back!*
> *Bronze: (laughs)*
> *Onyx: Right, sir? You're giving that back I hope?*
> *Moonstone stops for a moment, and puts down the shirts on the desk.*
> (Truscene, April 04: Observation notes).

Moonstone is a new employee who is leaving the company after only 1 month. Onyx, a senior manager, is not happy with Moonstone's decision, and uses humor with full honorifics to address Moonstone ("*right, sir*?"). Onyx usually uses casual language (no honorifics or formal titles) to address his subordinates. Therefore, using full honorifics toward Moonstone who is hierarchically beneath Onyx (in both organizational position and age) is incongruous and sarcastically humorous. The use of honorifics in Onyx's humor implies that Moonstone is not a colleague anymore, but an outsider. On the surface, the use of honorifics may seem to maintain a certain level of societal politeness. However, the conversation between Onyx and Bronze creates a form of double-incongruity through humor and honorifics, in order to deliver the message that Moonstone is now an outsider, and show that relationships have changed. While Onyx may have achieved some relief from his disapproval through his barbed jokes, it is likely that they have negatively impacted Moonstone- but in his subordinate role he simply bows politely.

Honorific use maintains common politeness that is important to the vertical Korean societal structure (Yoon, 2004; Brown et al., 2014). Honorifics clearly denote age differences and hierarchical differences in the workplace. Therefore, humor that does not include honorifics may be risky for these subordinate employees bound by this societal/ workplace convention. However, managers are not bound to use honorifics with those beneath them and so they may instigate a freer form of humor with their subordinates. Honorifics may be incorporated into humor and used to emphasize a humorous point, but sarcastic use of honorifics would also seem to be only a prerogative of senior managers.

Saving Face

According to participants humor may help to redefine roles and save "face" (known as "*chemyon*"). This *chemyon* theme is strongly apparent in our observation data. Across all three participating companies, 34 observed instances of humor were recorded where humor was used to save face. However, the number of interview responses regarding this topic was much lower because participants seem to consider discussing an exposure of their "shameful" moments too painful. Thus, this theme analyses mostly observational interactions with a few interview extracts in support.

Spinel teases Ivory who is hierarchically below him based on organizational position and age:

> *Spinel stands up from his desk, bending his body forward as if to see Ivory better. Other members (Diamond, Emerald, and Sapphire) are whispering to each other in a joking way, pointing their fingers at Ivory, laughing at her. Ivory covers her fringe with both her hands, while seated at her desk.*
> *Ivory: My fringe was chopped by a weirdo hairdresser yesterday. I need to get it fixed up.*
> *Spinel: It looks stupid. You look really stupid.*
> *Diamond: Yeah you look really stupid.*
> *Emerald: Sorry, you kind of look stupid.*
> *Ivory makes a sad expression, making eye contact with each of the others as they comment about her hair. Her gaze stops at Spinel.*
> *Spinel smirks and shrugs his shoulders.*
> *Spinel: I told you to think twice then three times (before getting the haircut) if needed.*
> *He laughs for a long time and points his index finger at his own fringe.*
> *Spinel: But then again, it's not all too… yes it is too bad.*
> *Ivory covers her face with her hands and makes a crying sound.*
> (Mintrack, May 12: Observation notes).

The interaction shows humor that is used to undermine another person or to reinforce their lower status. In his interview Spinel (the manager) further revealed:

> *I can only joke well when there is a suitable target. My style of humor is really about picking on others, so when there is a target that can be smashed and go under (me) the situation works out well.* (Spinel, 31, Mintrack).

Spinel reveals his feeling of superiority ["*a target that can be smashed and go under (me)*"], suggesting that he considers his humor successful when it heightens his own social position, at the victim's expense. His role as manager gives him autonomy that allows him to openly denigrate Ivory ("*you look really stupid*") as she is lower in the hierarchy. His power is unchallenged in his put-down jokes and the other employees mimic his words to reinforce and escalate the joke until Ivory signals defeat by making a *"crying sound*." Her participation in the joke by pretending to cry, saves face as she is forced to play along and participate in the joke at her own expense but such humiliation and barbed humor surely impacts her PWB although she gamely plays along with the joke as expected.

Humor may also be used to maintain *chemyon* when a person feels ashamed. Observation incidents captured both verbatim conversations and some body language of organizational participants. Humor may mask or hide or ignore embarrassing moments or workplace mistakes. This observation includes three female workers from Mintrack (Citrine, Emerald, and Ivory), spending their lunchtime drawing pictures:

> *Ivory spills the contents from her large pencil case, picking up a small, silver color craft knife. She turns around to Citrine, who is busy drawing her own picture, and offers to sharpen Citrine's pencil with the knife. As Citrine passes the pencil to Ivory, Ivory blurts out quite loudly:*
> *"I'm good at sharpening pencils, I'm good at sharpening pencils!"*
> *Ivory slices away the wooden pieces from the pencil on a paper positioned on her lap, but the sharpened pencil is not "sharp," but rather bulky. Citrine grabs her pencil from Ivory and starts to sharpen it again herself. Ivory stares at Citrine.*
> *Ivory: (Whispers) Oh my gosh, I better practice my pencil sharpening skills to seduce your hearts!*
> *Both Citrine and Emerald do not respond to Ivory's comment. Ivory smiles, faces down, and starts to pick on her fingers.* (Mintrack, April 17: Observation notes).

Ivory attempts to cope with her embarrassment/shame by using hyperbolic humor *("I better practice my pencil sharpening skills to seduce your hearts"*). It appears that Ivory uses humor to reduce the embarrassment she feels in failing to sharpen the pencil. She considers this situation to be shameful, as she fails in accomplishing a task which she has confidently announced to her seniors. Ivory's body language also indicates that she feels shame as she maintains her smile but bows her head and nervously picks her fingers. When questioned afterwards Ivory tersely stated that "*it was embarrassing*" and refused to respond further. It seems that her humorous remark—"*seducing your hearts*" was intended to divert her colleague's attention away from her "shame," using humor to save face. Her unwillingness to talk about this embarrassment leaves us not knowing whether her face-saving humor was successful in releasing her painful feelings.

Humor is used to save face in these Korean workplace interactions. We see this through participants making a hyperbolic humorous comments to cover embarrassment, and playing along within a barbed joke about a new haircut. Although we achieved some follow-up interviews to these incidents it was confronting for our Korean participants to discuss these interactions as they indicated that they experienced shame that made them uncomfortable. Interviews did elicit some harsh comments from one manager who openly declared his objective of "smashing" and "picking on" his subordinates, deliberately shaming them through targeted "humor." These hierarchical dynamics of the "shamer" and the "shamed" will be explored relation to PWB in the subsequent discussion.

DISCUSSION

The constructive effect of humor has been emphasized in many past studies, especially with regards to its positive emotional, relational, and communicational influences [see Alden et al. (1993), Holmes (2000), and Martin (2004)]. Humor is a contextual phenomenon that is perceived differently in different cultural contexts. Humor may be approached differently in Western and Eastern contexts and Confucian-based cultures may not favor humor in social interactions (Yue et al., 2016). Korean society embeds strong Confucian values, and organizations reflect such societal ideas in forms of organizational hierarchy (Rowley and Bae, 2003). Our data corroborates prior studies finding that humor does occur in Korean organizations (Kim and Lee, 2009; Jung, 2014) but we contribute new ideas to the limited research in showing how humor in Korean organizations is constrained by Confucian values of hierarchy and respect with conflicting influences on PWB.

We argue that most humor in these Korean workplaces is instigated by those with superior hierarchical status (managers) determined by role, tenure and age. Our participants showed that humor is enacted according to the relational hierarchy of the communicators, where superiors had more freedom to use humor, while subordinates considered humor to be risky or potentially impolite. Building on earlier research (Smith and Powell, 1988) we show how hierarchical differences between organizational members influences how humor is enacted. We argue that humor is riskier and potentially more damaging for subordinate employees who may consider humor to be inappropriate, as Confucian values teach people to behave seriously, formally (King and Bond, 1985), and show obedience (Lim, 1999). We argue that this may even compel subordinate employees to feign amusement to managers' humor.

Our younger, subordinate participants emphasized the cultural value of politeness and perceived humor as a potentially impolite behavior in their workplace and somewhat risky for them. However, when the humor is top-down and instigated by a manager, then politeness norms influence a subordinate employee to at least appear to appreciate manager's humor and display an expected response such as laughter or a smile- even if they are not amused. In applying Ryff's (1989) dimensions to our data it appears that the dimensions of autonomy and positive relations with others are seminal to the PWB of workers in our studies companies. Autonomy in humor seems to reside firmly with managers and those with superior status can joke freely and even make barbed jokes at the expense of their subordinates. While this may increase PWB for the managers offering them a release through joking and allowing them to alleviate their feelings and stress, it does not appear to have a comparable benefit for the subordinate employees. They lack autonomy in humor exchanges and therefore their responses are governed by the workplace politeness rules that see them laughing at jokes at their own expense, or forcing laughter at jokes that they do not find funny. Therefore the humor here may reduce PWB for those in subordinate positions as their autonomy is highly constrained by politeness norms and therefore both their response to humor and their creation of humor is governed by norms of polite behavior [see Kadar and Spencer-Oatey (2016)].

In one of our observations we saw a senior manager use honorifics in his joke to redefine his relationship with a soon-to-be exiting subordinate. The importance of honorifics used in everyday work conversations (including humor interactions) are linked to linguistic politeness in Japanese and Korean societies (Shibamoto-Smith, 2011; Brown et al., 2014). Zajdman (1995) identified that joking may be used to promote distance. In our example, honorifics were employed as a distancing mechanism rather than a signal of politeness and although framed in humor, the sarcastic honorifics signified that the subordinate was now an "outsider." Therefore, honorifics may not always serve as polite behavior, but can be face-threatening

in targeted humor that redefines workplace relationships. While this may have again, offered the manager a way to release his feelings about the departure of his employee that may have increased his PWB, he may have simultaneously embarrassed and distressed the leaving employee, at the expense of the subordinate's PWB.

Much of the humor we encountered served to save face (chemyon) and we saw humor used to disguise mistakes, offset embarrassment and redirect a joke's target. An early study identified that Japanese people experienced mistakes and predicaments as shame (Imahori and Cupach, 1994) and our respondents indicated that in some of these humor interactions they felt shame. Shame is a self-conscious emotion that can signal when a person has violated moral standards or social norms of their (work) group. Shame can include self-criticism and ruminative thoughts, increasing the need for emotional support and can adversely affect psychological well-being (Kiffin-Petersen, 2018). The concept of *shame* is linked to chemyon, with our participants articulating their shame and embarrassment even for minor mistakes. Humor helped some to try and mitigate and save face after "shameful" mistakes but somewhat disturbingly, a manager openly declared that he used humor to shame and "pick on" his subordinates, potentially causing them distress and embarrassment.

Saving face through humor is strongly linked to hierarchical dynamics and relationships as lower level employees sought to placate senior managers, senior managers sought to take back their superior position, and even used humor to denigrate and belittle subordinates while re-establishing dominance and their superior position. In contrast to Western literature that argues that humor can be used by subordinates to safely challenge managers' directives (Holmes and Marra, 2002; Plester and Orams, 2008), we found that subordinate Korean employees were tightly bound by politeness rules that constrained humor use toward their higher level managers, making humor instigation too risky for most lower level workers. However, the same politeness dynamic dictated a polite response to humor instigated by a senior manager and amusement had to be displayed by subordinates—even if feigned. In Western organizations the liberating freedom and momentary escape enjoyed by jokes at authority seems a release not afforded to all of their Korean counterparts, and some of our examples indicated that our Korean participants were aware of these East-West differences. Therefore the maintenance of positive relationships important to improved PWB guided these workers' humor responses. Relational harmony superseded the notion of autonomy, also significant to PWB (Ryff, 1989), in how humor was enacted in these workplaces.

Korean organizational contexts are highly complex due to the hierarchical relationship structure and the use of honorifics, which convey hidden meanings. We argue that humor interactions help us to understand the important hierarchical relational dynamics that are prioritized in Korean workplaces. Such an understanding identifies some significant implications for workers' PWB as they skillfully navigate complex workplace dynamics and preserve their own and others' psychological well-being.

CONCLUSION AND IMPLICATIONS

This study explores relationships between humor, hierarchy and psychological well-being in Confucian-based Korean workplace contexts. Our findings have implications for both theory and practice. Most significantly, this study offers an original theorization of the significance and prioritization of harmonious relationships over autonomous responses to humor at work. This has implications for PWB and implies that humor can enhance PWB on one dimension whilst simultaneously diminishing a different dimension of PWB. Our study shows that humor used by senior managers may enhance or damage their subordinate's chemyon (face) and we suggest that this may create some significant implications for subordinate employees' equilibrium and well-being. Additionally, managers might consider their impact on employee well-being and frame their humor to be more supportive toward employees. We find that honorifics are implicated in humor interactions with subordinates and they work to establish, maintain and redefine hierarchical workplace relationships.

In terms of practice, we argue that workers must consider key cultural differences in workplace humor that impact on workplace relationships and individual well-being. The actual form of language used to engage in humor (such as honorifics) may not be the most important aspect to consider, but the cultural expectations, relational hierarchy, and the associated and expected responses should be carefully considered in humor interactions. It seems that reactions to humor interactions may be important in maintaining harmonious work relationships and our participants' career progressions, both important to their on-going PWB.

Although not generalizable, our study provides significant insights into worker perspectives and experiences at different hierarchical levels and across different Korean organizations. We call for a wider research agenda into intricate Eastern organizational experiences and argue that studying humor interactions offers rich and novel insights into employee and managerial relational dynamics that contribute to PWB, on-going cultural understandings and theorizations.

DATA AVAILABILITY STATEMENT

The dataset presented in this article are not readily available because of privacy and ethical issues. Requests to access the dataset should be directed to hs-kim@yonsei.ac.kr.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Auckland Human Participants Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR'S NOTE

This article is substantively and empirically distinct from Kim and Plester (2019). Both papers are based on the same data set

(and thus the same number of interviews and observations). However, our two papers provide different interpretations and thus different overall findings. Our first paper focuses on the different dimensions of hierarchy within the studied Korean organizations in relation to humor, especially for those in subordinate positions. This current paper focuses on honorifics, politeness, and "face" in humor. Hierarchy is a part of the context in analyzing these ideas, rather than the main outcome, thus we discuss the implications on PWB for parties involved.

AUTHOR CONTRIBUTIONS

All authors shared the writing of this paper and contributed evenly to the writing and development of the work.

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Effect of Psychological Capital of Volunteers on Volunteering Behavior: The Chained Mediation Role of Perceived Social Support and Volunteer Motivation

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This study explored the role of perceived social support and voluntary motivation in the effect of psychological capital of volunteers on volunteering behavior. A sample of 1,165 volunteers who were registered in the China Voluntary Service Information System was investigated using a self-reported questionnaire, showing that the psychological capital, perceived social support, voluntary motivation, and volunteering behavior of the volunteers were significantly and positively related to each other. The psychological capital of the volunteers affected volunteering behavior not only directly, but also indirectly through the mediating role of voluntary motivation. Moreover, perceived social support and voluntary motivation also played a chain role in the relationship between the psychological capital and volunteering behavior of the volunteers. Therefore, increasing the psychological capital of the volunteers should promote their perceived social support and inspire voluntary motivation, in turn affecting their volunteering behavior.

Keywords: volunteer, psychological capital, perceived social support, voluntary motivation, volunteering behavior

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INTRODUCTION

Volunteers are defined as members of organized groups who engage in social public service activities without remuneration or publicity. Musick and Wilson (2003) believe that the scale and service effectiveness of volunteer organizations can be regarded as a barometer of social health. In fact, volunteering behavior not only holds great economic benefit for a country, but also brings warmth, love, and well-being to the people (Stukas et al., 2016). Previous studies have shown that the effectiveness of volunteer service is often closely related to the positive mental quality of the volunteers (Li and Zhou, 2017; Xu et al., 2020). Actually, to promote and strengthen volunteer service, it is essential to explore the positive mental quality and volunteering behavior of the volunteers. Moreover, the core element of promoting and strengthening voluntary service is the mental health of people, especially the mental state and quality of volunteers, which plays an important role in the generation and development of their volunteering behaviors, and the core content of the mental state and quality of volunteers is the psychological capital of volunteers. Most studies of voluntary service have focused on the macro level of volunteer

function and motivation (Pauline and Pauline, 2009; Arbak and Villeval, 2013; Dickson et al., 2013, 2015; Li L. et al., 2016), voluntary management and incentive (Prestby et al., 1990; King, 2018; Gong and Li, 2019), values and volunteerism (Johnson et al., 1998; Song et al., 2016), and leisure perspectives (Green and Chalip, 2004). Moreover, the research on volunteering behavior at present also focuses on physical, social, and cultural capital (Xu et al., 2020). However, previous research on the psychological analysis of the mechanism, whereby they influence volunteering behavior, has been relatively rare. Moreover, there have been very few studies on volunteering behavior from the perspective of psychological capital. Studies have reported that psychological capital goes far beyond physical, social, and cultural capital, showing how the positive psychological state in individual development affects individual cognition and behavior, and brings unexpected help to work and life of the individual (Luthans and Youssef, 2004; Luthans et al., 2007).

According to the conservation of resources theory, positive psychological quality, helpful social support, and contextual factors are considered to be valuable resources (Hobfoll and London, 1986; Hobfoll, 1989), and the tendency of individuals to try to conserve resources is one of the key factors to explain changes in individual psychology and behavior (Halbesleben et al., 2014). Individuals with abundant resources may have more enthusiasm and energy to drive them to have more positive behaviors (Hobfoll, 2011; Hobfoll et al., 2018). Moreover, previous studies have found that perceived social support plays an important role in protection from depression, releasing work-related stress, improving mental health, and enhancing well-being (Guerette and Smedema, 2011; Gariépy et al., 2016; Chen et al., 2020; Jung and Baek, 2020; Lecca et al., 2020). These studies provided a theoretical reference to reveal the impact of perceived social support on voluntary behavior. Additionally, self-determination theory holds that the causal orientation of an individual and social environment work together to promote the internalization of internal motivation and external motivation by satisfying the three psychological needs of an individual, namely: autonomy, relationship, and competence, and ultimately change the behavior of the individual (Deci and Ryan, 2000). This provides a theoretical support for revealing the influence of voluntary motivation on voluntary behavior.

Therefore, in the process of the occurrence, development, and formation of volunteering behavior, changes in mental quality, emotion, and cognition of volunteers caused by psychological resources such as psychological capital, voluntary motivation, and perceived social support, might be more closely related to volunteering behavior. However, how does the psychological capital of volunteers affect their volunteering behavior? What is the mechanism? These questions await further research. Although Li and Zhou (2017) mentioned a relationship between psychological capital (PsyCap) and altruistic behavior, the dimensions of their psychological capital follow the structure of an ordinary individual psychological capital. Therefore, based on conservation of resources theory and self-determination theory, this study introduces two elements of perceived social support and voluntary motivation to explore the mediating path between them, thus revealing the "black box" of the influence of psychological capital of volunteers on the volunteering behavior and its mechanism, which provides a new theoretical perspective to enrich the application of psychological capital, while broadening research on the sustainable development of volunteering behavior.

THEORY AND HYPOTHESIS

The Positive Predictive Effect of the Psychological Capital of Volunteers on Volunteering Behavior

Psychological capital, as a comprehensive mental resource, is a positive mental quality and state in the process of individual growth and development that can promote positive cognition, attitude, and behavior of an individual (Luthans et al., 2004). Meanwhile, self-efficacy, optimism, hope, and resilience are considered the structural dimensions of general individual psychological capital (Luthans and Youssef, 2004; Luthans et al., 2007). The conservation of resources theory holds that psychological capital is also a type of psychological resource that helps to strengthen more positive behaviors (Hobfoll et al., 2018; Xu et al., 2020). However, there have been few reports on research in the psychological capital of volunteers. As a special group, volunteers have distinctive characteristics regarding the structural dimension of their psychological capital. In a previous study, we stated that the psychological capital of volunteers, which refers to the positive mental quality or state of volunteers in the process of volunteering, determines whether individuals continue to participate in voluntary activities and perform volunteering effectively; it includes the five dimensions of self-efficacy, sense of responsibility, gratitude, resilience, and hope (Xu and Han, 2020). In addition, there have been very few reports on the relationship between the psychological capital of volunteers and volunteering behavior in the past. However, research on the relationship between psychological capital and altruistic behavior (Gholampour and Mohammad, 2017; Li and Zhou, 2017), service behavior (Cheng et al., 2018), and organizational citizenship behavior (Avey et al., 2010; Harms and Luthans, 2012) has shown that high-level psychological capital is significant for the emergence and development of altruistic behavior, service behavior, and organizational citizenship behavior. These studies provide a theoretical reference for how the psychological capital of volunteers can effectively stimulate or promote the generation, stability, and development of volunteering behavior. Thus, this study proposes that the PsyCap of volunteers would have a positive predictive effect on volunteering behavior (Hypothesis 1).

Mediating the Effect of Perceived Social Support of the Volunteers

Perceived social support emphasizes the social support of self-understanding and self-feeling of individuals, which refers to three dimensions including perceived social support from family, friends, and others (Blumenthal et al., 1987). It is not imaginary but a perception of objective support from the external

environment (Thoits, 1983), and it is an important aspect of social support (Blumenthal et al., 1987). Besides, as an element of individual cognition, perceived social support is also the cognitive assessment of an individual that reflects a reliable relationship with others (Barrera, 1986). The theory of positive psychology posits that psychological capital is a psychological state or quality that can promote the positive cognition and action tendencies of individuals (Luthans et al., 2007; Avey et al., 2011; Zhu and Wang, 2011). Previous studies have found that the psychological capital of college students has a positive predictive effect on perceived social support (Jiankun et al., 2018). Besides, psychological capital, as a positive psychological quality or state, is usually manifested as positive cognition, rational attribution, strong antifrustration ability, and so on (Luthans et al., 2004), and can thus enhance the strong perception of support from friends, family, and society of the individuals (Jiankun et al., 2018). Moreover, perceived social support as a subjective support may be more meaningful than actual support. Because although subjective support is not objective reality, "the perceived reality is the psychological reality, and it is the psychological reality as the actual (mediating variable) variable that affects human behavior and development" (Thoits, 1983). In other words, perceived social support can also effectively predict individuals' behavior. Meanwhile, according to the theory of resource preservation, perceived social support is considered as another psychological resource, which can promote the occurrence of individual behavior (Hobfoll, 1989). It can be seen from the above that improving the psychological capital of volunteers helps to enhance the perceived social support of individuals, thereby contributing to the development of individual volunteer behavior. Taken together, based on these findings, this study proposes that perceived social support would play a mediating role on the impact of psychological capital on the volunteering behavior of volunteers (Hypothesis 2).

Mediating Effect of Voluntary Motivation of Volunteers

Voluntary motivation is linked to an internal psychological process and behavioral dynamics that motivates individuals to participate in voluntary service, and the maintenance of sustainable volunteering behavior (Omoto and Snyder, 1995). In fact, volunteering behavior is also an external manifestation of voluntary motivation (Compton et al., 2004). Previous research has discussed the relationship between voluntary motivation and volunteering behavior more theoretically, resulting in the self-determination theory (Deci and Ryan, 1985), trait model theory (Carlo et al., 2005), the motivational behavior theory (Snyder and Omoto, 2008), system quality of life theory (Shye, 2010), and integrated model theory (Penner, 2010). These theories would reveal the predictive effects of voluntary motivation on the generation, development, and sustainability of volunteering behavior from different perspectives. For example, self-determination theory is the motivation theory of human behavior, which reveals the effective path of external intervention affecting individual motivation, and expounds the process of an external environment promoting internal motivation and the internalization of external motivation and thus changes behavior (Deci and Ryan, 1985). Meanwhile, this intrinsic motivation can help individuals to promote the activation, orientation, maintenance, and development of volunteering behavior (Scheuthle et al., 2005; Snyder and Omoto, 2008; Li C. et al., 2016). Clary et al. (1998) believe that the motivation for individual volunteering behavior includes six aspects, which are as follows: improving the expression of values, professional skills, social interaction, self-enhancement, self-protection, and knowledge understanding. Empirical studies have also confirmed the positive predictive effect of voluntary motivation on volunteering behavior (Shipway et al., 2012; Dickson et al., 2015; Okun et al., 2015). Moreover, psychological capital has a stimulating effect on the improvement of intrinsic motivation of individuals (Siu et al., 2013; Datu et al., 2016). In addition, a study has shown that there are mediating effects of intrinsic motivation in relationships between psychological capital and in-role behavior among cosmetology workers (Kwon, 2018), and another study has shown that there is a mediating effect of internal motivation on the relationship between psychological capital and innovation behavior (Quan and Shen, 2017). Thus, this study also proposes that voluntary motivation would play a mediating role in the impact of the psychological capital on the volunteering behavior of the volunteers (Hypothesis 3).

The Chained Mediating Effect of Perceived Social Support and Voluntary Motivation of Volunteers

This study proposes the mediating effects of perceived social support and voluntary motivation in the relationship between psychological capital and voluntary behavior, respectively. The psychological capital of volunteers, as a positive psychological quality, can be regarded as a mental resource that has predictive effects on individual cognition, attitude, and behavior (Luthans et al., 2007), which can enhance individuals strong perception of support from others (Jiankun et al., 2018). Additionally, according to the conservation of resources theory, resource is defined as that which the individual perceives as being something that helps him achieve his goal (Halbesleben et al., 2014). This definition emphasizes the subjective perception and evaluation of whether specific things are helpful to achieve their goals, and emphasizes that the value of a specific resource depends on the degree to which it matches the current needs or goals of an individual (Halbesleben et al., 2014; Hobfoll et al., 2018). Therefore, perceived social support, as a positive cognition, is influenced by psychological capital (Luthans et al., 2007). Meanwhile, perceived social support is also regarded as a psychological resource that can help individuals to achieve their goals (Halbesleben et al., 2014), which can stimulate the motivation of volunteers, and thus promote the development of volunteer behavior (Omoto and Snyder, 1995). Moreover, previous studies have found the mediating effect of perceived social support in self-efficacy and achievement motivation in secondary vocational students (Ya-Ru et al., 2019). Studies have also found a relationship between the perceived social support and learning motivation in college students, and revealed the

predictive effect of the perceived social support of family, friends, and other important people on the motivation for learning (Tezci et al., 2015). Besides, Horowitz et al. (2001) revealed that an individual with a clear goal actively seeking help is likely to obtain positive results in a good psychological state. This shows that perceived social support has significant effects on behaviors through psychological motivation within individuals. For the above-mentioned reasons, this study proposes that the perceived social support and voluntary motivation of volunteers would play a chained mediating role with the same impact that the psychological capital has on volunteering behavior of the volunteers (Hypothesis 4).

The Present Study

The present study focused on the relationship between the psychological capital and volunteering behavior of the volunteers as well as the chained mediating effect of perceived social support and voluntary motivation. Taken together, based on theory and the hypotheses of the present study, a theoretical model of the chained mediating effect of perceived social support and voluntary motivation was constructed, as shown in **Figure 1**.

MATERIALS AND METHODS

Participants and Procedure

This study was approved by six organizations of social workers and seven universities including Guangdong Teachers College of Foreign Language and Arts, Southern Medical University, Yichun University, Linyi University, Zhuhai Campus of Zunyi Medical University, Guangdong Polytechnic of Industry and Commerce, and the South China University of Technology, which are located in Guangdong, Jiangxi, Shandong, and Guizhou Provinces and in Shanghai, China. My team members and I contacted the leaders of voluntary organization within each unit and randomly distributed about 100–200 questionnaires with their help. All the respondents had volunteer service experience and were taking part in volunteer service training or volunteer work at that time, and the volunteers were recruited by the recruitment notice published on the internet and signed up voluntarily. Participants completed the survey individually on-site after providing their informed consent, all of them were volunteers without any compensation, and the data they filled out were completely anonymous.

A total of 1,600 questionnaires were distributed and 1,204 were collected, and we finally obtained 1,165 valid questionnaires after eliminating 39 questionnaires with incomplete information, with a questionnaire effective rate of 96.8%. The inclusion criterion for the participants was active registration in the CVSIS (China Voluntary Service Information System). All participants served in the community, such as maintaining community order and environment, helping orphans and school-age children, and promoting health knowledge. Participants were 60.4% females (704) and 39.6% males (461), in the age range 16–68 years. In terms of education subjects, there were 19.1% in the liberal arts (223), 25.7% in science and engineering (299), 22.2% in medical science (259), 9.7% in management (113), 4.5% in art (53), and 18.7% in others (218). In addition, 3.4% were civil servants (40), 51.8% college students (603), 16.7% freelancers (195), 20.5% personnel of enterprises and institutions (239), and 7.6% retirees (88).

Measures

Psychological Capital of Volunteers

This questionnaire, based on the psychological capital questionnaire, was developed by Zhang et al. (2010) in accordance with the theory of Luthans et al. (2007). Meanwhile, following the preliminary results of grounded theory (Xu and Han, 2020), four items on responsibility mission (Xu and Li, 2019) and six items on gratitude (Mccullough et al., 2001) were added. Following the basic principle that the data of the exploratory factor analysis and the confirmatory factor analysis of the revised questionnaire cannot overlap or repeat, 552 questionnaires (47.4%) were randomly selected from the total sample for exploratory factor analysis. Confirmatory factor analysis was applied to the remaining 613 questionnaires (52.6%).

This questionnaire includes five dimensions as follows: sense of responsibility, gratitude, self-efficacy, resilience, and hope. The items with loadings <0.3 were deleted, and each dimension finally retained four items. The questionnaire comprises 20 items scored on a 7-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). Sense of responsibility refers to a positive psychological quality of the sense of responsibility of an individual in the pursuit of social values and social responsibilities. This dimension contains four items, such as "It is incumbent upon us to provide help to vulnerable groups." Gratitude refers to the kind of compassion and positive mental state of individuals after receiving the favor of altruistic behavior. This dimension contains four items, such as "I am grateful for being given many wonderful things." Self-efficacy refers to the self-consciousness of the individual that he or she is capable of accomplishing tasks and achieving success. This dimension contains four items, such as "I'm more capable than the average person." Resilience refers to the ability of individual to recover quickly from adversity, frustration, and failure. This dimension contains four items, such as "I can quickly recover from the difficulties." Hope refers to the positive state of achieving the predetermined goal in various ways. This dimension contains four items, such as "I think life is always good." We calculated an average score for each item; the higher the score for each dimension, the higher the level of each factor. The structural validity of the scale was adequate ($\chi^2/df = 3.743$; NFI = 0.858; IFI = 0.892; TLI = 0.874; CFI = 0.891; RMSEA = 0.067). The reliability of this questionnaire is 0.857 in this study.

Perceived Social Support

This study used the perceived social support scale compiled by Blumenthal et al. (1987), and it was translated into Chinese by Jiang et al. (2006). Perceived social support refers to the extent to which an individual perceives social support from family, society, friends, and others. This scale used a 7-point Likert scale and comprised 12 items such as, "My family can help me concretely." (1 = totally disagree, 7 = totally agree). We calculated the average score for each item. The higher the average score, the higher the

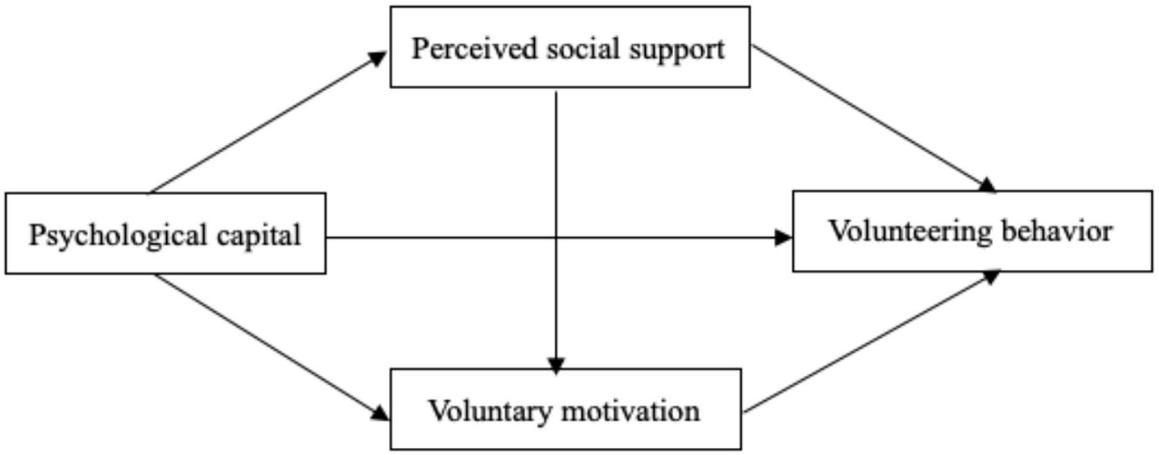

FIGURE 1 | Model of the chained mediating effect of perceived social support and voluntary motivation.

perceived level of social support from others. The reliability of this scale is 0.897 in this study.

Voluntary Motivation

This study used the volunteer function motivation inventory compiled by Clary et al. (1998) and revised by Law et al. (2011) at the Chinese University of Hong Kong, which includes six dimensions, such as: understanding function motivation, enhancement function motivation, protective function motivation, values of function motivation, social function motivation, and career function motivation. This questionnaire consisted of 30 items scored on a 7-point Likert scale ranging from 1 (totally disagree) to 7 (totally agree). Understanding function motivation refers to participating in voluntary activities designed to gain new knowledge and exercise skills. This dimension contains five items, such as "Experience in volunteer activities may be the first step as I like to work." Enhancement function motivation refers to seeking psychological growth and development, such as experiencing self-worth and enhancing self-esteem. This dimension contains five items, such as "Volunteer activities improved my self-esteem." Protective function motivation refers to alleviating negative emotions by participating in volunteer work. This dimension contains five items, such as "I no longer feel lonely after participating in volunteer activities." Values function motivation refers to expressing or practicing personal values such as humanitarianism and altruism. This dimension contains five items, such as "Volunteering makes me feel important." Social function motivation refers to strengthening social connections. This dimension contains five items, such as "Volunteer activities are a way to make new friends." Career function motivation refers to gaining career-related experiences. This dimension contains five items, such as "Volunteer activities provide me with opportunities to explore different careers." We calculated the average score for each item. The higher score for each dimension indicates that the individual perceives a higher level of voluntary motivation. The reliability of this questionnaire is 0.956 in this study.

Volunteering Behavior

The present study used the volunteering behavior questionnaire developed by Carlo et al. (2005). This questionnaire comprises four items. Volunteers were asked whether they had ever volunteered (yes = 1, no = 0), are currently volunteering (yes = 1, no = 0), or planed to volunteer during the next 2 months (yes = 1, no = 0), and the likelihood that they would volunteer in the campus-based community service program if asked (definitely yes = 4, probably yes = 3, maybe = 2, probably no = 1, and definitely no = 0). We calculated an average score for each item by dividing the total score by 4. The final score of this questionnaire varied from 0 to 1.75, where a higher average score denotes a higher tendency to participate in volunteering. The reliability of this questionnaire is 0.762 in this study.

Statistical Analyses

The present study used SPSS24.0 to calculate Cronbach's alpha coefficients, descriptive statistics, and interitem correlations analyses on the 1,165 questionnaires, and adopted Model 6 of the PROCESS procedure for SPSS24.0 (the model assumes that two variables have a chained mediating effect in the relationship between the independent and dependent variables, which is in coincidence with the theoretical model in this study) to carry out the bootstrap inspection of the 95% confidence interval of the mediating effect of perceived social support and voluntary motivation on the effect of the psychological capital of volunteers on volunteering behavior and setting the self-sampling number to 5,000 (Hayes, 2013).

RESULTS

Common Method Deviation Analysis

Haman single-factor analysis method was used to analyze the common deviation method (CMD) of all the valid data in this

TABLE 1 | Means, standard deviations and correlation coefficients of variables.

	M	*SD*	1	2	3
1. Psychological capital	4.89	0.67	—		
2. Perceived social support	5.59	0.92	0.544**	—	
3. Voluntary motivation	5.39	0.84	0.651**	0.606**	—
4. Volunteering behavior	1.38	0.41	0.461**	0.281**	0.384**

*Represents $p < 0.05$; **Represents $p < 0.01$. The same is as following.

study. The results showed that the featuring root value of 11 factors was >1, where the variance of the first was 14.956%, which was smaller than the critical value of 40%. The present study also carried out a confirmatory analysis of the single factor model, and the results showed that the model had fit badly (RMSEA = 0.19, $\chi^2/df = 42.151$, CFI = 0.63, TLI = 0.57), which meant that the CMD of this study was not remarkable.

Preliminary Analysis

The results of the descriptive statistics and correlation analysis are shown in **Table 1**. The results revealed that the psychological capital of the volunteers had a positive correlation with factors such as volunteering behavior, voluntary motivation, and perceived social support. The correlation coefficient was 0.281–0.651 ($p < 0.01$), which showed that it was necessary to further reveal the internal relationship between the elements.

Hypothesis Testing

Previous studies have shown that age, education and profession are important factors that influence volunteering behavior (Musick and Wilson, 2003; Haski-Leventhal et al., 2008) and that women are more likely to volunteer than men (Moore et al., 2014). Therefore, the present study viewed gender, age, education, and profession as the control variables when analyzing the mediating model of joint regulation in the relationship between the psychological capital and volunteering behavior of volunteers. In addition, the study applied centralization treatment to the variable data to avoid multicollinearity between the variables. On this basis, the present study adopted Model 6 of the PROCESS procedure for SPSS24.0 to explore the role of perceived social support and volunteer motivation in the relationship between the psychological capital and volunteering behavior of the volunteers.

The results showed that the total effect of volunteer psychological capital on volunteering behavior was significant ($ß = 0.256$, $p < 0.01$) and can positively predict volunteering behavior ($ß = 0.21$, $p < 0.01$); Hypothesis 1 was thus accepted. Moreover, psychological capital of the volunteers can significantly predict not only perceived social support ($ß = 0.79$, $p < 0.01$), but also voluntary motivation ($ß = 0.55$, $p < 0.01$). Moreover, voluntary motivation can significantly positively predict volunteering behavior ($ß = 0.06$, $p < 0.01$) (see **Table 2**).

The result for the mediation effect showed (see **Table 3** and **Figure 2**) that the bootstrap 95% confidence interval for the mediating effects of perceived social support and voluntary motivation was from 0.166 to 0.253, excluding 0, indicating that perceived social support and voluntary motivation were the mediating variables for the psychological capital of volunteers to influence volunteering behavior, which accounted for 18.4% of the total effect (effect value = 0.256), whereas the direct effect of volunteer psychological capital on volunteering behavior accounted for 81.6% of the total effect; that the indirect effect 1 (effect value = −0.002) was not significant for the path of the mediating effect of psychological capital → perceived social support → volunteering behavior (Hypothesis 2 was rejected); and that the mediating effects of perceived social support and voluntary motivation on the effect of volunteer psychological capital on volunteering behavior were mainly exerted through two paths, namely: indirect effect 2 (effect value = 0.016) mediated psychological capital → voluntary motivation → volunteering behavior (Hypothesis 3 was accepted), and indirect effect 3 (effect value = 0.033) was the chained mediating effect of psychological capital → perceived social support → voluntary motivation → volunteering behavior (Hypothesis 4 was accepted); and that indirect effects 2 and 3 accounted for 6.1% and 13.1% of the total effect, respectively.

DISCUSSION

Correlation analyses reveal that the volunteering behavior of the volunteers has a significant positive correlation with psychological capital, voluntary motivation, and perceived social support, consistent with former studies on the relationships among psychological capital, volunteering behavior (Li and Zhou, 2017; Xu and Han, 2020), motivation (Siu et al., 2013; Ephrem et al., 2021), and perceived social support (Ren and Ji, 2019; Xu et al., 2020). This means that volunteers with higher levels of psychological capital tend to show a higher level of volunteering behavior, perceived social support, and voluntary motivation. Psychological capital is a positive psychological quality or state of an individual in the process of carrying out voluntary activities, and it is the source of motivation for individuals to continue participating in voluntary activities and effectively carry out volunteering behavior (Li and Zhou, 2017; Xu and Han, 2020). Besides, individuals with higher psychological capital tend to have better perception, which can perceive the support from others and from the organization and society (Ren and Ji, 2019; Xu et al., 2020). Moreover, psychological capital, as a positive psychological resource, has the effect of enhancing motivation and replenishing energy (Datu et al., 2016).

On the basis of correlation analyses, this study explores the mediation path between psychological capital and volunteering behavior by introducing two elements, namely, perceived social support and voluntary motivation, and by adopting an integrated approach to reveal the impact of volunteer psychological capital on volunteering behavior, and thus opening the "black box" of its underlying mechanism. It not only helps us to understand how the psychological capital of the volunteers affects the generation, maintenance, and sustainable development of volunteering behavior from the perspective of both conservation of resources theory and self-determination theory, but also helps to integrate

TABLE 2 | Analysis of chained mediation model.

Regression equation		Index of overall fit			Significance of regression coefficient			
Result variable	**Prediction variable**	***R***	R^2	***F***	**ß**	**LLCI**	**ULCI**	***t***
Volunteering behavior		0.50	0.25	75.847**				
	Gender				0.012	−0.030	0.054	0.56
	Age				0.075	0.042	0.107	4.46**
	Profession				0.001	−0.029	0.026	0.03
	education subject				−0.020	−0.047	0.008	−1.40
	psychological capital				0.256	0.223	0.289	15.34**
Perceived social support		0.56	0.32	106.74**				
	Gender				0.17	0.077	0.258	3.63**
	Age				0.14	0.068	0.208	3.85**
	Profession				−0.10	−0.152	−0.049	−3.84**
	education subject				0.03	−0.037	0.081	0.73
	psychological capital				0.785	0.715	0.855	21.97**
Voluntary motivation		0.72	0.52	209.85**				
	Gender				0.01	−0.057	0.081	0.34
	Age				0.04	−0.016	0.092	1.37
	Profession				0.01	−0.034	0.044	0.25
	education subject				−0.06	−0.100	−0.010	−2.40*
	perceived social support				0.327	0.293	0.371	14.62**
	psychological capital				0.553	0.489	0.616	17.06**
Volunteering behavior		0.51	0.25	56.54**				
	Gender				0.01	−0.038	0.051	0.39
	Age				0.07	−0.016	0.092	4.17**
	Profession				0.002	−0.022	0.026	0.15
	education subject				−0.02	−0.044	−0.011	−1.12
	perceived social support				−0.003	−0.032	0.027	−0.17
	voluntary motivation				0.060	0.025	0.096	3.37**
	psychological capital				0.209	0.166	0.253	9.46**

*$p < 0.05$; **$p < 0.01$.

TABLE 3 | Test of mediation effect.

	Indirect effect value	**Boot standard error**	**Boot LLCI**	**Boot ULCI**	**Relative mediation effect%**
Total indirect effect	0.047	0.015	0.018	0.077	18.4
Indirect effect 1	−0.002	0.011	−0.023	0.202	−0.8
Indirect effect 2	0.016	0.006	0.005	0.027	6.1
Indirect effect 3	0.033	0.012	0.011	0.057	13.1

conservation of resources theory and self-determination theory to improve the explanatory power of the mediation effect. The mediating effect analysis shows that voluntary motivation has a significant mediating effect on the psychological capital of the volunteers. Psychological capital, as a positive psychological quality or state, can awaken and stimulate individual voluntary motivation (Luthans et al., 2004). Meanwhile, according to the conservation of resources theory, psychological capital is regarded as a type of psychological resource that can help to strengthen more positive behaviors (Hobfoll et al., 2018; Xu et al., 2020). Moreover, self-determination theory posits that it plays an important role in activating, inducing, directing, and maintaining individual volunteering behavior with clearly defined voluntary service needs and goals (Ryan and Deci, 2000; Li L. et al., 2016). This is consistent with previous findings that voluntary motivation is a proximal factor whereby positive psychological capital affects individual behavior (Horowitz et al., 2001; Xu et al., 2020). Besides, the results of this study show that the indirect effect of perceived social support on the effect of psychological capital of volunteers on individual volunteering behavior is not significant, but that the psychological capital of volunteers is a direct predictor of perceived social support. This shows that there may be other variables between perceived social support and voluntary behavior. In other words, the

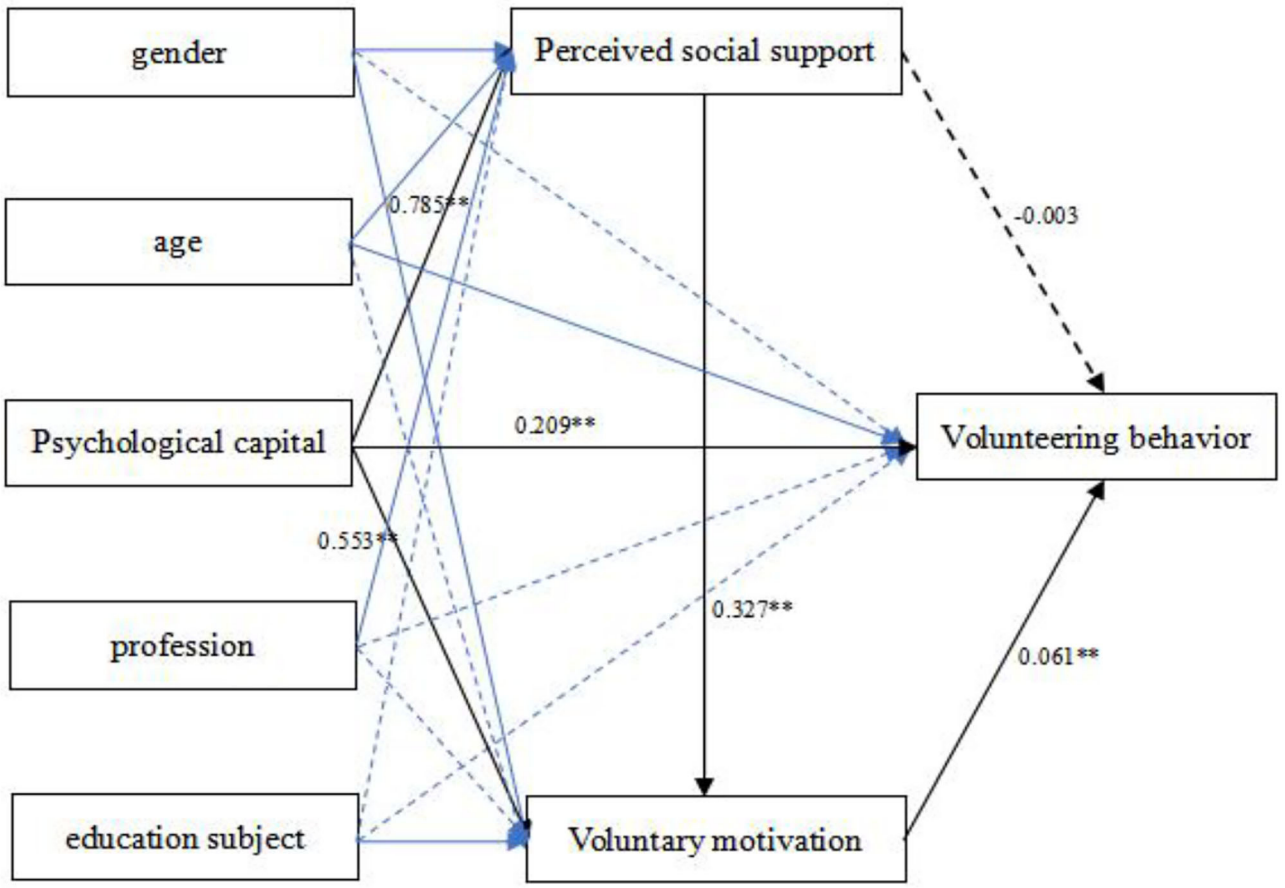

FIGURE 2 | Chained mediation diagram. The solid line in the influence of demographic variables on each factor indicates $p < 0.05$; the dashed line indicates $p > 0.05$. The numbers in the figure indicate the path coefficients. $^{*}p < 0.05$; $^{**}p < 0.01$.

perceived social support of volunteers may have an effect on voluntary behavior through one or several variables. Meanwhile, the reason why the psychological capital of volunteers can positively predict and comprehend social support is related to the fact that psychological capital, as a positive psychological resource, can enhance the ability of individuals to perceive or experience support and help from external environment (Hobfoll et al., 2018; Jiankun et al., 2018).

The present study also finds that the chained mediation of "perceived social support→ voluntary motivation" is an important pathway, whereby the psychological capital of volunteers influences volunteering behavior. Although there have been few direct studies on the effect of perceived social support on voluntary motivation, studies on the relationship between social support and motivation show that it plays a significant positive predictive role in the effect of perceived social support on learning motivation (Bagci, 2018). Perceived social support is a cognition of individuals of being supported, cared for, and helped by family members, society, or organizations through their own networks (Wentzel, 1994), and it is a perception of objective support from the external environment (Thoits, 1983). Voluntary motivation is an inner mental process that is motivated, guided, and maintained by volunteer goals or targets (Compton et al., 2004). Self-determination theory argues that motivation is a state inherent in any individual, but not entirely an internal state. Whether this state is stimulated depends mainly on the dynamic interaction between the individuals and their environment (Ryan et al., 2009). Voluntary motivation is the result of the dynamic interaction between volunteers and their environment. Volunteers often have several needs or goals in the process of interacting with the environment, which require volunteers to effectively adjust themselves to the environment (Myers, 2006). Therefore, voluntary motivation can be regarded as a result of the dynamic interaction between volunteers and their environment. Self-determination theory posits that the formation and development of individual positive goals are inseparable from the common function of the external environment (Deci and Ryan, 2000). The establishment of new goals of the volunteers and the extent of their motivation are influenced by whether the dynamics of their goals and intentions can effectively match their perception of the external support of family, society, or an organization (Muradian Sarache and Rival, 2012). When individuals can become fully perceived of support from families, society, or voluntary organizations,

their voluntary goals and intentions will be further stimulated, promoting the formation, stability, and sustainable development of volunteering behaviors.

This study reveals some of the mechanisms whereby the psychological capital of volunteers affects volunteering behavior by constructing a chained mediation model. The psychological capital of volunteers can predict volunteering behavior through the independent mediation role of voluntary motivation and the chained mediation role of perceived social support and voluntary motivation. The results regarding the independent mediating role of voluntary motivation endorse self-determination theory to some extent. Moreover, the chained intermediary role of perceived social support and voluntary motivation effectively integrates conservation of resources theory and self-determination theory, which is of great value to revealing the combined role of perceived social support and voluntary motivation in the relationship between the psychological capital and volunteering behavior of volunteers. This implies that raising the level of the psychological capital of the volunteers will stimulate their voluntary motivation and further promote volunteering behavior, as well as voluntary goals and intentions, through perceived social-support-enhancing voluntary motivation, thus promoting the formation and development of volunteering behaviors.

Theoretical Contribution

The theoretical contributions of this study mainly include the following three aspects: firstly, the present study reveals the direct effects of psychological capital on perceived social support, voluntary motivation, and voluntary behavior. Individuals with high psychological capital tend to perceive higher levels of support from others and from organizations and society, which contributes to the formation of voluntary motivation, and which in turn translates into voluntary service behavior. This enriches the theoretical research on the effect of psychological capital. Secondly, the present study analyzes the emergence and development of volunteering behavior from the perspective of psychological capital, whereas previous studies mainly analyze it from the perspectives of physical capital, social capital, and human capital. This broadens the analytical perspective of voluntary behavior research. Thirdly, the present study creatively integrates the factors of perceived social support and voluntary motivation into the theoretical model of the influence of volunteer psychological capital on voluntary behavior. It is found that perceived social support and voluntary motivation have the chain mediating effect on the psychological capital of the volunteer to voluntary behavior, which has no report in previous studies.

Limitations and Future Research

There were also some limitations in this study. Firstly, the present study used crosssectional methods only, so this research may be restricted by causal inferences. Therefore, we encourage the use of longitudinal experiments in future studies to draw causal inferences among psychological capital, perceived social support, voluntary motivation, and volunteering behavior. Secondly, this study only discussed how the psychological capital of volunteers predicted volunteering behavior. Previous studies revealed that role identification could play a mediating or moderating role (Callero et al., 1987; Ngan et al., 2011; Li and Zhou, 2017; Song et al., 2018), and perceived social support could be considered as a moderating variable rather than an intermediary variable (Fontanini et al., 2014; Miloseva et al., 2017). It was obvious that previous studies mostly focused on employees, whereas this study focused on volunteers. In addition, we also encourage future research to introduce moderating variables to further discuss how the psychological capital of volunteers affects volunteering behavior. Thirdly, in this study, we did not distinguish the volunteers engaging in different volunteer activities, but discussed them as a whole, which helped us to understand the volunteer group as a whole. There is no doubt that there may be some differences in psychological capital and voluntary motivation of volunteers engaging in different voluntary activities. Therefore, we encourage future research to explore the moderating role of different types of voluntary activities in the relationship between voluntary psychological capital and voluntary behavior. Last but not least, the analysis of the mediating effects in this study have shown that the direct effect of psychological capital on volunteering behavior was much stronger than the indirect effect, suggesting that more attention should be paid to changing and developing the psychological capital of volunteers, while improving the level of the psychological capital of volunteers through certain interventions that would promote volunteering behavior and its sustainable development. It was also enlightening that there might be other important variables in the process whereby volunteer psychological capital affected volunteering behavior. So we suggest that qualitative research should be applied to explore other core elements of the psychological capital of the volunteer and promote the development of volunteering behavior.

CONCLUSION

The psychological capital of volunteers, perceived social support, voluntary motivation, and volunteering behavior were significantly and positively related to each other and voluntary motivation had a significant mediating effect on the psychological capital of volunteers. Moreover, perceived social support and voluntary motivation also had a chain effect on the relationship between the psychological capital and volunteering behavior of the volunteers.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by this study was carried out in accordance

with academic Ethics guidelines, and the recommendations of the Committee of Social Sciences Department of Zunyi Medical University Zhuhai Campus, which also approved the study protocol. All subjects provided written informed consent in accordance with the Declaration of Helsinki. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

LX wrote this manuscript, as well as designed, performed, analyzed, and critically revised the research. JL, YW, and HK searched literature. All authors contributed to the article and approved the submitted version.

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The Resilience Journal: Exploring the Potential of Journal Interventions to Promote Resilience in University Students

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Given the prevalence of mental health issues among university students, they must be regarded as a vulnerable population. Resilience interventions offer one potential means of strengthening students' capacity to overcome academic challenges and external threats. This is all the more urgent in light of the additional difficulties caused by the current COVID-19 pandemic, such as the demands of remote learning. The present study is a first step toward designing and evaluating an appropriate dynamic resilience intervention for students. The design of the *Resilience Journal* intervention draws on insights from expressive writing and positive writing research and focuses on reflection on daily challenges. In this online intervention, 100 business school students (66% female, M_{age} = 23.74) at a German university were randomly assigned to two groups and completed two different versions of the *Resilience Journal* for 5 days. The two versions focused, respectively on broadening attention to challenges and priming attention to mastered challenges. In a pre-post design, two resilience measures and one measure of life satisfaction were used to assess intervention outcomes. Additionally, a newly developed rating scale was used for daily monitoring of dynamic resilience. While both groups showed a significant increase in resilience as measured by the Brief Resilience Scale, that increase could not be attributed directly to the intervention, as there were no group differences, and the design did not include a control group. The other resilience and life satisfaction measures showed no significant change. This first implementation confirms the potential of the *Resilience Journal* and indicates directions for the development of dynamic resilience interventions and measures in future studies. To further study the potential of such a positive psychology intervention, future research necessitates the inclusion of control groups.

Keywords: resilience, university students, journal intervention, online intervention, broaden-and-build theory, well-being, higher education, COVID-19

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INTRODUCTION

Despite the traditional positive view of entering university, many studies have shown that this stage of life poses multiple challenges for students that may increase psychological disturbance (e.g., Fisher and Hood, 1987; Leary and DeRosier, 2012; Hussain et al., 2013). In line with those findings, recent research in Germany revealed that more than 80% of higher education students report

time- and performance-related pressures (Herbst et al., 2016). About 25% reported symptoms of burnout (Grützmacher et al., 2018) while 17.4% said they experienced anxiety, and 15.6% exhibited symptoms of depression (Grützmacher et al., 2018). Compared to their non-university peers, higher education students are more often diagnosed with depressive episodes and affective or anxiety disorders (Techniker Krankenkasse, 2015), as well as higher stress levels than those of working adults in general (Herbst et al., 2016). While mental health problems were already known to be more prevalent among higher education students before the pandemic, there is emerging evidence that the pandemic has created additional risks to their well-being (e.g., Essadek and Rabeyron, 2020; Liu et al., 2020). To that extent, students should be considered a vulnerable population, and ensuring their well-being seems an important organizational goal for universities. However, this creates a dilemma, as universities have a responsibility to challenge students to develop the necessary career competencies, and those challenges cannot simply be reduced to manage the potential impact on well-being.

One possible way of mitigating this dilemma would be to find ways of enhancing students' resilience to enable them to cope with the new and challenging organizational environment they encounter in the university and so maintain their well-being despite facing challenges (e.g., Pidgeon and Keye, 2014; Turner et al., 2017). The building of resilience is based on the neuronal plasticity of the brain; the ability of the brain to be shaped by experiences (Nelson, 1999; Masten, 2001; Curtis and Cicchetti, 2003; Lerner et al., 2012). While this neuronal plasticity can have negative effects on the brain, when confronted with stressful experiences, it also provides the ability to adapt to changes and learn from experiences (e.g., Nelson, 1999; Curtis and Cicchetti, 2003). The ubiquity of relative plasticity across the life span suggests that individuals can adapt successfully and be resilient even later in their lives (e.g., Nelson, 1999; Lerner et al., 2012). According to Tabibnia and Radecki (2018) cognitive and behavioral pathways can influence the neuroplasticity and boost resilience. Despite this important bio-psychological foundations of resilience, other factors such as current experiences, social context, timing of adverse evet(s), and experiences, as well as the developmental history of the individual influence resilience (Curtis and Cicchetti, 2003). Resilience can therefore be seen as a complex multidimensional construct (Luthar et al., 2000). During the transition to university especially the external influences on individual's resilience change. In this phase of live family support often decreases and additional demands for autonomy, self-regulation and academic pressure require adaption (e.g., Fisher and Hood, 1987; Bitsika et al., 2010; Leary and DeRosier, 2012; Houston et al., 2017). Supporting the resilience of university students is particularly important in this phase of life. According to Archana and Singh (2014, 228), "resilience has emerged as one of the most important factors that contribute towards the well-being of students." Existing research suggests that appropriate interventions can increase resilience and well-being among higher education students (e.g., Galante et al., 2018; Hill et al., 2018), reducing stress, anxiety, and depression (e.g., Steinhardt and Dolbier, 2008; Houston et al., 2017; Akeman et al., 2020). Resilience is linked to greater life satisfaction and academic progress, especially for vulnerable students (van Breda, 2018).

Despite the observed positive effects of resilience and resilience interventions, relevant research insights remain limited. Most definitions of resilience refer to the two core concepts of *adversity* and *positive adaptation* (Fletcher and Sarkar, 2013), but there is no gold standard how resilience should be defined or measured (Windle et al., 2011; Calitz, 2018), making it difficult to operationalize resilience and compare scientific results or apply them in practice. This diversity of definitions reflects both the complex multidimensional nature of the construct and the historical development of how resilience is understood (Luthar et al., 2000). While pioneering researchers defined resilience as a stable lifelong trait (e.g., Werner, 1993; Block and Kremen, 1996), subsequent approaches viewed it as a "dynamic process encompassing positive adaptation within the context of significant adversity" (Luthar et al., 2000, 543)–in other words, resilience came to be seen as a changing process rather than a stable trait (e.g., Luthar et al., 2000; Masten, 2001). Today, researchers continue to pursue both of these approaches and multiple definitions are used (e.g., Robertson et al., 2015; Chmitorz et al., 2018a; Joyce et al., 2018; Brewer et al., 2019; Linz et al., 2020). In the field of training and teaching, resilience is more often characterized as a dynamic process (Linz et al., 2020), and the present study adopts this recommendation and the definition proposed by Luthar et al. (2000).

Given these differing definitions, it is unsurprising that intervention researchers employ different scales to measure resilience (e.g., Robertson et al., 2015; Chmitorz et al., 2018a; Joyce et al., 2018; Brewer et al., 2019; Linz et al., 2020). Importantly, these different scales do not measure exactly the same construct (Joyce et al., 2018), and their results must therefore be treated with caution. In particular, the more commonly used scales are not ideal for measuring dynamic resilience processes over shorter time intervals (e.g., daily). In addition, the social distancing regulations associated with the COVID-19 pandemic have created a pressing need for effective online interventions, which remain rare in this context (e.g., Robertson et al., 2015; Joyce et al., 2018; Brewer et al., 2019; Linz et al., 2020).

In light of the known positive outcomes of resilience interventions for higher education students and the existing limitations of resilience research, the present study represents the first step in a larger research project, which aims at understanding, measuring, and fostering resilience as a dynamic process. The goal of this initial study was to assess the potential of a novel online intervention to support university students' resilience and well-being during distance learning. To develop this intervention, we adapted findings from the existing research on writing interventions. Expressive writing interventions are traditionally used to help participants to recover from traumatic events by promoting disclosure, habituation, and desensitization (Wing et al., 2006; Burton and King, 2009). According to Glass et al. (2019), such

interventions are also a very effective means of promoting resilience development.

Beyond the domain of trauma, the growing body of positive psychology interventions include positive writing interventions (Reiter and Wilz, 2016). Although they developed from expressive writing (Wing et al., 2006), positive writing interventions focus on remembering and reflecting on positive experiences and associated positive emotions (Reiter and Wilz, 2016). In particular, diary and journal interventions such as the *Gratitude Journal* (Emmons and McCullough, 2003), where participants regularly record five experiences for which they are grateful, have been widely evaluated. In general, the *Gratitude Journal* is reported to enhance life appraisal and positive affect while reducing negative affect (e.g., Emmons and McCullough, 2003). Among college students this approach has been shown to increase gratitude, life satisfaction, and university adaptation (Işık and Ergüner-Tekinalp, 2017).

Other positive psychology interventions have also confirmed the promising effects of positive writing. For example, Cohn et al. (2009) reported increased resilience among higher education students who reported positive emotions for 28 days. In an evaluation of the *Three Good Things in Life* intervention, which asks participants to write down three things that went well each day, Seligman et al. (2005) showed that this had the strongest long-term effects among different happiness interventions. In a related study, Risch and Wilz (2013) asked participants to write for 4 weeks in a *Resource Journal* about their interpersonal and intrapersonal resources, and this was found to have positive effects on mood and emotion regulation.

These insights highlight the potential of positive writing interventions in non-traumatic contexts. To the best of our knowledge, however, there is as yet no published account of an intervention based on journaling of resilience experiences. Given the reported effects of expressive writing (Glass et al., 2019) and positive writing (Cohn et al., 2009) on resilience, it seems worthwhile to adapt this approach for resilience enhancement. Following Tabibnia and Radecki (2018) journaling can influence the neuroplasticity and resilience *via* the cognitive (i.e., emotion disclosure) and the behavioral pathway (i.e., gratitude). In addition, this method lends itself to online delivery, which has become a critical issue during the COVID-19 pandemic. Both Cohn et al. (2009) and Seligman et al. (2005) delivered their interventions online, and a more recent publication by Kern et al. (2018) reported that a number of web- and app-based positive psychology interventions have employed the journaling method, indicating its suitability for online distance learning delivery.

Despite empirical evidence of the effectiveness of positive writing, the reasons for this remain unclear (Reiter and Wilz, 2016). Some authors have proposed an explanation based on broaden-and-build-theory (e.g., Emmons and McCullough, 2003; Burton and King, 2009). The primary claim of this theory is the *broadening* effect (Conway et al., 2012) of positive emotions on attention and cognition (Fredrickson, 2001). Broadened attention incorporates experiences from one's surroundings that would otherwise have been excluded, and broadened cognition expands one's thinking, cognitive flexibility, and creativity (Conway et al., 2012). According to this theory, broadening attention and cognition triggers momentary thought-action repertoires that can weaken or transform negative emotions to provide resources for coping with adversities.

Based on this theory, Burton and King (2009) proposed that "writing about a positive experience is, itself, a positive experience" (868) that can broaden cognition. In this regard, Fredrickson (2001) theorized that positive emotions foster a positive upward spiral over time, resulting in increased resilience and well-being. Cohn et al.'s (2009) findings support this claim and show that the relationship between positive emotions and life satisfaction (as an indicator of well-being) is fully mediated by the change in resilience. The theoretical assumptions and empirical evidence underpinning broaden-and-build-theory support the view that journaling resilience experiences is likely to increase resilience.

Other authors have proposed underlying mechanisms beyond broaden-and-build-theory. Rather than a general broadening of attention, these explanations suggest that writing interventions direct attention in particular ways. For example, Risch and Wilz (2013) explained the effectiveness of their positive writing intervention in terms of resource priming, and Wing et al. (2006) described positive writing as an opportunity for the writer to gain a sense of mastery. In other words, the priming of resources and abilities may result in their more frequent use, so increasing resilience and well-being.

As mentioned earlier, resilience is typically explained in terms of two core concepts, *adversity* and *positive adaptation* (Fletcher and Sarkar, 2013), which underpin two distinct explanations of the effectiveness of positive writing interventions. While directing attention to resources and mastery emphasizes *positive adaptation* and ways of achieving it, broaden-and-build-theory posits a general broadening of attention and cognition that involves both core concepts. It can be hypothesized that these alternative approaches vary in their effectiveness because they address adversities differently. A design that focuses on adversities may have negative effects if it primes negative emotions, but an intervention that emphasizes disclosure, habituation, and desensitization to adversities may have positive effects (e.g., Wing et al., 2006; Burton and King, 2009).

In sum, journal interventions are a widely used and potentially effective means of increasing resilience. To our knowledge, however, the existing literature does not include an online journal intervention that specifically addresses resilience. The *Resilience Journal* described in this explorative study is grounded in theory and was tested empirically in the vulnerable population of university students. In contrast to existing journal-based studies of resilience (e.g., Cohn et al., 2009), we asked university students to reflect on their resilience-related experiences in a daily writing intervention to explore the influences of this activity. In an attempt to clarify the underlying mechanisms of positive writing, two separate versions of the journal were implemented. While the *Attention Version* adopts broaden-and-build-theory and focuses on a general broadening of attention, and the *Mastery Version* primes attention to resources and abilities. The respective effects on student resilience and well-being were evaluated in terms of the following hypotheses:

H1: University students who complete a daily resilience journal develop greater resilience and well-being over time.

H2: Interventions based on the *Attention Version* and the *Mastery Version* differ in their effects on student resilience and well-being.

MATERIALS AND METHODS

Participants and Recruitment

Students of economic and business education at the University of Mannheim were contacted by email during the 1st week of August 2020. Based on the information provided, 111 students registered and gave informed consent for data collection. Of these, 103 students completed the pre- and post-test. Three students who completed less than half of the daily journals were excluded from the subsequent analysis on grounds of insufficient exposure to the intervention. The final sample included 100 university students between the ages of 19 and 30 years (M = 23.74, SD = 2.44) who were majoring in economic and business education. The participants had completed between 1 and 14 semesters (M = 5.68, SD = 3.32, 47% bachelor, and 53% master), and the gender distribution of 34% males and 66% females was representative of the study program as a whole. Participation was voluntary, but optional course credits could be awarded for participation.

Intervention

To create a journal intervention, we formulated a daily task that involved reflection on daily challenges. Following Emmons and McCullough (2003) and Seligman et al. (2005), the formulation of the *Resilience Journal* drew on insights from the *Gratitude Journal* and the *Three Good Things in Life* interventions. To explore the mechanisms underlying the intervention, two journal versions were formulated.

Based on broaden-and-build-theory, the *Attention Version* was designed to broaden attention to challenging daily experiences (Conway et al., 2012), recording both successes and failures in overcoming those challenges. Theoretical considerations informed the following instruction to participants.

> *Every day, we face many challenges, both small and big, in private and academic contexts. Think back over the past day and enter three challenges that you encountered in the field below. For each challenge, write down what specifically was challenging for you.*

The *Mastery Version* was designed to activate the posited mechanisms of resource priming (Risch and Wilz, 2013) and mastery (Wing et al., 2006). To that end, this version directed the participant's attention to challenges that were successfully mastered, based on the following instruction.

> *Every day, we master many challenges, both small and big, in private and academic contexts. Think back over the past day and enter three challenges that you mastered today in the field below. For each challenge, write down how you mastered it.*

For the purposes of comparison, participants were randomly assigned to one of the two versions, which they completed each day for 5 days.

Measures

Brief Resilience Scale

Originally developed by Smith et al. (2008), the Brief Resilience Scale (BRS) is a six-item scale that measures resilience as the "ability to bounce back" (195), based on items such as "I tend to bounce back quickly after hard times" rated on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). This scale has been recommended for use in resilience research for its validity (Linz et al., 2020). For present purposes, we used the German version (Chmitorz et al., 2018b), which achieved good reliability (Cronbach's alpha 0.85) for a German sample.

Connor-Davidson Resilience Scale

The Connor-Davidson Resilience Scale (CD-RISC) (Connor and Davidson, 2003) comprises 25 items (e.g., ability to adapt to change) measuring resilience on a 5-point Likert scale (0 = *rarely true* to 4 = *true nearly all of the time*). This is the most widely used scale for measuring resilience (e.g., Salisu and Hashim, 2017). For present purposes, we used the German version, which has achieved a high Cronbach's alpha of 0.90 (Sarubin et al., 2015).

Satisfaction With Life Scale

The Satisfaction with Life Scale (SWLS) (Diener et al., 1985) is a self-report assessment of global life satisfaction as an element of subjective well-being. The scale includes five items (e.g., "I am satisfied with my life") rated on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The German version of the SWLS shows very good internal consistency (Cronbach's alpha 0.92) (Glaesmer et al., 2011).

Monitoring of Actual Resilience State

To account for pre-post differences and to evaluate the daily effects of the two journal versions, a third resilience measure was included to detect dynamic changes in resilience from day to day. As no existing resilience measure was appropriate for daily use, we developed a new scale. The *Monitoring of Actual Resilience State* (MARS) scale includes eight items (see **Table 1**) rated on a slider control scale (1 = *strongly disagree* to 100 = *strongly agree*).

Short 10-Item Version of the Big Five Inventory

The short 10-item version of the Big Five Inventory (BFI-10) (Rammstedt and John, 2007) was included as a control measure. BFI-10 measures the Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness); each trait is measured on two items, rated on a 5-point Likert scale (1 = *disagree strongly* to 5 = *agree strongly*). Again, we used the German version, which was also published by Rammstedt and John (2007).

Procedure

A pre-post design was chosen to evaluate the two versions of the *Resilience Journal*. After registering and giving their informed consent, participants completed the pre-test, which

TABLE 1 | Items related to Monitoring of Actual Resilience State (MARS).

MARS Items
Today. . .
(1) I had support when I needed it.
(2) I could rely on myself to overcome challenges.
(3) I did not give up in the face of adversities.
(4) I dealt well with negative emotions.
(5) My actions did not lead to a higher goal.[1]
(6) I had difficulties with recovering from stress.[1]
(7) I should have tried harder to achieve my goals.[1]
(8) I lacked something to overcome challenges.[1]

[1] *reverse items.*

included the BRS, CD-RISC, SWLS, and BFI-10, as well as demographic items (gender, age, study semester, and study program). Using a random number generator, we then assigned participants randomly to one of two groups; Group 1 (n = 50, M_{Age} = 23.90, SD_{Age} = 2.42, and 36% male) were asked to complete the *Attention Version* of the *Resilience Journal* for 5 days while Group 2 (n = 50, M_{Age} = 23.58, SD_{Age} = 2.47, and 32% male) completed the *Mastery Version* of the *Resilience Journal* for the same period. In addition, all participants were asked to complete the MARS scale each day. After 5 days, participants completed the post-test, which measured the same items as the pre-test. At each measurement point, each participant was identified by their individual code, enabling evaluation of individual changes while preserving anonymity.

All measurement scales and the assigned version of the *Resilience Journal* were completed online through the SoSci-Survey program; participants could use any device with internet access. The intervention took place during the COVID-19 pandemic (August 10–14, 2020); pre- and post-tests could be completed up to 3 days before and after the intervention, respectively.

Data Analyses

Mean scores and standard deviations were calculated for all variables as the basis for further analyses. Pre-requirements for hypothesis testing were evaluated, and reliability and correlations were calculated for all dependent variables to assess measurement quality. To assess the effects of the two versions of the *Resilience Journal* intervention, we compared the results of the BRS, CD-RISC, and SWLS as between-group factors in a one-way MANOVA. To test Hypothesis 1, we performed MANOVA and *post hoc* ANOVAs of time effects. To test Hypothesis 2, we examined time x group interactions in the same MANOVA, followed by *post hoc* ANOVAs and discriminant analysis. Additional ANOVAs were computed to assess changes in MARS. The multilevel reliability of MARS was analyzed using Mplus Version 8.6; all other analyses were performed using IBM SPSS Statistics Version 27.0.0.0. A significance level of $\alpha = 0.05$ was used throughout. For multiple testing, the Bonferroni correction was applied.

RESULTS

Pre-requirements

To establish pre-requirements for statistical procedures, we tested for pre-existing group differences and violations of homogeneity of variance and normal distribution. A one-way MANOVA, including all pre-test variables, found no significant group differences ($F(13,83) = 0.440$, $p = 0.950$). Further exploration of the pre-test measures and Day 1 MARS data found no significant differences in between-group t-tests and no significant violation of homogeneity of variance in Levene tests (see **Supplementary Table 1**). No variable exceeded the acceptable skewness of ±2, and only the demographic variables study semester and study program violated kurtosis of ±2 (see **Supplementary Table 1**). Normal distribution of all other variables was accepted.

Measurement scale reliability and validity were assessed by calculating Cronbach's alpha and correlations for all dependent pre-post-variables. BRS, CD-RISC, and SWLS achieved acceptable Cronbach's alpha values ($\alpha > 0.70$; see **Table 2**). All subscales of BFI-10 other than extraversion showed a Cronbach's alpha of less than 0.70. Cronbach's alpha values for the daily MARS ranged from $\alpha = 0.64$ to $\alpha = 0.81$; only Day 3 values fell below 0.70 (see **Table 2**). To take account of the multi-level structure of MARS, an intraclass correlation (ICC) and multi-level reliability were computed. ICC showed a relatively low value of 0.29. Multi-level reliability estimation using CFA as proposed by Geldhof et al. (2014) returned a total reliability of $\alpha = 0.75$, with between-person reliability of $\alpha = 0.79$ and within-person reliability of $\alpha = 0.73$.

All resilience measures (BRS, CD-RISC, and MARS) showed medium-to-low correlations to each other. Correlations of the resilience measures to life satisfaction were positive, and to neuroticism they were negative; both in a medium to low magnitude (**Table 2**).

Hypothesis 1: Effectiveness of the Resilience Journal

The results indicate the significant impact of time point ($F(1,98) = 6.48$, $p = 0.012$, and $\eta^2 = 0.06$) for both groups combined. In *post hoc* analyses, separate one-way ANOVAs were computed for every variable included in the MANOVA (see **Table 3**). BRS results for both groups combined revealed a significant increase over time in resilience ($F(1,98) = 9.91$, $p = 0.002$, and $\eta^2 = 0.092$). There were no mean differences in CD-RISC results, and a *post hoc* one-way ANOVA revealed no significant time effects ($F(1,98) = 0.089$, $p = 0.766$, and $\eta^2 = 0.001$). Mean SWLS values increased slightly from pre- to post-test, but the *post hoc* ANOVA showed that this increase was not significant ($F(1,98) = 1.17$, $p = 0.282$, and $\eta^2 = 0.012$). In the case of MARS, a one-way ANOVA found no significant effect of time ($F(4,86) = 1.23$, $p = 0.31$, and $\eta^2 = 0.054$) at any point.

Hypothesis 2: Effectiveness of Journal Versions

Interactions in MANOVA and *post hoc* ANOVAs were analyzed to identify between-group differences. A one-way MANOVA

TABLE 2 | Pre-post variables: correlations and Cronbach's alpha.

Variable		1a	1b	2a	2b	3a	3b	4c	4d	4e	4f	4g	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	α
(1) BRS	(a) Pre	–																					0.80
	(b) Post	0.70	–																				0.79
(2) CD-RISC	(a) Pre	0.49	0.42	–																			0.83
	(b) Post	0.46	0.40	0.80	–																		0.84
(3) SWLS	(a) Pre	0.31	0.28	0.33	0.23	–																	0.86
	(b) Post	0.31	0.36	0.38	0.35	0.83	–																0.85
(4) MARS	(c) Day 1	0.17	0.09	0.22	0.13	0.39	0.39	–															0.73
	(d) Day 2	0.27	0.27	0.22	0.33	0.19	0.22	0.31	–														0.81
	(e) Day 3	0.18	0.12	0.27	0.26	0.20	0.30	0.26	0.26	–													0.64
	(f) Day 4	0.27	0.25	0.08	0.19	0.27	0.34	0.05	0.25	0.40	–												0.78
	(g) Day 5	0.17	0.32	0.02	0.20	0.24	0.40	0.31	0.28	0.41	0.42	–											0.75
(5) BFI-10 N	(a) Pre	−0.41	−0.40	−0.35	−0.30	−0.15	−0.18	−0.16	−0.17	−0.14	−0.23	−0.15	–										0.57
	(b) Post	−0.49	−0.46	−0.45	−0.57	−0.15	−0.19	−0.06	−0.22	−0.19	−0.29	−0.27	0.64	–									0.50
(6) BFI-10 C	(a) Pre	−0.06	0.01	0.07	−0.03	0.20	0.18	0.29	0.12	0.09	0.11	0.07	−0.08	0.08	–								0.50
	(b) Post	0.06	0.10	0.15	0.18	0.19	0.27	0.21	0.23	0.25	0.21	0.17	−0.04	−0.09	0.73	–							0.39
(7) BFI-10 E	(a) Pre	0.07	0.08	0.06	0.15	0.14	0.14	0.11	0.13	−0.03	0.05	0.06	−0.01	−0.21	0.00	0.09	–						0.77
	(b) Post	0.13	0.19	0.10	0.26	0.09	0.16	0.05	0.12	−0.03	0.10	0.18	−0.17	−0.40	−0.08	0.03	0.87	–					0.85
(8) BFI-10 O	(a) Pre	−0.05	0.02	0.15	0.19	0.16	0.12	0.10	0.19	0.06	0.08	0.09	−0.02	−0.03	0.05	0.09	0.05	0.07	–				0.65
	(b) Post	0.05	0.04	0.23	0.24	0.17	0.14	0.04	0.07	0.15	0.06	0.09	−0.04	−0.14	0.06	0.17	0.14	0.15	0.78	–			0.68
(9) BFI-10 A	(a) Pre	0.04	0.00	0.10	0.09	0.09	0.01	0.19	0.10	−0.06	−0.03	0.13	0.01	0.03	0.09	0.01	0.00	−0.04	0.10	0.05	–		0.17
	(b) Post	0.03	−0.04	0.02	0.07	0.10	0.09	0.21	0.05	−0.02	0.07	0.18	−0.01	0.03	0.08	−0.02	−0.01	−0.04	−0.04	−0.08	0.81	–	0.22

Significant correlations ($p < 0.05$) in black print; (1) BRS, brief resilience scale; (2) CD-RISC, connor-davidson resilience scale; (3) SWLS, satisfaction with life scale; (4) MARS, monitoring of actual resilience state; (5) BFI-10 N, big five inventory 10 – neuroticism; (6) BFI-10 C, big five inventory 10 – conscientiousness; (7) BFI-10 E, big five inventory 10 – extraversion; (8) BFI-10 O, big five inventory 10 – openness; (9) BFI-10 A, big five inventory 10 – agreeableness; (a) Pre, pre-test variable; (b) Post, post-test variable; (c) Day 1, first day of intervention; (d) Day 2, second day of intervention; (e) Day 3, third day of intervention; (f) Day 4, fourth day of intervention; (g) Day 5, fifth day of intervention; and α, Cronbach's alpha.

TABLE 3 | Results of pre-post measures: means, standard deviations, and ANOVA.

Variable	Pre			Post			ANOVA
	MV	AV	Total	MV	AV	Total	
BRS	3.19 (0.76)	3.36 (0.60)	3.27 (0.68)	3.45 (0.75)	3.42 (0.59)	3.44 (0.67)	Time: $F = 9.91^{**}$, $\eta^2 = 0.092$ Interaction: $F = 2.14$, $\eta^2 = 0.037$
CD-RISC	2.89 (0.37)	2.82 (0.39)	2.86 (0.38)	2.86 (0.38)	2.87 (0.38)	2.86 (0.38)	Time: $F = 0.89$, $\eta^2 = 0.001$ Interaction: $F = 3.74$, $\eta^2 = 0.021$
SWLS	5.33 (1.11)	5.37 (0.85)	5.35 (0.98)	5.38 (1.01)	5.44 (0.90)	5.41 (0.96)	Time: $F = 1.17$, $\eta^2 = 0.012$ Interaction: $F = 0.0674$, $\eta^2 = 0.001$

*Standard deviations in parentheses; MV, mastery version of the resilience journal; AV, attention version of resilience journal; Total, both conditions combined; ANOVA, ANOVA results; BRS, brief resilience scale; CD-RISC, connor-davidson resilience scale; SWLS, satisfaction with life scale. **p > 0.01.*

found no significant time x group interaction ($F(1,98) = 0.32$, $p = 0.574$, and $\eta^2 = 0.003$). In the individual *post hoc* analyses, one-way ANOVAs established that BRS time x group interaction was not significant ($F(1,98) = 3.74$, $p = 0.056$, and $\eta^2 = 0.037$). *Post hoc* one-way ANOVAs also found no significant time × group interaction for the CD-RISC ($F(1,98) = 2.14$, $p = 0.147$, and $\eta^2 = 0.021$) and SWLS ($F(1,98) = 0.06$, $p = 0.808$, and $\eta^2 = 0.001$). For all three variables, *post hoc* discriminant analysis revealed no significant discriminant function ($\Lambda = 0.94$, $\chi^2 = 5.43$, $df = 9$, and $p = 0.80$). A one-way ANOVA also showed no significant effect of time x group interaction for MARS ($F(4,86) = 1.52$, $p = 0.20$, and $\eta^2 = 0.066$) (see **Figure 1**).

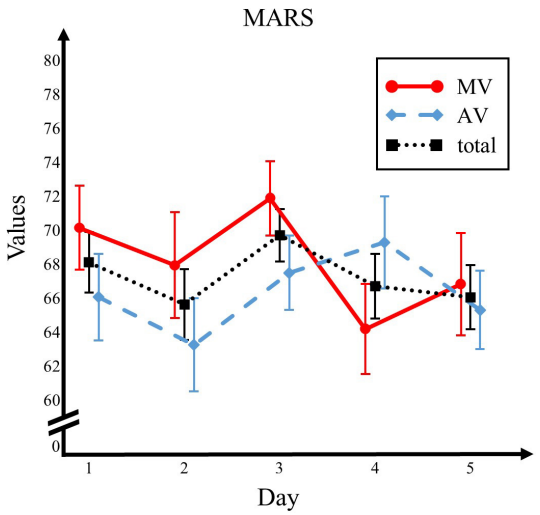

FIGURE 1 | Trends in Monitoring of Actual Resilience State (MARS). MV, mastery version of resilience journal; AV, attention version of resilience journal; Total, both conditions combined.

DISCUSSION

This explorative study represents a first step toward the design and evaluation of an online journal-based intervention addressing daily challenges and resilience experiences. The journaling approach was chosen for its known effectiveness in positive psychology and trauma research, and for its suitability for online delivery. To explore the mechanisms that determine the effectiveness of such interventions, we compared two distinct versions of the journal and accompanying instructions. Unlike existing journal-based studies of resilience, we included a daily writing intervention to explore the influences of university students' reflections on their resilience-related experiences.

In relation to Hypothesis 1, the pre-post MANOVA and ANOVA results revealed a significant increase in resilience as measured by the BRS, but there was no significant increase in the other resilience measures (CD-RISC, MARS). Despite an increase in mean values for life satisfaction, there were no significant effects. In relation to Hypothesis 2, there were no significant differences on any variable between the two versions of the *Resilience Journal*.

Following Ellis (2010), the effect sizes found here can be interpreted as follows. The effects of time on resilience (H1) as measured by BRS were medium and small on SWLS. Only BRS showed a significant increase, although mean SWLS differences were positive in direction. As measured by CD-RISC, there was no time effect for resilience. For time x group interaction (H2), small effects were found for resilience as measured by BRS and CD-RISC. However, these effects were not significant in either case and differed in direction. Mean differences in BRS scores indicate a stronger increase in resilience among those using the *Mastery Version*. Mean CD-RISC scores show a small decrease in resilience among those using the *Mastery Version* while those using the *Attention Version* show a small increase. SWLS results show no effect of time x group interaction on this variable. Although most of the results fell short of significance, the reported effect sizes align with the medium to small effect sizes reported in other resilience and positive psychology interventions in similar contexts (e.g., Davis et al., 2016; Houston et al., 2017; Hill et al., 2018; Akeman et al., 2020; Armenta et al., 2020; Linz et al., 2020).

As measured by BRS, resilience increased significantly from pre- to post-test, but the other resilience measures indicate no such effect. The observed differences and medium-to-low correlations between resilience measures align with Joyce et al.'s (2018) view that the various scales are not measuring the same construct. Despite the increase in BRS values, H1 is not fully supported, as the observed increase refers only to resilience as the ability to bounce back (Smith et al., 2008). The CD-RISC literature reports that the scale measures trait resilience (e.g., Singh and Yu, 2010; Wollny and Jacobs, 2021), which should not change easily, and the absence of any effect on this scale aligns with this theoretical view. The differences in resilience measures highlight that operationalization of resilience solely *via* these scales could be problematic.

The MARS resilience measure was used for the first time in this study, and the findings reflect its non-validated status. According to Nezlek (2017), diary measures are often reported as less reliable than classic trait measures, and evaluation standards should be more relaxed. Nevertheless, MARS was found to offer good reliability at daily level, as all but one measure of internal consistency exceeded a Cronbach's alpha value of 0.70. Multi-level reliability estimation using CFA aligned with this observation, with alpha values above 0.70 for the separate levels and the overall model. The results indicate that between-person reliability was slightly better than within-person (see Geldhof et al., 2014), aligning with low-to-medium re-test correlations and ICC values indicating that only 29% of the variance can be attributed to stable personal attributes. This suggests that the MARS instrument is sufficiently reliable and dynamic to account for daily variations. In relation to construct validity, MARS was correlated with BRS and CD-RISC at a medium-to-low level. This suggests that MARS is similar in some respects but not identical to those more established measures of resilience or associated constructs. Correlations with satisfaction with life and the personality traits of conscientiousness and neuroticism align with earlier research on resilience among university students (e.g., Wilson et al., 2019). This suggests that MARS is useful as a measure of daily dynamic resilience, but further research is needed to clarify how dynamic resilience relates to other operationalizations. All MARS correlations were medium to low; the other scales used here were not based on a dynamic understanding, and the Big Five and CD-RISC are trait measures, which may account for the low-to-medium correlations. The non-significant MARS results call into question whether the scale lacks the necessary construct validity to detect dynamic variations in resilience or whether dynamic resilience did not change significantly within the given timeframe. The non-significant results are also contrary to the significant change detected by BRS. These differences could indicate a lack of convergent validity. In short, further validation is needed to determine whether MARS can adequately detect changes in dynamic resilience and behaves like other resilience scales. Linz et al. (2020) also recommends including biological resilience measures more often in research studies. The relation of neuronal plasticity and resilience provides a biological basis for measuring resilience *via* physiological measures (e.g., Curtis and Cicchetti, 2003). Further evaluation of the validity of MARS and estimating if the time of exposure to the intervention had physiological effects could have provided additional objective insights.

Regarding the non-significant increase in satisfaction with life, it remains unclear whether the intervention had no effect on this variable or whether the interval between pre- and post-test was too short to reveal any such effect. According to Cohn et al. (2009), resilience can contribute to greater life satisfaction, but no such effect was observed here beyond the increase measured by BRS. The absence of a control group prevents attribution of any changes in resilience or life satisfaction solely to the intervention, and other factors may have contributed.

In relation to H2, the results cannot confirm the superiority of either version of the *Resilience Journal*. It is therefore impossible to clarify the underlying mechanism or whether broadening attention is more effective than directing the focus to resources and abilities. As the broaden-and-build theory suggests that directing attention to mastered experiences may also foster positive emotions (e.g., Burton and King, 2009), the two versions of the *Resilience Journal* may offer two distinct routes to the same mechanism. This first exploration of the two journal versions did not control for positive emotions and broadening of attention, and future studies should do so to clarify the mechanisms at work in journal interventions.

Strengths and Limitations

This study represents the first implementation of two different versions of the *Resilience Journal*. The aim of this study was to explore the potential of journal interventions to increase resilience in students and create a starting point for further studies. Due to its exploratory nature and the development of a dynamic longitudinal intervention and measure, this study shows some strength, but also some limitations.

This first explorative implementation employed a randomized pre-post design with two different intervention groups. However, this approach does not meet the gold standard of randomized control trials in intervention research (e.g., Lupşa et al., 2020; Goldberg et al., 2021). With regards to the sample size and the pandemic situation we did not include a control group without a resilience intervention. However, the absence of a control group means that reported increases in post-test scores might be caused by factors beyond the intervention itself. Additionally, a relatively short period of five days was chosen for this first implementation of the *Resilience Journal*. This short period may have been too brief to detect meaningful changes and effect neuronal plasticity of the students. The long-term effects of the intervention cannot be predicted in the absence of any follow-up measurement and the short intervention period.

Despite these limitations, the inclusion of a journaling method is seen as a strength of this study. Compared to other resilience interventions, this method could be used flexible and cost-efficient during the COVID-19 pandemic. The journaling format was suitable to reach many students without the need for face-to-face meetings or professional trainers and could be delivered daily. The short daily format and the anonymity in journaling interventions could decrease thresholds for participating and we see high practical potential in the journaling method. However, in contrast to most face-to-face interventions the journaling method is an individual task and does not directly provide important interaction or social support.

Additionally, the journaling method was suitable to address daily dynamics in resilience. The development of a framework that conceptualizes resilience as a dynamic process is one of the study's strengths, especially in training and intervention contexts (e.g., Linz et al., 2020). This dynamic account of resilience grounds the study theoretically and informs the development of the journaling tasks and the daily resilience measure. To the best of our knowledge, MARS is the first published resilience measure to be developed for daily use. However, this new scale is also a limitation; despite encouraging signs, the results of this first implementation must be treated with caution, as the instrument has not yet been validated in a large sample.

Nevertheless, following the recommendations of Joyce et al. (2018), the use of multiple resilience scales supports comparison with other resilience interventions. Another strength of this study is the inclusion of a validated measure of life satisfaction to evaluate the intervention's effects on well-being (Diener et al., 1985). The non-significant SWLS results refer only to one aspect of subjective well-being and cannot be generalized to well-being as a whole; in other words, the intervention may impact differently on other aspects of well-being. While the selected measures of resilience and life satisfaction all exhibit good internal consistency, the Big Five personality traits returned relatively low values of Cronbach's alpha. This can be attributed to the small number of items per subscale, and re-test correlations would be more suitable for assessing the reliability of this scale (Rammstedt et al., 2013). The re-test correlations were acceptable, indicating reliable measurement of all variables.

The study was conducted during the COVID-19 pandemic in 2020, and this can be seen as both a strength and a limitation. On one hand, as Joyce et al. (2018) argued, an accurate measure of resilience depends on the presence of a significant challenge or threat, which is not the case in most studies. In the present case, the pandemic fulfilled this requirement, and there was an urgent practical need to develop new online interventions to support university students as a vulnerable population. On the other hand, it is difficult to generalize these insights to other contexts beyond the pandemic. The pandemic could have created additional stress or uncertainty which could have influenced the results. In addition, August is the time in the academic year when students prepare for exams, and the findings might differ at another time of year.

The generalizability of these findings is also limited by the sample, which represents only students from one study program at one German university. While the gender distribution was representative of the study program, the larger proportion of women prohibits generalization to other academic and non-academic populations.

Implications

This study explored a new approach to online resilience interventions, and the findings have a number of implications for theoretical frameworks and the practicalities of fostering resilience in university settings. To address resilience as a dynamic process, it was necessary to develop a dynamic resilience measure (MARS). These initial findings show that while MARS aligns with the theoretical assumptions, it achieved only low-to-medium correlations with CD-RISC and BRS, indicating that the underlying construct differs from those measured by the other resilience scales. As dynamic definitions of resilience are recommended for the purposes of intervention (Linz et al., 2020), it would be useful to clarify these theoretical differences. In the present case, MARS failed to detect any significant changes in resilience, and any future development of scales measuring short-term changes in resilience must ensure construct and content validity.

Brief resilience scale detected an increase in resilience during the five days of the *Resilience Journal* intervention. While the study's limitations preclude direct attribution of this effect to the intervention, the findings offer a point of departure for future research on the potential of positive writing, and especially journal-based interventions, as a means of promoting resilience in university students. As there were no significant differences between the two journal versions, there is a need for further research to clarify the underlying mechanisms. In particular, it may prove useful to investigate whether resilience is developed more effectively by a general broadening of attention as proposed by the broaden-an-build-theory (Conway et al., 2012) or by directing attention to resources and abilities. Additionally, future studies should use a control group to eliminate extraneous factors.

The study also has important practical implications for universities. In particular, the challenges of university life in Germany demand appropriate resilience interventions for students. The benefits of online interventions include easy access, reduced inhibition threshold, and flexible use (Kern et al., 2018), making online interventions like the *Resilience Journal* ideal for university use. The ability to reach and support a large population of students in this way makes this a time- and cost-efficient alternative to face-to-face interventions during and beyond the COVID-19 pandemic. The *Resilience Journal's* flexible format means that it can be used as a standalone tool or to supplement other online and offline resilience interventions. While the *Resilience Journal* was designed for university settings, it could also be used on the same theoretical basis (with relatively minor task changes) by other institutions and organizations.

Future Research

The present findings confirm the potential of the *Resilience Journal*, which should be further evaluated using other student and non-student samples. The effect sizes reported here serve as a guide for calculating sample sizes. As there were no significant differences between the two journal versions, future research should also investigate similarities and differences in greater depth to clarify the underlying mechanisms activated by the different versions. To that end, future research designs should incorporate control groups of adequate sample size and journal entries should be qualitatively analyzed for further insights.

Additionally, the long-term effects of using the *Resilience Journal* should be explored over a period of several weeks, with follow-up measurement, and recommendations for designing and evaluating resilience and positive psychology interventions should guide future studies (e.g., Joyce et al., 2018; Brewer et al., 2019; Carr et al., 2020; Linz et al., 2020; Goldberg et al., 2021). To generalize the present findings, it will be necessary to replicate the intervention in different faculties, universities, and countries, as well as exploring its use in non-academic contexts. Any new initiatives should be scientifically evaluated–for example, when using the *Resilience Journal* to supplement other resilience interventions or in an offline format.

The new MARS measure introduced here shows promise, but it failed to detect any significant changes. Further validation should involve a larger sample, establishing norm values and capturing day-to-day variations in different settings in the absence of any intervention. By facilitating longitudinal exploration of daily fluctuations in resilience, MARS can help to

develop dynamic measures of resilience within individuals and across different time periods. Those insights can then be linked to specific events and traits to provide a better understanding of resilience by building better theoretical models that help to foster resilience and well-being.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

ML and CA contributed to the conception and design of the study. ML organized the data collection, performed the statistical analysis, and wrote the first draft of the manuscript. CA supervised the process of data collection and analysis and contributed to the manuscript revision, read, and approved the submitted version. Both authors contributed to the article and approved the submitted version.

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REVIEW
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Resilience Training Programs in Organizational Contexts: A Scoping Review

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The importance of resilience for employees' well-being and performance at work has grown steadily in recent years. This development has become even more pronounced through the recent COVID-19 pandemic and its consequences, including major changes in occupational settings. Although there is increasing interest in resilience in general and a growing number of publications focusing on the development of resilience in particular, many questions remain about resilience training, especially in organizational contexts. The purpose of this scoping review is to uncover what is known about resilience training in organizational contexts. A systematic search of four databases for articles published through 2021 was conducted. A total of 48 studies focusing on resilience training programs in organizational contexts were included in this review. The review provides relevant insights into resilience training programs by focusing on program characteristics, target group, study design, and outcomes. Based on the results, the main aspects that concern the development of resilience training programs for organizational settings and requirements for the study design for empirical investigation were summarized. The results of the review highlight possible directions for future research and offer useful insights for resilience-enhancing training programs in organizations.

Keywords: resilience, resilience training, resilience training programs, well-being, organizational context, scoping review

INTRODUCTION

In times of ongoing global change and amid a trend of work intensification, today's employees face increased pressure at work, ranging from small to more chronic stressors, such as excessive job demands or challenging working conditions across different occupational contexts. In light of those challenges, adverse situations may not only affect employees' performance but can also seriously threaten their mental health and well-being (e.g., Schaufeli and Greenglass, 2001). This development has become even more pronounced during the recent COVID-19 pandemic and its consequences, including major changes in occupational settings (Teng-Calleja et al., 2020). Due to the need for social distancing, mandatory lockdowns, and isolation periods, the pandemic has brought with it even more challenges associated with work-related stress (Giorgi et al., 2020) and substantial costs to individuals and organizations. In response to those challenges, growing attention has been paid to resilience, which can be defined as an employee's ability to manage and positively overcome stress and adversity at work but also to grow though them

(Mancini and Bonanno, 2009; King and Rothstein, 2010; Cooper et al., 2013; Fletcher and Sarkar, 2013; Johnston et al., 2015; Kossek and Perrigino, 2016). Therefore, the question arises regarding how to design effective resilience training programs that could help individual members of organizations improve their resilience and well-being.

Given the increased demands in organizational contexts and the importance of resilience, a growing number of resilience training programs have provided insights into training outcomes and elements. Studies including resilience training programs have been reported to show positive impacts on the mental health and subjective well-being of employees (e.g., Grant et al., 2009; Pipe et al., 2012). Moreover, some studies have also reported positive changes in performance or other work-related benefits (e.g., Grant et al., 2009; Pipe et al., 2012). A review of studies regarding resilience training in organizational contexts conducted by Robertson et al. (2015) and meta-analyses performed by Leppin et al. (2014) and Vanhove et al. (2016) all revealed support for the assumption that resilience training could positively affect employees' resilience as well as their well-being and performance at work. The reviews, however, also highlight that resilience training programs differ in their approaches and implementation and that "no single accepted theoretical framework or consensus statement exists to guide the development or application of those programs" (Leppin et al., 2014; p. 2). The purpose of this scoping review is to uncover what is known about resilience training programs in organizational contexts. By applying a scoping approach, we were able to build upon earlier reviews and summarize the state of research by integrating new insights from current studies published through 2021. In this article, we first present the applied review and analysis methods, followed by the results of our review. Finally, we discuss our findings and provide possible directions for future research.

METHODS

A literature review was conducted based on the guidelines for scoping reviews (Arksey and O'Malley, 2005, PRISMA-ScR: Tricco et al., 2018). According to Arksey and O'Malley's (2005) methodological approach for scoping reviews, the following five stages were conducted: (1) identifying the research questions, (2) identifying the studies, (3) selecting the studies, (4) extracting and charting the data, and (5) summarizing the results.

Review Questions

This scoping review was conducted to address the following questions:

1. What training programs exist to improve the resilience of employees in organizational contexts?
2. What are the target groups of resilience training programs in organizational contexts?
3. Which concepts do these programs use and on which theories are they founded? What are their aims and content?
4. What are the (main) characteristics of resilience training programs in organizations?
5. Which methods and approaches are used to evaluate resilience training in organizations?
6. What are the (main) outcomes of resilience training programs in organizations?

Identification of Studies

A systematic search was conducted between November 2020 and March 2021. We selected four databases—PubMed, PsycINFO, Business Source Complete (provided by EBSCO), and Web of Science. For each database, we developed an adequate research string that combined the term "resilien*" with "train*" or "intervent*" or "program*" or "promote*" and "work*" or "organi*ation" or "employ*" and searched within titles, abstracts, and keywords. Search limiters used included (when available): journal articles, English language, and abstract available. In addition to the search performed in the online databases, an additional search was performed through snowballing the reference lists of existing reviews and the publications identified in the database search.

Study Selection

In a first step, the titles, keywords, and abstracts of the identified articles were screened. In a second step, four authors independently judged the relevance of the full-text articles and fine-screened the remaining articles using the selection criteria mentioned below, regarding participants, training characteristics, outcomes measures, and study design. To ensure rigor and high quality, the literature selection was documented using both inclusion and exclusion criteria. If judgements of single articles were inconsistent, the authors discussed their disagreements and achieved a consensus. **Figure 1** depicts the stages of the paper-selection process.

For the purposes of this review, selection criteria were used according to a previous review by Robertson et al. (2015):

Participants

Any working (employee) sample (i.e., adults >18 years old). As we aim at a comprehensive understanding of work-related resilience training, we did not exclude any specific occupational context.

Training Characteristics

Any specifically resilience-based training, irrespective of content, duration, setting, or delivery media. In this sense, a training was classified as a resilience training if the study's authors labeled it explicitly as such or used similar wording or if the training increased resilience according to the study results.

Outcome Measures

These include resilience (as measured with specific resilience scales) as well-closely related constructs, such as individual mental health and well-being. Further outcomes include physical health, psychological functioning, and work performance (if applicable).

Study Design

All study designs were included (e.g., randomized-controlled trial, controlled trial, trial).

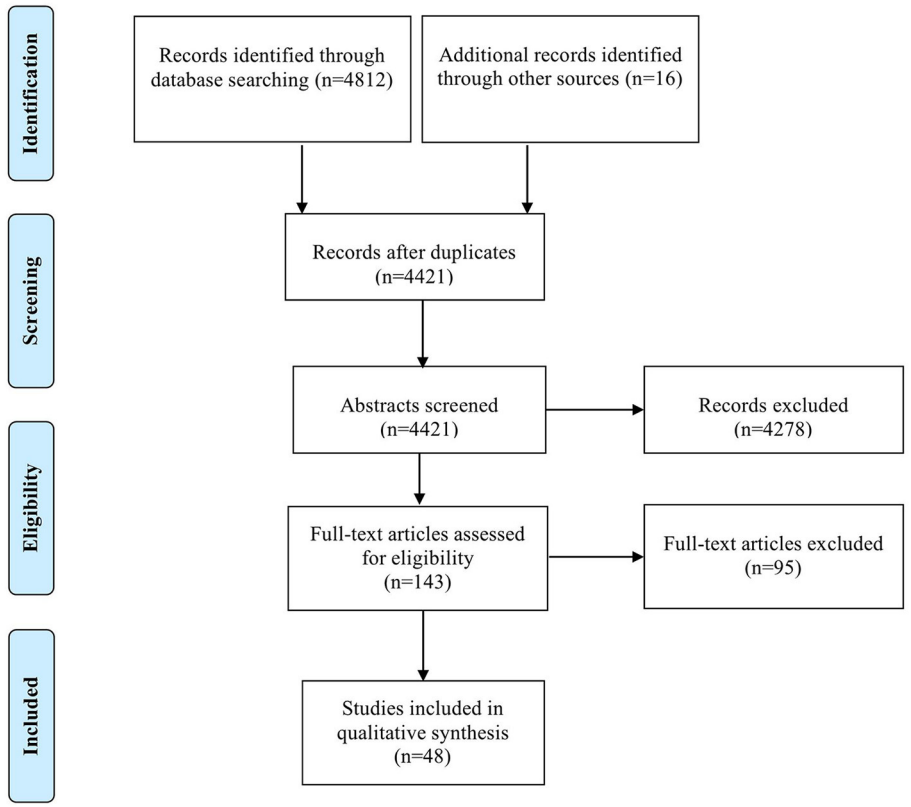

FIGURE 1 | Flow diagram of articles identified and excluded according to PRISMA guidelines.

Data Extraction

An Excel spreadsheet was used to maintain a systematic data-extraction and-analysis process. In the first stage, the relevant information from each study, including authors, year, study design, sample, and outcomes, were extracted. This step provided a general overview of aspects of resilience training programs found within the literature and a basis for a more detailed analysis. In the second stage of the review process, the results were synthesized in a narrative and tabular form by describing the resilience training programs and their characteristics and the outcomes. We organized and clustered the relevant results into themes, examining those that related to the research questions. To characterize the studies included in our review, we used five categories:

(1) general overview (i.e., date of publication, occupational context, and country),
(2) target group,
(3) program characteristics: (i) program name, conceptual and/or theoretical background, aim, content; (ii) delivery mode; (iii) duration;
(4) study description (i.e., design, data gathering, outcome measures, data analysis), and
(5) outcomes.

RESULTS

General Overview

We identified 48 relevant articles with a focus on resilience training programs in organizational contexts (see **Table 1**). Recently, there has been a steady increase in the number of resilience training publications, with more than half of the studies in this area having been published after 2017. The reviewed studies were conducted in different countries and occupational settings. Half of the studies were conducted in the United States, followed by Australia and other countries (the United Kingdom, Canada, and others). Most of the studies were conducted in health-care and high-risk occupational contexts (e.g., military, police, firefighters), followed by a smaller number of studies in public administration, business, or educational contexts.

Target Group

The target groups comprised participants from different occupational contexts, with the most training programs (nearly 40%) addressing employees working in health care. These training participants included, e.g., nurses, residents, and physicians, coming from various disciplines and representing different hierarchical levels of the organization.

TABLE 1 | Resilience training programs.

Main category	Reference	Program name	Delivery mode	Duration
Multimodal	Babanataj et al. (2019)	Resilience training	live (f2f)	5 × 90–120 min
	Grant et al. (2009)	Multimodal intervention	live (f2f)	8–10 weeks
	Henshall et al. (2020)	Taking care of yourself to take care of others	live (f2f)	6 days over 12 weeks
	Kinman and Grant (2017)	Multimodal intervention	live (f2f)	3 days over 2 months
	Mahaffey et al. (2021)	Disaster worker resiliency training program (DWRT)	live (f2f)	4 hr
	Mealer et al. (2014)	Multimodal intervention	live (f2f)	12 weeks
	Mistretta et al. (2018)	Mindfulness-based resilience training (MBRT) Smartphone delivered resiliency-based intervention	mixed	MBRT: 6 weeks (120 min/week) Smartphone: 6 weeks
	Rogerson et al. (2016)	Workplace resilience program	live (f2f)	5 weeks (1 hr/week)
	van Agteren et al. (2018)	Resilience training	live (f2f)	2 days
SMART	Chesak et al. (2015)	Brief Stress management and resiliency training (SMART)	live (f2f)	1 × 90 min + optional 1 × 1 hr follow-up after 4 weeks
	Sharma et al. (2014)	Stress management and resiliency training (SMART)	distance	12 weeks
	Sood et al. (2011)	Stress management and resilience training (SMART)	live (f2f)	90 min + optional 30–60 min follow-up
	Sood et al. (2014)	Stress management and resilience training (SMART)	live (f2f)	90 min + 2 follow-up phone calls
	Werneburg et al. (2018)	Stress management and resiliency training program (SMART)	live (f2f)	12 weeks
Mindfulness	Aikens et al. (2014)	Online mindfulness intervention (modified MBSR)	online	7 weeks (1 hr/week)
	Crowder and Sears (2017)	Mindfulness-based stress reduction (MBSR)	live (f2f)	8 weeks (2.5 hr/week) + 1 full-day weekend session
	Fortney et al. (2013)	Abbreviated MBSR program (MBSR)	live (f2f)	18 hr + 2 × 2 hr follow-up
	Christopher et al. (2018)	Mindfulness-based resilience training (MBRT)	live (f2f)	8 weeks (2 hr/week) + extended 6 hr class in 7th week
	Rees et al. (2020)	Mindful self-care and resiliency program (MSCR)	mixed	4 hr (f2f) + 3 × 1 hr video-conference follow-up sessions
	Jennings et al. (2013)	Cultivating awareness and resilience in education (CARE)	live (f2f)	4 days over 4–6 weeks + intersession phone coaching + booster 2 months after
PAR	Foster et al. (2018)	Promoting adult resilience program (PAR)	live (f2f)	2 days (3 weeks apart)
	Liossis et al. (2009)	Promoting adult resilience program (PAR)	live (f2f)	7 weeks (11 sessions × 60 min)
	Millear et al. (2008)	Promoting adult resilience (PAR)	live (f2f)	11 weeks (1 hr/week)
R2MR	Carleton et al. (2018)	Road to mental readiness (R2MR)	live (f2f)	1 single session (no time specified)
	Dobson et al. (2020)	Anti-stigma workplace intervention "working mind" (adaption of R2MR)	live (f2f)	*not specified*
	Fikretoglu et al. (2019)	Road to mental readiness (R2MR)	live (f2f)	160 min
RAW	Joyce et al. (2018)	Resilience@work mindfulness program (RAW)	online	self-paced intervention (6 sessions à 20–25 min)
	Joyce et al. (2019)	Resilience@work mindfulness program (RAW)	online	self-paced intervention (6 sessions à 20–25 min)
Coaching	Dyrbye et al. (2019)	Professional coaching intervention	distance (telephone)	5 months (1 × 1 hr coaching session + 5 × 30 min sessions every 2-3 weeks)
	Sherlock-Storey et al. (2013)	Brief coaching for resilience	live (f2f)	3 × 90 min over 6 weeks
Others	Abbott et al. (2009)	Resilience online (ROL)	online	10 weeks
	Agarwal et al. (2020)	Sustaining resilience at work (StRaW)	live (f2f)	2 days
	Arble et al. (2017)	Imagery-based trauma prevention training program	live (f2f)	5 × 90 min (on consecutive days)
	Arnetz et al. (2009)	Police trauma resilience training	live (f2f)	10 weeks (2 hr/week) + 1 initial session
	Buchanan and Reilly (2019)	Heart math resiliency training	live (f2f)	8 hr monthly class
	Burton et al. (2010)	Psychosocial resilience training (READY program)	live (f2f)	11 × 2 hr over 13 weeks

(Continued)

TABLE 1 | Continued

Main category	Reference	Program name	Delivery mode	Duration
	Carr et al. (2013)	Master resilience trainer	live (f2f)	12 weeks (weekly sessions)
	de Visser et al. (2016)	Stress resilience training system (SRTS)	online (app-based)	not specified
	Grabbe et al. (2020)	Community resiliency model class	live (f2f)	3 hr
	Heather et al. (2019)	LAMDU resilience program	mixed	*not specified*
	Kim et al. (2018)	Mobile video conference-based Intervention (SMART-3RP)	online (app-based)	4 weeks (1 hr/week)
	McCraty and Atkinson (2012)	Coherence advantage stress resilience and performance enhancement	live (f2f)	3 × 4 hr over 1 month
	Pehlivan and Güner (2020)	Compassion fatigue resiliency program	live (f2f)	Short-term: 5 hr for 2 days; long-term: 5 weeks (2 hr/week)
	Pidgeon et al. (2013)	Mindfulness with metta training program (MMTP)	live (f2f)	2 1/2 days + booster sessions at 1 and 4 months
	Pipe et al. (2012)	Transforming stress	live (f2f)	1 × 5 hr + 1 × 2 hr
	Tonkin et al. (2018)	Well-being intervention (well-being game)	online (app-based)	1 month
	Waite and Richardson (2003)	Personal resilience and resilient relationships (PRRR)	live (f2f)	5 weeks (7 hr/week) + follow-up review sessions
	Weber et al. (2019)	Mobile health intervention (Kelaa mental resilience)	online (app-based)	4 weeks (6–7 daily sessions à 2–4 min, max. 28 sessions)

Employees working in health administration and health management represented the target group in six studies (Grant et al., 2009; Pipe et al., 2012; Sharma et al., 2014; van Agteren et al., 2018; Buchanan and Reilly, 2019; Heather et al., 2019). In contrast to frontline employees in health care, their work in administration does not include direct medical contact with patients. Four of these six studies, however—those by Buchanan and Reilly (2019), Pipe et al. (2012), Sharma et al. (2014), and van Agteren et al. (2018)—additionally included health-care employees in their target groups.

Eleven studies investigate employees working in high-risk environments that involve ensuring public safety and security, such as members of military services (Carr et al., 2013; de Visser et al., 2016; Fikretoglu et al., 2019), police officers (Arnetz et al., 2009; McCraty and Atkinson, 2012; Arble et al., 2017; Carleton et al., 2018; Christopher et al., 2018), firefighters (Joyce et al., 2018; 2019), and disaster workers (Mahaffey et al., 2021).

Nine studies were conducted in the occupational context of business management or public administration (Waite and Richardson, 2003; Abbott et al., 2009; Liossis et al., 2009; Burton et al., 2010; Sherlock-Storey et al., 2013; Rogerson et al., 2016; Tonkin et al., 2018; Agarwal et al., 2020; Dobson et al., 2020). The corresponding target group consisted of employees working in public and private corporations and in different business units, such as sales, tax, accounting, or human resources.

In three studies (Pidgeon et al., 2013; Crowder and Sears, 2017; Kinman and Grant, 2017), the target group consisted of employees working in social care: for instance, as social workers. One study was directed at teachers (Jennings et al., 2013).

The remaining studies (Millear et al., 2008; Aikens et al., 2014; Kim et al., 2018; Weber et al., 2019) did not clearly specify their target groups regarding the occupational background of study participants. Instead, they identified their target groups simply as employees. These employees worked in a multinational chemical corporation (Aikens et al., 2014), a resource sector company (Millear et al., 2008), in different European businesses in Germany, England, and Northern Ireland (Weber et al., 2019), or were characterized as full-time employees. As the studies did not outline the employees' occupations, however, they cannot be assigned to a specific occupational context.

Program Characteristics

Program Name, Background, Aim, Content

All included studies referred to at least one specific category of training programs, resulting in a total of eight different categories of resilience training programs (see **Table 1**). Nine studies focused on *multi-modal resilience programs*, which differed in name, were based on more than one conceptual and/or theoretical background and applied multifaceted contents. The aims of these multi-modal training programs were quite heterogeneous. Many focused on improving resilience (Grant et al., 2009; Mealer et al., 2014; Rogerson et al., 2016; Kinman and Grant, 2017; Babanataj et al., 2019; Mahaffey et al., 2021). While three aimed to decrease stress, another three studies focused on improving well-being or mental health through the training programs. While previous reviews (Robertson et al., 2015; Vanhove et al., 2016) classified programs with different cognitive-behavioral techniques as *multi-modal*, this review used and broadened the category to include programs that employ multiple theoretical/conceptual approaches and contents. Part of these theoretical foundations was positive psychology, as well as cognitive (-behavioral) and mindfulness

approaches. The various contents of the training programs include, for example, relaxation training, goal-setting, problem-solving, meditation, coaching, feedback, psycho-education on resilience, and reflective and critical thinking.

Five studies applied the *Stress Management and Resilience Training (SMART)* program (Sood et al., 2011, 2014; Sharma et al., 2014; Chesak et al., 2015; Werneburg et al., 2018). All studies focused on increasing resilience, and two also focused on improving mindfulness (Sharma et al., 2014; Chesak et al., 2015). Decreasing stress and/or anxiety was an aim of four out of five studies. One study also focused on improving quality of life (Sood et al., 2014). This training program itself is based on Attention and Interpretation Therapy (AIT), which teaches learners to focus their attention on the present moment and to defer unrefined judgments. Learners are also taught to cultivate and guide their interpretations by higher-order principles such as forgiveness, acceptance, gratitude, compassion, and life's meaning, instead of superficial prejudices, (Sharma et al., 2014; p. 248).

Three studies applied the Mindfulness-Based Stress Reduction (MBSR) program, which aimed at promoting well-being and positive organizational behavior, resilience or job satisfaction, quality of life, or compassion. Reducing burnout was also an aim of one study. The *Mindfulness-Based Resilience Training (MBRT)* and *Mindful Self-Care and Resiliency (MSCR)* were each used by one other study. While the first targeted stressors inherent to police work, the other aimed to increase well-being. The term "mindfulness" can be defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994; p. 4) and has its roots in Buddhist philosophy. Mindfulness, as a factor in improving health-related aspects like well-being and stress, was part of six studies in this review (Fortney et al., 2013; Jennings et al., 2013; Aikens et al., 2014; Crowder and Sears, 2017; Christopher et al., 2018; Rees et al., 2020). The specific approach to mindfulness differed among the authors. *MBSR*-founded by Kabat-Zinn at the University of Massachusetts Medical Center-is a "well-researched and clinically useful program widely recognized as a healthy way to manage symptoms of stress" (Fortney et al., 2013; p. 413). It includes various mindful exercises, such as body-scanning, yoga, or walking meditation. *MBRT*, on the other hand, integrates *MBSR* and Acceptance-Commitment Therapy (ACT). It "incorporates two practices: learning mindfulness skills to deal effectively with unpleasant/unwanted thoughts or experiences; and learning resilience skills to foster positive growth and behavior in keeping with one's intentions and values" (Mistretta et al., 2018; p. 560). The *Mindful Self-Care and Resiliency (MSCR)* program includes themes of "introduction to mindfulness, staying present, allowing/letting be, thoughts as thoughts, and review and planning for the future" (Craigie et al., 2016; p. 767). The *Cultivating Awareness and Resilience in Education (CARE)* program developed by Jennings et al. (2013), on the other hand, combines mindfulness and compassion practices and aims to reduce stress and improve performance.

The *Promoting Adult Resilience (PAR)* program was applied in three other studies (Millear et al., 2008; Liossis et al., 2009; Foster et al., 2018). Its aim is to promote resilience, mental health, and well-being (in the working population). This training program comprises seven main topics: (1) understanding personal strengths and resilience, (2) understanding and managing stress, (3) challenging and changing negative self-talk, (4) practicing changing negative self-talk, (5) promoting positive relationships, (6) problem-solving and managing conflict, and (7) "bringing it together."

The *Road to Mental Readiness Program (R2MR)* program was applied in three studies (Carleton et al., 2018; Fikretoglu et al., 2019; Dobson et al., 2020). One study aimed to increase mental health literacy and stress-management skills, another to improve short-term performance and long-term mental health, and the third to improve resilience and reduce stigmata. The training program focuses on teaching four major skills (the "Big 4") to the participants: tactical breathing, goal-setting, visualization, and self-talk (Fikretoglu et al., 2019).

Two studies reported on the *Resilience@Work Mindfulness Program* (*RAW*; Joyce et al., 2018, 2019). The aim of this training program (and in both studies) was to enhance psychological resilience in high-risk workers (Joyce et al., 2018, 2019). The training program involves "mindfulness training, psycho-education, and a range of skills and strategies drawn from evidence-based therapies" (Joyce et al., 2018; p. 3). These other therapies are Acceptance-Commitment Therapy (ACT), Mindfulness-Based Stress Reduction (MBSR), and Compassion-Focused Therapy.

Two studies applied a *professional coaching program* and aimed to improve either resilience-related behaviors (e.g., making use of a support network) or enhance well-being, job satisfaction, resilience, and fulfillment in physicians and a measurable reduction in burnout (Dyrbye et al., 2019). The specific content was individualized regarding the needs of the respective coachee. In one training, this was analyzed through an initial coaching session about needs, values, goals, and forming a relationship with the coachee. The subsequent sessions followed a structure: (1) check-in, debrief on the strategic action the participant has taken since the last session, manage the progress, and review accountability; (2) plan and set goals; (3) design actions to incorporate into daily life; (4) commit to the next step; and (5) check out and summarize. The other coaching program was briefer and included three sessions that focused on psycho-education about resilience areas and supporting goal-setting regarding resilience and well-being. A short review of the coaching progress and future goal-setting beyond the coaching program was also part of the coaching sessions.

Of the 48 studies analyzed, the remaining 18 studies focused on *various other training programs*. Similar to the multimodal training programs, these included not only mixed and heterogeneous content but also various aims, such as promoting well-being, reducing stress, or enhancing resilience or resilience-related concepts (e.g., self-efficacy, hope). Four of these studies shared the conceptual basis of self-regulation toward stress responses via technology (McCraty and Atkinson, 2012; Pipe et al., 2012; de Visser et al., 2016; Buchanan and Reilly, 2019) but applied different theoretical backgrounds (e.g., theory of

human caring, physiological coherence). Two articles were based on the Penn Resiliency Program (PRP), while the other twelve applied concepts and/or backgrounds that ranged from self-determination theory (Tonkin et al., 2018) to compassion fatigue (Pehlivan and Güner, 2020), imagery-based emotional exposure (Arble et al., 2017), and cognitive therapy or peer support systems approaches. The content also varied among these specific training programs, often including psycho-education on health-related subjects (e.g., stress, resilience, sleep science, compassion fatigue).

Delivery Mode

In terms of delivery mode of the resilience training programs, the characteristics, delivery media, form of delivery, and form of interaction of these training programs were analyzed. Thirty-five programs were delivered on a face-to-face basis. Seventeen of these were held in groups: twelve included group work and exercises alone (e.g., as homework), and three included one-on-one sessions or sole participation with support (e.g., through a coach). Three face-to-face training programs did not specify the interaction (Carr et al., 2013; Carleton et al., 2018; Pehlivan and Güner, 2020).

In eight studies, an online training was conducted, four of which were app-based (de Visser et al., 2016; Kim et al., 2018; Tonkin et al., 2018; Weber et al., 2019). Two training programs included mixed delivery media through online and face-to-face sessions (Heather et al., 2019; Rees et al., 2020). Of these ten training programs, seven were conducted on a one-on-one basis with one participant and trainer or implemented for solo participation with or without support (e.g., through a virtual partner). Two of these online and mixed training programs included group interaction, and one training did not specify how the participant(s) and potential trainers interacted.

A study by Mistretta et al. (2018) included two training programs. One delivered the intervention face-to-face, while the other applied smartphones as delivery media. While the first one was held in a group, the second was designed for sole participation without further outside support. Another single training applied its training via telephone (Dyrbye et al., 2019); therefore, it was based on a one-on-one interaction. One study used neither a digital nor a face-to-face delivery format, as the sessions were self-directed via analog-written materials as delivery media (Sharma et al., 2014). Here, participants handled the tasks alone, without any further support.

Duration

Of the ten online and mixed (face-to-face and online) training programs, two featured a self-paced training, one without a time frame and the other with a time frame of 3.5–6 weeks. Five training programs were conducted in a time span between 4 and 8 weeks (with varying daily or weekly sessions), and two gave no specific information about their duration. The training with self-directed learning through written material employed a 12-week duration (Weber et al., 2019), and the one held by telephone included six sessions over a span of 5 months (Dyrbye et al., 2019).

The 35 face-to-face training programs ranged from a single training session (e.g., Sood et al., 2011; Chesak et al., 2015; Carleton et al., 2018) to 11 sessions over 13-week period (Burton et al., 2010). The length of each session also varied from 60 minutes (e.g., Millear et al., 2008; Rogerson et al., 2016) up to 6 full-day sessions (Henshall et al., 2020). One of the face-to-face interventions gave no further insight into its duration (Dobson et al., 2020). Some studies only gave an overview of the length of their overall training program (e.g., Grant et al., 2009; Carr et al., 2013; Agarwal et al., 2020), such as "2-day course," "8–10-week period," or "12-week period with weekly sessions."

Study Description

Study Samples and Groups

Of the 48 articles included in this review, 23 were based on randomized controlled trials (RCTs), five used a controlled trial (CT), one study used a cluster RCT, and 19 ran a trial (T) with no control group. The included studies' sample sizes ranged between 9 (Agarwal et al., 2020) and 2,202 (Fikretoglu et al., 2019) participants, with a median of 49 participants ($M = 115.76$, $SD = 321.46$). Sample sizes of more than 100 participants were reported in 10 articles.

Design, Data Gathering, Outcome Measures, Data Analysis

Two studies reported a single measurement point after the training (Heather et al., 2019; Agarwal et al., 2020). The remaining 46 studies used at least one measurement point before and one after the training. Seventeen of these studies implemented a pre-test and an immediate post-test with measurements directly before and after the training. In seven studies, pre-tests and delayed post-tests were used with one measurement directly before the training and a second measurement between 1 month and 1 year after the end of the training ($med = 3$ months, $M = 4.42$ months, $SD = 3.54$ months). The remaining 22 studies applied pre-, post-, and follow-up tests. Follow-up measurements were collected between 2 weeks and 1 year after the end of the training. As it was used in eight of the 22 studies, a delay of 3 months between the end of the training and the follow-up measurement was the most frequently used timespan, as well as the median ($M = 4.48$ months, $SD = 3.23$ months). Five of the studies using a pre-, post-, and follow-up test used multiple follow-up measurement points. Finally, the study by Weber et al. (2019) used a pre-, post-, and follow-up test, and also included a measurement at the mid-point of the training program.

Forty-seven studies included a quantitative evaluation of the training outcomes, while one study (Agarwal et al., 2020) focused on a qualitative outcome evaluation via interviews. Quantitative outcomes were gathered mainly through self-report questionnaires, but some featured performance tests (Fikretoglu et al., 2019), physiological measures like heart rate and blood pressure (Arnetz et al., 2009; McCraty and Atkinson, 2012), observer assessments (Arnetz et al., 2009; de Visser et al., 2016), and organizational performance data (Abbott et al., 2009) to evaluate the training outcomes.

The CD-RISC (Connor and Davidson, 2003) was the most frequently used measure in the reviewed studies; it was used in

16 of them. In the studies using this scale, six included the 10-item short form, and 10 studies used the 25-item version. Other frequently used self-report scales were the Perceived Stress Scale (Cohen et al., 1983), included in 13 studies, the Depression and Anxiety Stress Scale 21 (Lovibond and Lovibond, 1995), included in ten studies, and the Maslach Burnout Inventory (Maslach et al., 1986), included in five studies. All remaining measures occurred in fewer than five reviewed articles.

Common variables can, however, be identified in the outcome measures, with scales for resilience and coping included in 37 studies, scales for stress included in 30 studies, scales for mental health disorders included in 27 studies, and scales for well-being and quality-of-life outcomes included in 18 studies. Additionally, 13 studies included outcomes for training satisfaction or feasibility, which were mostly gathered at the end of the training and often included open-answer instruments or self-developed scales.

Twenty-nine of the 47 studies that included a quantitative measurement featured a scale directly related to the occupational setting or work context: e.g., Resilience at Work (Rogerson et al., 2016), Teachers' Sense of Efficacy Questionnaire (Jennings et al., 2013), and Police Stress Questionnaire (Christopher et al., 2018). Scales for general characteristics and traits not bound to a work-related context are included in 46 articles.

For statistical analysis of the training effectiveness, *t*-tests were the most commonly used method, being present in 24 studies. Eight of those studies include *t*-tests in conjunction with other analysis methods (e.g., as post-*hoc* analyses following an ANOVA), while the remaining 16 articles used *t*-tests as their sole analysis method. Analysis of variance or covariance was performed in 16 studies, and regression models in 10 studies. Effect sizes were reported in 22 studies, with frequent use of Cohen's *d* in 13 studies.

Outcomes

Of the 27 studies, 17 found a significant positive effect of the training on the resilience variables. The reported effects ranged from small to large effect sizes. Similar results were reported for outcomes regarding stress: 16 of the 25 studies that reported significance show a significant decrease in this variable, with the reported effect sizes ranging from small to large. Regarding measures for psychological disorders, 14 of the 26 studies calculating significances for these outcomes found significant changes in at least one of the mental-health outcomes (e.g., depression, anxiety, PTSD, burnout). Effect sizes ranged from no effect to large effects, but large effects were only found for the reduction of anxiety in the studies by Sood et al. (2011, 2014) and of negative mood in the study by Arnetz et al. (2009). Of the 18 studies that included measures for well-being or quality of life, all authors reported *p*-values, but only ten articles reported results lower than $p = 0.05$ threshold. Effect sizes ranged from no effect to large effects, with large effects occurring in the study by Sood et al. (2011, 2014) for quality of life and in the study by Mistretta et al. (2018) for well-being.

Twelve of the 20 studies that reported significance for occupational or work-related scales found a significant effect on at least one of these outcomes. Effect sizes ranged from no effect to large effects, with large effects for resilience at work in the study by Rogerson et al. (2016), work family spillover in the study by Liossis et al. (2009), and observer performance rating in the study by Arble et al. (2017).

Few studies statistically tested participants' satisfaction with and feasibility of the training, but the reported findings showed that the training programs were positively evaluated by most participants. Several studies, however, reported a high dropout rate over the course of the intervention.

DISCUSSION

First, the reviewed studies showed that resilience training programs are usually applied in high-risk contexts and focused on employees who are regularly confronted with high levels of stress (e.g., police officers, military members, or doctors). Even though the prevention and treatment of stress and burnout, as well as the promotion of well-being and resilience, are particularly important in these contexts, studies of employees in regular business settings (e.g., office work) remain rare. Nevertheless, we already know that these employees also face increasing pressure at work (e.g., Fletcher and Sarkar, 2013). Furthermore, as resilience has been conceptualized as a context-related construct (Kossek and Perrigino, 2016), it cannot be assumed that one resilience training is also relevant and can be conducted without adaptation in another context. Moreover, further attention should be paid to employees in managerial posts. Here, issues like standard overtime, work–life imbalance, or an irregular schedule are often cause for burnout or early retirement (Foerster and Duchek, 2017). Although there is recent research concerning organizational leaders' resilience and leaders' resilience-enhancing factors (e.g., Bossmann et al., 2016; Foerster and Duchek, 2017), no specific training programs have yet been developed and evaluated.

Second, a broad range of different training programs have been applied in organizations. Program characteristics, such as conceptual backgrounds, aims and contents, vary widely. As this heterogeneity has been stated by other reviews before (e.g., Robertson et al., 2015; Vanhove et al., 2016), our approach included clustering the articles due to the applied training programs (e.g., RAW, R2MR) or their common basis, such as mindfulness. Building on our results, multi-modal and specific single-focused training programs can be distinguished. A lot of studies focused on multi-modal resilience programs, which were based on more than one conceptual and/or methodological background and vary in their aims and contents. These contents include aspects, such as psycho-education about various health-related topics, relaxation techniques, social support, reflective thinking, goal setting, and/or problem solving. As mentioned before, some studies applied a single-focused (e.g., professional coaching or mindfulness) program or focus on other specific resilience training programs (e.g., Imagery-Based Trauma Prevention Training Program). Taken together, even though the number of studies on resilience development in the organizational context has risen largely, research is still in an early developmental stage.

Third, in terms of delivery mode (i.e., delivery media and forms of interaction) of the resilience training programs, the reviewed studies show a range of different strategies. While most of the studies focused on training programs applied on a face-to-face basis, several implemented online training, and a few applied approaches that combined online and face-to-face sessions. In keeping with increasing digitalization and—over the past 17 months—current regulations designed to contain the spread of COVID-19, numerous online-based training programs have been developed in recent years. Their effectiveness, however, remains to be examined, especially as Vanhove et al. (2016) meta-analysis showed computer-based training programs to be less effective than face-to-face programs. Additionally, the form of interaction should be taken into account. Most training programs applied forms of group interaction or a combined form of group and individual work (e.g., completing worksheets at home). Some conducted one-on-one meetings between a participant and an instructor (e.g., a digital or live coaching session) or individual work without support. Most of the latter categories were part of online-based programs. Given the discussed aspects—that is, effectiveness of digital or face-to-face formats and interaction forms in training programs—blended learning could combine the strengths of both approaches (combination of online module and offline learning) and therefore be a flexible, cost-effective way to strengthen employees' resources (see, e.g., Tonkin et al., 2018). Additional research is needed to gain further insight into the feasibility and effectiveness of different delivery and interaction formats.

Forth, another important aspect that varied between the resilience training programs was their duration. Results show that training programs range from short, single-session ones to regular weekly and/or full-day sessions. Despite the documented effects of short-term training sessions (e.g., Sood et al., 2011), the application of what has been learned, must be repeatedly applied in practice and transferred to new or other tasks (e.g., Andergassen et al., 2014). This could be achieved through short-term refresher courses that can become flexible, effective extensions of full training programs. These were applied in some training programs as "booster sessions," at, for example, 1 and 4 months after the initial training (Pidgeon et al., 2013) or via follow-up sessions or phone calls (Sood et al., 2011; Sharma et al., 2014; Chesak et al., 2015). Because this practice was applied in only a few of the studies, regular (e.g., weekly) and follow-up courses should generally be part of future implementations, instead of the previously applied one-time sessions. This will not only allow participants to overcome potential shortcomings in learning and applying new knowledge and skills, but will also allow study conductors to run long-term analysis.

Fifth, examining the study descriptions, among the studies reviewed, fewer than half of the studies evaluated resilience training programs in organizations following a RCT design. In addition, a high prevalence of studies lacked a control group, making it difficult to control for external effects and/or generalize findings. Future resilience training studies should include control groups and use the RCT design to produce more reliable findings. Ideally, control groups should be recruited from the same occupation and organization. The control group could either receive an alternative non-resilience related training or receive the same resilience training after the last measurement of the experimental group (waiting list control group). Additionally, suitable sample sizes should be calculated and procured to ensure the success of such designs. The effect sizes reported in the existing studies can form a basis for calculating sample sizes for future training evaluations of existing programs. When planning a training evaluation, this review also highlighted the importance of recruiting more than the minimum number of suitable participants due to high dropout rates in some programs (e.g., Carr et al., 2013; Buchanan and Reilly, 2019). The included studies offer no insight into why participants drop out of resilience training, and a scientific evaluation is needed to detect whether these reasons lay in the organizational context or the acceptance of participants. As authors have treated their report on drop-out rates very differently, no consistent picture emerges regarding the existence, number of, or reasons for drop-out.

Sixth, the included outcome measures to evaluate resilience training programs showed a large variety. This underlines the observations by Windle et al. (2011) that there is no "gold standard" in resilience measurements and shows that this observation can be confirmed for the studies included in this review. Few studies describe why the chosen resilience measures were used, but CD-RISC was the most often used scale to assess resilience. Resilience measured via CD-RISC represents trait resilience (e.g., Singh and Yu, 2010; Wollny and Jacobs, 2021), but in the training context resilience is operationalized as a changeable variable; and thus, it is important to use resilience scales that match the theoretical considerations (Linz et al., 2020). With most studies finding positive effects for resilience outcomes and a reduction in stress, resilience training programs seem to be effective and fulfilling their purpose. Effectiveness was also shown for mental-health outcomes and well-being, but fewer studies could report significant improvements in these variables. Work-related outcomes seem to be positively influenced by resilience training, especially if they are closely related to the concept of resilience (e.g., resilience at work, work–family spillover). While significant positive relationships with various desirable outcomes could be found, the studies allow no conclusions to be drawn about causality. The heterogeneous characteristics of the training programs did not allow to mark single training characteristics as advantageous or disadvantageous. It is only possible to acknowledge that most resilience training programs showed positive effects.

Finally, we can conclude that recent research has not yet systematically focused on instructional design aspects of resilience training programs. The description of the design and implementation of resilience training programs (e.g., specific learning objectives or assessment approaches) in some studies was limited, precluding a more in-depth analysis and presentation of the findings. Some aspects, like duration, delivery mode, forms of interaction, and an overview of the content, have been part of the training programs in the analyzed studies. However, these aspects do not seem to have been deliberately designed according to an instructional framework. Regarding the current results of this review, it can be seen that most of the authors have not included this aspect in their research or—at

least—have not reported on it in their publications. This needs to be further analyzed, with special regard to instructional design of resilience training programs.

CONCLUSION AND FUTURE DIRECTIONS

In recent years, research has leveraged and extended the findings generated in previous reviews. Still, while progress has been made, some research gaps remain that should be addressed by future studies to provide a more comprehensive understanding of resilience training in organizational contexts. We hope that this scoping review can raise awareness of the importance of resilience training research in an organizational context. Specifically, future research should address the roles of different resilience training programs, their conceptual backgrounds, and their related outcomes more precisely to help organizations choose or develop resilience training programs in three ways. First, by taking a closer look at different contexts, it becomes apparent that the identified professional backgrounds are not equally represented in the considered studies. For example, most training programs are implemented with general employees or employees working in high-risk environments; only a few programs focus on employees in business settings. In addition, few studies specify the hierarchical positions of their participants, so there is less knowledge of the level of resilience development for specific target groups within organizations. Second, as we provided insights into program characteristics and outcome measures, future research could consider how different program characteristics or, especially, delivery modes (e.g., face-to-face vs. online) may affect the outcomes of resilience training programs. Overall, more research is needed to implement the criteria for success in the design and implementation of resilience training programs in organizations themselves as well as the training conditions of the organizational context. Third, an interesting future direction has opened up in the research regarding the instructional frameworks and designs of resilience training programs for employees. Although some design aspects were included in the examined training programs, these aspects do not seem to have been deliberately designed according to an instructional framework or include instructional approaches. Future studies could, therefore, focus on instructional design aspects and analyze which forms of learning are especially relevant for resilience training programs in general and in the organizational context in particular.

AUTHOR CONTRIBUTIONS

IS provided the idea for the study, designed the research plan and the review protocol, co-developed the assessment, supervised the analyses, and co-wrote the manuscript. NP co-developed the assessment, conducted the analyses and interpretation, and co-wrote the manuscript (program characteristics). ML co-developed the assessment, conducted the analyses and interpretation, and co-wrote the manuscript (study design and outcomes). CM co-developed the assessment, conducted the analyses and interpretation, and co-wrote the manuscript (target group). CA and BF supervised the analyses and were involved in preparing and reviewing the manuscript. All authors contributed to the article, reviewed the results and approved the final version of the manuscript.

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Basic Psychological Needs in the Work Context: A Systematic Literature Review of Diary Studies

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According to the self-determination theory, individuals' basic psychological needs for autonomy, competence, and relatedness should be satisfied for optimal psychological growth. The satisfaction of these needs seems to vary due to changes in a person's social context, and the outcomes of the satisfaction of these needs also vary along with the needs. Despite several studies investigating daily and weekly variations in need satisfaction and its correlates, no systematic investigation exists. This study aimed to conduct a narrative synthesis of existing quantitative diary studies of basic psychological needs in the work context. We specifically aimed to evaluate if psychological need satisfaction varies daily and weekly and judge whether they vary more daily or weekly. Additionally, we also aimed to review the literature regarding the relations between daily or weekly variations in need satisfaction and its assumed antecedents and outcomes. We included peer-reviewed articles in English that measured work-related basic psychological needs using a quantitative diary study design. Database searching (Web of Science, ScienceDirect, EBSCOhost, and Scopus) led to the extraction of 2 251 records by February 2020. Duplicates were removed, the remaining records were screened (n = 820), and 30 articles were assessed using eligibility criteria. Two authors individually conducted the screening and eligibility processes to manage selection bias. In total, 21 articles were included in the final review. The review indicated that basic psychological need satisfaction showed considerable within-person variation and was more dynamic daily (compared to weekly). Job demands, job resources, organisational resources, and individual characteristics appeared to associate with these variations. The organisational context seemed to matter the most for need satisfaction. Variations in need satisfaction were also related to employee well-being, performance, and motivation. Despite the small number of published studies (particularly for weekly studies), our results indicate that researchers should pay attention to within-person variations in need satisfaction. Measuring daily need satisfaction could be prioritised. Different antecedents and outcomes seem to be associated with different needs. Thus, when needs are viewed as distinct constructs instead of unidimensional ones, one can derive greater insights. The study is funded by the National Research Foundation.

Keywords: basic psychological needs, autonomy, competence, relatedness, systematic review, self-determination theory, diary studies

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INTRODUCTION

From a self-determination theory (SDT) perspective, the satisfaction of basic psychological needs is essential for autonomous motivation, well-being, and work performance (Deci et al., 2017; Ryan and Deci, 2019). Three needs are considered essential. These are the needs for autonomy (i.e., the need to make free choices), competence (i.e., the need to master tasks), and relatedness (i.e., the need to connect with others) (Deci and Ryan, 2000).

Within the research domain, basic psychological need satisfaction has received extensive attention in the work context (Ryan and Deci, 2017). Studies have shown how individuals' need satisfaction differ from one another (i.e., between-person). Considering that the satisfaction of these psychological needs is dependent on changes in the environment (Deci and Ryan, 2000) and that the environment and perceptions thereof are not static, it is plausible that the experience of need satisfaction fluctuates within persons over time (Ryan and Deci, 2017). Therefore, scientific information is needed regarding how the same individuals' experiences of need satisfaction fluctuate (i.e., within-person) over time. Understanding these intra-individual fluctuations is essential, as it brings us closer to understanding real-life, naturally occurring phenomena (Bolger et al., 2003).

Intensive research designs, such as diary studies, enable researchers to capture within-person changes (Bolger et al., 2003; Sonnentag and Geurts, 2009). Diary studies may help facilitate an understanding of not only the degree to which needs vary but also with which individual (e.g., personality) and contextual (e.g., job characteristics) antecedents and outcomes (e.g., well-being and performance) (Bidee et al., 2017) such variations correlate. Within-person studies are also valuable from a methodological point of view. Apart from gathering real-life data (contributing to high external validity) (Bolger and Laurenceau, 2013), recall bias is minimised (Bolger et al., 2003; Sonnentag and Geurts, 2009).

The work context is an area in which diary studies are increasing. Some researchers tapped into within-person variations of psychological need satisfaction at work (e.g., Aldrup et al., 2017; Bakker and Oerlemans, 2019; Van Hooff and De Pater, 2019). These diary studies have either taken a daily (e.g., Haar et al., 2018) or a weekly (e.g., Weigelt et al., 2019) approach to study variations in psychological needs. Although Van den Broeck et al. (2016) advocated for diary studies on basic psychological needs in the work context and some researchers heeded this call, we still lack a systematic understanding of whether the needs fluctuate and how often, and which factors are associated with this variation. Without a summary of current evidence of fluctuating need satisfaction in the work context, contributions to evidence-based practises and future research avenues remain limited. From this summary, we might assess whether the use of daily or weekly studies would be most beneficial. Therefore, a review could guide future studies on whether a within-person approach would be more suitable and on which level(s) (i.e., daily or weekly) need satisfaction should be studied.

Cross-sectional studies on psychological need satisfaction and its relations with potential antecedent and outcome variables have been synthesised (see Van den Broeck et al., 2016). However, it would be valuable to determine if variations in need satisfaction relate to variations in antecedents and outcomes. Thus, reviewing need satisfaction's relationships with other variables (e.g., potential antecedents and outcomes) could facilitate an understanding of the factors that might affect within-person variations in need satisfaction and the consequences (i.e., outcomes) thereof. Furthermore, a review could facilitate an understanding of which antecedents and outcomes of fluctuations in need satisfaction are already well-studied and which areas require more research.

This study aimed to review diary studies on work-related basic psychological need satisfaction. Specifically, this study aimed to (1) evaluate if need satisfaction varies on a daily and weekly level, and to judge on which level the needs vary more, and (2) to examine the associations between fluctuating need satisfaction and its associated categorised antecedents and outcomes.

In accomplishing these aims, the review contributes to SDT literature by synthesising the available diary study literature on basic psychological need satisfaction in the work domain and providing directions for future research studies utilising a diary method design. Practically, this study can help organisations design and plan interventions that may contribute to high within-person levels of need satisfaction and positive employee and organisational outcomes. Practitioners may use the review to help them create an environment that promotes satisfaction of basic needs both between and within persons.

LITERATURE OVERVIEW

Basic Psychological Needs

SDT is a theory of human motivation (Deci et al., 2017) that examines how social or contextual factors can either enhance or inhibit people's experiences of the satisfaction of three basic psychological needs (Deci and Ryan, 2000; Van den Broeck et al., 2016). The need for *autonomy* refers to "volition" and willingness and is concerned with people's aspiration to self-organise their experiences to ensure that activities are consistent with their sense of self (Deci and Ryan, 2000). It is satisfied once a person can make choices freely and, subsequently, experience ownership of their behaviour (Deci and Ryan, 2000). *Competence* satisfaction refers to the experience of mastery and effectiveness when engaging in tasks (Deci and Ryan, 2000). The need for competence is fulfilled when people can perform tasks confidently and develop new skills to enable mastery in the future (Van den Broeck et al., 2016). Finally, *relatedness* satisfaction refers to a person's desire to experience warm, meaningful, and close connexions with significant others (Deci and Ryan, 2000). The need for relatedness is satisfied when people experience a sense of affiliation with others and develop close relationships (Van den Broeck et al., 2016).

According to the meta-analysis of Van den Broeck et al. (2016), in which literature on need satisfaction was summarised, most studies investigating basic psychological need satisfaction employed cross-sectional survey designs. Yet, some scholars are starting to adopt within-person diary study methods.

According to Bolger and Laurenceau (2013), psychological constructs should be studied as naturally developing or evolving processes. Basic psychological need satisfaction is a psychological construct that depends on the social environment and how it is perceived (Ryan and Deci, 2017). Therefore, it can be argued that need satisfaction is likely to fluctuate along with changes in the environment or perception thereof. Recent diary studies showed that basic psychological needs might fluctuate daily (Bidee et al., 2017) and weekly (Petrou and Bakker, 2016). To provide more systematic insights into these fluctuations and whether they occur, we aim to focus on the following review objective:

Review Objective 1: To investigate whether basic psychological need satisfaction varies at the within-person level on a daily and weekly basis and to judge whether the needs vary more on a daily or weekly level.

If basic need satisfaction is likely to vary, it is essential to understand its associations with antecedents and outcomes. Building on the meta-analysis of Van den Broeck et al. (2016), we aim to gain a comprehensive understanding of the dynamic processes of need satisfaction by systematically reviewing the available diary studies. Similar to previous research, we (1) clustered key variables (e.g., workload and well-being) into potential antecedents and outcomes of psychological need satisfaction, and (2) categorised antecedents and outcomes into sub-categories (e.g., work environment and employee factors, employee attitudes and well-being, and behavioural and motivational outcomes, respectively).

Cross-Sectional "Antecedents" of Basic Psychological Need Satisfaction in the Work Context

Work Environment

Basic psychological needs are context-responsive constructs (Vansteenkiste et al., 2020). Hence, their satisfaction depends on the organisational context in which employees operate (Vansteenkiste and Ryan, 2013; Ryan and Deci, 2017). Several cross-sectional studies investigated workplace factors as "antecedents" of need satisfaction. These factors can be categorised as job demands and resources in the job demands-resources (JD-R) model (Demerouti et al., 2001) or factors in the organisational context (referred to as organisational resources) (Van den Broeck et al., 2016). Job demands are the organisational, physical, psychological, and social job aspects that require persistent effort and may result in adverse outcomes (Demerouti et al., 2001). Job demands (e.g., high workload, work-home interference, role conflict, and role ambiguity) are generally detrimental to need satisfaction (Van den Broeck et al., 2008, 2016), but this relationship may not be straightforward. The appraisal of these demands—as challenges or hindrances—determines whether their effect is detrimental or beneficial (Crawford et al., 2010; Van den Broeck et al., 2010). Hindrances are regarded as "health-impairing job demands" that thwart optimal functioning. At the same time, challenges are seen as job demands that are motivating yet require some energy (Van den Broeck et al., 2010, p. 736). In line with this view, meta-analytic findings indicate that whereas hindrance demands (e.g., role conflict) undermine need satisfaction, challenge demands (e.g., cognitive demands) enhance need satisfaction (Van den Broeck et al., 2016). Job resources are the organisational, physical, psychological, and social job aspects resulting in goal achievement, growth, development, and the buffering of demands and costs associated with demands (Demerouti et al., 2001). In their meta-analysis, Van den Broeck et al. (2016) found that the basic needs showed significant positive relations with all the job resources they measured (e.g., autonomy, social support, and skill utilisation).

Organisations consist of multiple levels, and therefore resources manifest on five different levels: individual, group, leader, organisational, and the broader (outer) context (IGLOO framework) (Nielsen et al., 2018). Building on this framework, in this study, organisational resources refer to aspects in the organisational context that manifest on the level of the organisation (i.e., organisational support or policies) or leader (i.e., leadership behaviour). Studies found that positive leadership (e.g., need-supportive leaders, transformational leadership, and servant leadership) promoted need satisfaction (Chiniara and Bentein, 2016; Van den Broeck et al., 2016; Slemp et al., 2018). On an organisational-level, organisational support and interpersonal, and organisational justice were also positively related to need satisfaction (Gillet et al., 2012; Van den Broeck et al., 2016).

In conclusion, the literature on the antecedents of need satisfaction indicates that job demands generally relate negatively to need satisfaction if perceived as a hindrance. In contrast, the opposite can be true for challenge demands. Job and organisational resources generally relate positively to basic psychological needs. Most of these studies adopted a between-person cross-sectional approach, comparing employees who experience, for example, different degrees of workload. However, the work environment is dynamic, and an employee's demands and resources can change constantly. For instance, one's workload may differ from day-to-day. If workplace factors associate with the satisfaction of the basic psychological needs cross-sectionally, it can be hypothesised that variations in these workplace factors can be associated with variations in need satisfaction. In that case, it might be that variations in these workplace factors can be related to variations in need satisfaction. Existing diary studies have demonstrated that variations of factors in the work environment are associated with variations in basic psychological need satisfaction (Aldrup et al., 2017; De Gieter et al., 2018). Therefore, this review has the following objective:

Review Objective 2a: To examine if variations in job demands and job and organisational resources associate with variations in psychological need satisfaction.

Employee Factors

Need satisfaction depends not only on the work environment but also on how employees interpret their environment. First, in the realm of SDT, such individual differences refer to *general causality orientations* (GCOs) (Deci and Ryan, 2000). Employees can interpret their environment as supportive *(autonomous orientation*), controlling (*controlled orientation*), or beyond their

control (*impersonal orientation*) (Deci and Ryan, 2000). GCOs relate positively to autonomy and relatedness satisfaction (Van den Broeck et al., 2016). Second, personal resources, defined as the personal characteristics (e.g., mindfulness, self-esteem, and self-efficacy) that have an impact on how people can control and influence their environment (Xanthopoulou et al., 2013), relate positively to need satisfaction (Van den Broeck et al., 2016). Third, biographical characteristics (e.g., age and tenure) also relate positively to need satisfaction (Van den Broeck et al., 2016). Finally, employee states (i.e., cognition, affect, and behaviours that change over time due to situational factors) (Schmitt and Blum, 2020) may influence employees' need satisfaction experiences. So, how employees feel (i.e., attitudes and well-being) in the morning before work or what they strive to do (i.e., proactiveness) during their workday could relate to their need satisfaction at work. For example, proactive work behaviour is positively related to competence satisfaction (Strauss and Parker, 2014). Therefore, this review has the following objective:

Review Objective 2b: To examine if variations in employee factors associate with variations in psychological need satisfaction.

Apart from studying the assumed "antecedents" of need satisfaction, scholars have also invested time in examining its expected "outcomes".

Cross-Sectional "Outcomes" of Basic Psychological Need Satisfaction in the Work Context

Employee Attitudes and Well-Being

A core assumption of SDT is that need satisfaction results in optimal functioning, growth, and well-being, including positive attitudes and behaviour, and various empirical studies confirmed this assumption (Van den Broeck et al., 2016, 2019; Van Hooff and De Pater, 2019). For example, need satisfaction is positively associated with job satisfaction and affective commitment and negatively with turnover intention (Trépanier et al., 2014; Van den Broeck et al., 2016). It also relates positively to well-being (e.g., positive affect, happiness, and life satisfaction) (Gillet et al., 2012; Van den Broeck et al., 2016), whereas it relates negatively to ill-being (e.g., negative affect, strain, and burnout) (Van den Broeck et al., 2016). Previous studies found that need satisfaction as well as employee attitudes and well-being fluctuate (e.g., Van Hooff and Van Hooft, 2017). Therefore, it can be argued that variations in need satisfaction could relate to variations in attitudes and well-being.

Employee Behaviours and Motivation

Another assumption of SDT is that need satisfaction facilitates employee performance and motivation (Deci and Ryan, 2000). Various empirical studies also support this assumption. For example, need satisfaction is related to performance (e.g., task, creative, and proactive), job crafting behaviours, effort (Chiniara and Bentein, 2016; Van den Broeck et al., 2016), and autonomous forms of motivation (Van den Broeck et al., 2016). From the above examples, it is evident that fluctuations in the experience of need satisfaction could be associated with changes in performance and motivation.

Apart from cross-sectional studies illustrating the associations between basic psychological need satisfaction and well-being and performance, respectively, diary studies have demonstrated that variations in need satisfaction are associated with variations in well-being and performance (Vansteenkiste and Ryan, 2013; Bakker and Oerlemans, 2019; Goemaere et al., 2019b). Therefore, this review has the following objective:

Review Objective 3: To examine if variations in need satisfaction associate with variations in employee attitudes, well-being, performance behaviours, and motivation.

METHODS

The literature overview on the available cross-sectional literature provided a preliminary understanding of the potential antecedents and outcomes of the basic psychological needs. The focus of this systematic review was on quantitative diary studies pertaining to basic psychological needs literature. The eight-step process for conducting systematic reviews described by Uman (2011) was followed: defining the review objectives, formulating the search strategy, determining the inclusion and exclusion criteria, screening the articles, conducting a quality assessment, extracting the data, analysing the data, and reporting the findings. Accordingly, a systematic approach was followed to select and critically appraise the available diary studies focused on work-related basic psychological needs. The 2020 version of the "Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols" (PRISMA-P) reporting guidelines were used (Page et al., 2020).

Search Strategy

A systematic search was independently conducted by the first and second authors between January and February 2020. Articles were accessed through the following databases: (a) Web of Science, (b) ScienceDirect, (c) EBSCOhost, and (d) Scopus. The only restrictions that were placed on the searches were language (i.e., English) and document type (i.e., journal articles). Searches were conducted using the Boolean search method. Three search term combinations were used in each of the databases, which yielded a total of 2,251 records that were imported into EndNote. **Table 1** provides these search term combinations as well as the sample sizes.

Using EndNote, 1,431 duplicates were removed, and the remaining 820 article titles and abstracts were manually screened against the inclusion criteria. The screening process was conducted independently by the first and second authors. Studies were included if they were empirical research articles focusing on daily or weekly fluctuations in the basic psychological needs utilising a diary study design in the work context. After the screening process, 790 articles were excluded. These records were excluded as they either did not focus on basic psychological need satisfaction, were not daily or weekly diary studies, or were not conducted within the work context. The full-text versions of the 30 included articles were screened and their reference lists checked, which led to the inclusion of one additional record. The

TABLE 1 | Search term combinations and sample sizes.

Database	Search term 1	Search term 2	Search term 3
Web of science	(Basic psychological need*) AND (diary* OR daily OR weekly) ($n = 135$)	(Psychological need* + self determin*) AND (diary* OR daily OR weekly) ($n = 203$)	(Psychological need* + self determin*) AND (diary* OR daily OR weekly) AND TS = (work*) ($n = 55$)
ScienceDirect	"Basic psychological need" AND ("diary" OR "daily" OR "weekly") ($n = 140$)	"Psychological need" AND "self determination" AND ("diary" OR "daily" OR "weekly") ($n = 261$)	"Psychological need" AND "self determination" AND ("diary" OR "daily" OR "weekly") AND "work" ($n = 233$)
EBSCOhost (Automatically removes duplicates from other searchers in EBSCOhost)	"Basic psychological need*" AND diary "Basic psychological need*" AND daily "Basic psychological need*" AND weekly ($n = 120$)	"Psychological need*" AND "self determin*" AND diary "Psychological need*" AND "self determin*" AND daily "Psychological need*" AND "self determin*" AND weekly ($n = 380$)	"Psychological need*" AND "self determin*" AND diary AND work* "Psychological need*" AND "self determin*" AND daily AND work* "Psychological need*" AND "self determin*" AND weekly AND work* ($n = 31$)
Scopus	"Basic psychological need*" AND diary "Basic psychological need*" AND daily "Basic psychological need*" AND weekly ($n = 295$)	"Psychological need*" AND "self determin*" AND diary "Psychological need*" AND "self determin*" AND daily "Psychological need*" AND "self determin*" AND weekly ($n = 380$)	"Psychological need*" AND "self determin*" AND diary AND work* "Psychological need*" AND "self determin*" AND daily AND work* "Psychological need*" AND "self determin*" AND weekly AND work* ($n = 267$)

additional record could have been missed in the original search as the title and abstract did not make any reference to basic psychological needs.

Eligibility Criteria

For articles to be considered as eligible for inclusion in the systematic review, the following eligibility criteria were considered for full-text article screening: (1) the sample had to be working adults; (2) basic psychological need satisfaction and/or frustration and/or autonomy; competence; and relatedness had to be studied as constructs; (3) the research approach utilised had to be quantitative diary studies; and (4) the articles had to focus on variation of the basic psychological needs and its potential antecedents and outcomes. Based on the eligibility criteria, ten articles were excluded. **Figure 1** provides an overview of the complete search strategy process.

Quality Assessment and Data Extraction

The quality of the 21 articles included was assessed using the Critical Appraisal Skills Programme (CASP), specifically the Adapted CASP for Quantitative Studies (see Laher and Hassem, 2020). Authors 1 and 2 critically appraised the included articles independently. The studies were scored out of 11, with all studies having acceptable scores (ranging between 8 and 11). Twenty-one articles were included in the review (See **Table 2** for a list of the studies included). The required data was then extracted into a separate document for further processing. The extracted data consisted of the within-person variations of the basic psychological needs, their potential antecedents and outcomes, and within-person correlations. Most authors included the required information; however, the authors of some of the articles were contacted to provide additional information where needed.

Selection Bias

A number of strategies were employed to manage selection bias. First, Authors 1 and 2 performed the literature searches independently using the same steps and keywords and compared the search results for consistency (ensuring that no records were missed during the search process). After the independent searches, Authors 1 and 2 found the same number of articles (2,251). Second, the titles and abstracts were independently screened by the first two authors. The inter-rater reliability [Cohen's Kappa coefficient (κ)] between Authors 1 and 2 was calculated using the statistical package R (Version 4.1.0) (R Core Team, 2020). The results showed a significant agreement between the two authors, as κ exceeded the cut-off score for good inter-rater reliability of 0.80 ($\kappa = 0.842$, $p < 0.01$) (McHugh, 2012). A quality appraisal was also performed independently by the first two authors. After each phase of the search process was completed, the author and co-authors would meet to

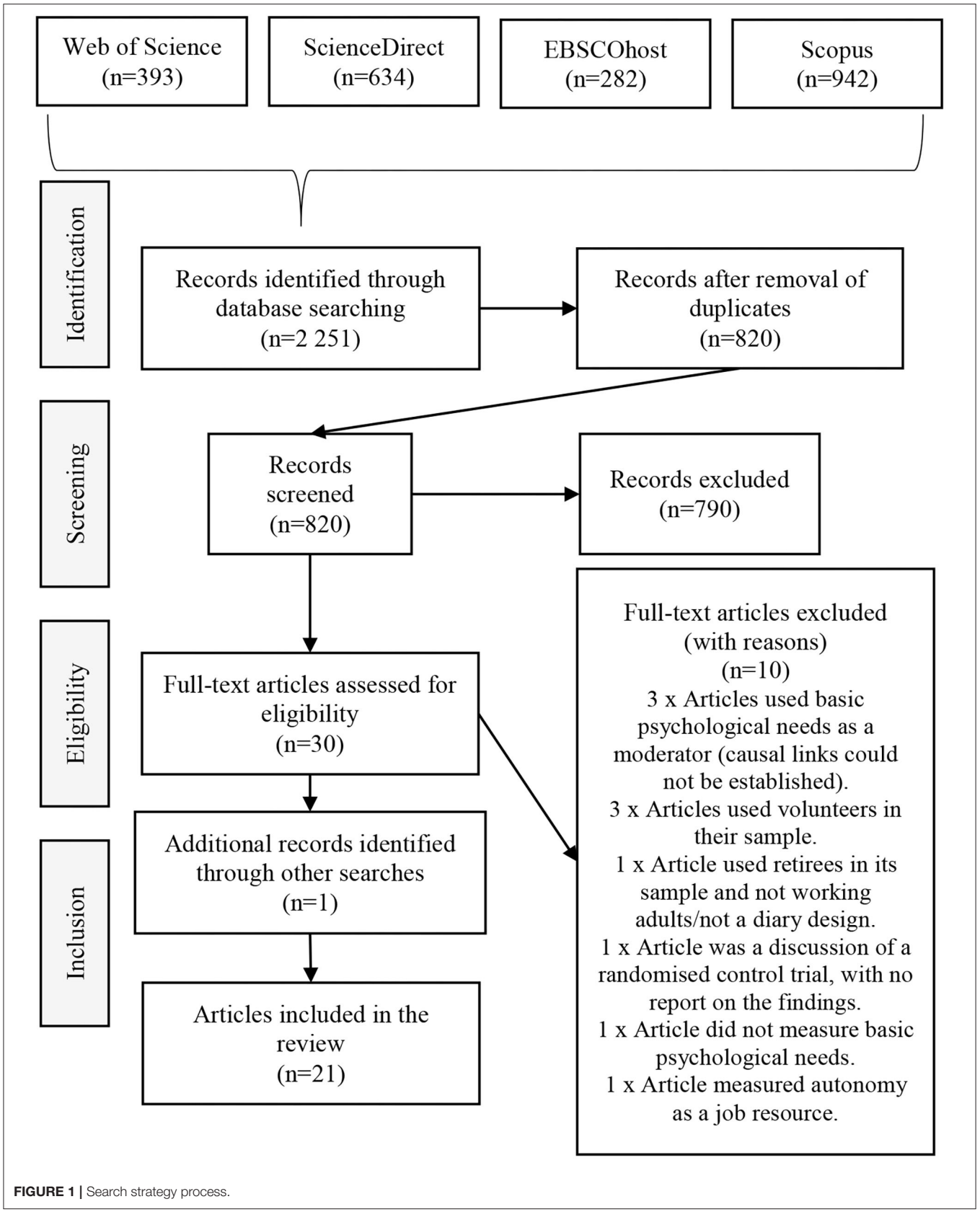

FIGURE 1 | Search strategy process.

TABLE 2 | List of included articles.

	Authors	Method	Autonomy	Competence	Relatedness	Need satisfaction
1	Aldrup et al. (2017)	Daily diary (10 days)		✓	✓	
2	Bakker and Oerlemans (2016)	Daily diary (3 days)				✓
3	Bakker and Oerlemans (2019)	Daily diary (4 days)	✓	✓	✓	
4	Breevaart et al. (2020)	Weekly diary (5 weeks)				✓
5	Cangiano et al. (2019)	Daily diary [5–7 days (3 times per day)]		✓		
6	De Gieter et al. (2018)	Daily diary (10 days)	✓	✓		
7	Foulk et al. (2019)	Daily diary (10 days)				✓
8	Frögéli et al. (2019)	Weekly diary (13 weeks)		✓	✓	
9	Goemaere et al. (2019a)	Weekly diary (8 weeks)	✓			
10	Goemaere et al. (2019b)	Weekly diary (48 weeks)	✓	✓	✓	
11	Haar et al. (2018)	Daily diary (4 days)	✓	✓	✓	
12	Hetland et al. (2015) (Study 2)	Daily diary (5 days)				✓
13	Petrou and Bakker (2016) (Study 2)	Weekly diary (3 weeks)	✓	✓	✓	
14	Van Hooff and De Pater (2019)	Daily diary (10 days)	✓	✓	✓	
15	Van Hooff and Geurts (2014)	Daily diary (5 days)	✓	✓	✓	
16	Van Hooff and Geurts (2015)	Daily diary (5 days)				✓
17	Van Hooff and Van Hooft (2017) (Study 2)	Daily diary (5 days)				✓
18	Vandercammen et al. (2014) (Study 1)	Daily diary (10 days)	✓	✓	✓	
19	Wang et al. (2019)	Daily diary (8 days)	✓	✓	✓	
20	Weigelt and Syrek (2017)	Weekly diary (14 weeks)	✓			
21	Weigelt et al. (2019)	Weekly diary (12 weeks)		✓		

debate the inclusion and exclusion of the papers and address any agreements/disagreements.

Certainty in Evidence

The Grading of Recommendation, Assessment, Development and Evaluation (GRADE) approach was used to assess certainty in the review results. Several factors have been assessed: (1) methodological limitations of the included studies, (2) indirectness of the results of the studies to the review's objectives, (3) imprecision of estimates, (4) inconsistency of the results, and (5) possible publication bias (Murad et al., 2017).

Methodological Limitations of the Studies

The included studies were assessed to be of high quality during the quality appraisal process, focusing on methodological aspects (see Adapted CASP for Quantitative Studies; Laher and Hassem, 2020). The methodologies used in the studies were relevant to the objectives of the review. Measurement points ranged between 240 and 1 619 ($n = 6$–264), which are sufficient for quantitative data analysis. Shortened questionnaires were used (a standard protocol in diary studies) to reduce participant burden/fatigue. This might mean that underlying content domains may not be fully represented. However, this is a risk in any diary study and should not influence the general results of the review.

Indirectness

Since the search strategy was very specific regarding sample, constructs, and method used, the primary studies were directly related to the objectives of the review. All of the included studies measured basic psychological need satisfaction, irrespective of what the research objectives were. The intraclass correlations (ICC) coefficients to evaluate if there are within-person variability in need satisfaction and judge whether the needs vary more daily or weekly (Review Objective 1) were extracted. In addition, the effect sizes of the within-person correlations in the studies were used to report whether fluctuating need satisfaction associates with antecedents and outcomes (Review Objectives 2–3). The research evidence extracted is therefore not dissimilar to the review objectives.

Imprecision

When all of the studies' sample sizes are aggregated, the review consisted of a sample of 2 114 employees. For Review Objective 1, the ICC-values were derived from 1,421 (daily studies) to 497 employees (weekly studies). For Review Objective 2a, 878 (daily) and 330 (weekly) employees were included, and 680 (daily) and 138 employees (weekly) for Review Objective 2b. Finally, for Review Objective 3, 1,520 (daily) and 250 (weekly) employees were included. Two of the weekly studies only had six employees over 8 and 48 weeks, respectively, which may cause problems to generalise the results of this study. Generally, the weekly studies were fewer than the daily studies. This could lower overall confidence in the certainty of weekly compared to daily diary studies' findings.

Inconsistency

The ICC values were relatively similar across daily as well as weekly studies. Due to the diversity of variables included in the

TABLE 3 | Intra-Individual variations in need satisfaction.

		N	Minimum (%)	Maximum (%)	ME (%)	*M* (%)	*SD* (%)
Daily	Autonomy	6	41.00	68.90	56.00	56.10	12.66
	Competence	8	42.00	72.70	56.00	57.57	11.40
	Relatedness	6	43.40	72.40	54.00	57.14	11.55
	Need satisfaction	5	41.00	62.60	56.40	54.60	8.66
Weekly	Autonomy	4	21.00	56.00	39.00	38.75	17.80
	Competence	4	40.00	47.00	44.00	43.75	2.99
	Relatedness	3	27.00	61.00	47.00	45.00	17.09
	Need satisfaction	1	39.60	39.60	39.63	39.63	–

N, number of studies; ME, median; M, mean; SD, standard deviation; some of these studies overlap; Minimum and Maximum, Range. Percentages in the table indicate 1-ICC.

primary studies, it was challenging to assess the similarity of the effect sizes. However, the studies that assessed similar variables' direction and magnitude of effect sizes were relatively consistent. Therefore, no major inconsistency issues were detected.

Publication Bias

Only peer-reviewed published studies were included in the review. Hence, we could not test for publication bias. Non-significant findings were also published, and therefore, we did not expect serious publication bias.

Based on the above GRADE analysis, the authors have a moderate to high confidence that the review findings reasonably represent the constructs/variables included.

RESULTS

Variations in Basic Psychological Need Satisfaction

The intraclass correlation (ICC) coefficients reported in the included studies were used to evaluate if the basic psychological needs varied on a daily and weekly level and judge on which level the needs vary more. The ICCs reflect the proportion of the variance that lies at the between-person level, whereas 1-ICC (expressed as a percentage) reflects the within-person variance. In **Table 3**, the percentages used indicate 1-ICC.

The 21 studies focused on need satisfaction as either uni- or multidimensional (i.e., autonomy, competence, and relatedness satisfaction). Fourteen studies measured the needs daily (ranging between 3 and 10 days), while seven measured the needs weekly (ranging between 3 and 48 weeks). The ICC values of two of the studies could not be obtained. As displayed in **Table 3**, five of the 14 daily-diary studies treated need satisfaction as unidimensional and reported daily fluctuations of between 41.00 and 62.60% (ME = 56.40). One weekly study reported a variation of 39.63%. The remaining 13 studies examined basic psychological need satisfaction separately, with seven focusing on daily fluctuations and six on weekly fluctuations. Autonomy satisfaction showed a daily variation ranging between 41 and 68.90% (ME = 56.00) and a weekly variation ranging between 21 and 56% (ME = 39.00). Competence satisfaction varied between 42 and 72.70% (ME = 56.00) daily, while it fluctuated between 40 and 47% (ME = 44.00) on a weekly level. Finally, relatedness satisfaction varied between 43.40 and 72.40% (ME = 54.00) on a daily level and between 27 and 61% (ME = 47.00) on a weekly level.

Table 3 indicates that 1-ICC values range from 41.00 to 72.70% for daily need satisfaction and from 21 to 61% for need satisfaction measured at the weekly level. Therefore, it can be concluded that need satisfaction varies at the within-person level, both daily and weekly. A preliminary analysis of the mean 1-ICC values showed that the variance in daily need satisfaction could be attributed more to within- than between-person variations. The opposite seemed true for the variance in weekly need satisfaction, with more of it being attributable to between-person variations. The daily variation ranged (on average) from 54.60 to 57.57% (ME; 54.00 to 56.40%), while the weekly variation ranged between 38.75 and 45.00% (ME; 39 to 47%). Consequently, we can conclude that basic need satisfaction levels fluctuate (on average) at the within-person level, more day-to-day than from week to week. Furthermore, daily and weekly fluctuations are relatively equal across the three needs, business sectors, occupations, and countries. Therefore, basic psychological need satisfaction varies daily and weekly, with daily variations being larger than weekly variations (Review Objective 1).

Relations Between "Antecedents" and Fluctuating Basic Psychological Need Satisfaction

In discussing the antecedent variables that appeared in the diary studies, it should be noted that almost all diary studies measured the antecedent and need satisfaction variables simultaneously at the same time of the day or week, mostly at the end of each workday or week. However, the antecedent variables were categorised based on theoretical justifications and hypotheses in the included studies.

Work Environment

Table 4 summarises an interpretation of the effect sizes of the within-person correlations between job demands and basic psychological need satisfaction from ten studies. All job demands, except unfinished tasks, were measured concurrently with the psychological needs, yet they are considered antecedents of need satisfaction based on theoretical grounds. The research examined job demands as diverse as emotional, physical, and cognitive demands as well as stress, work pressure, workload,

TABLE 4 | Interpreted within-person associations between job demands/stressors and daily or weekly basic psychological needs.

	Job demand/stressor	Article	Autonomy	Competence	Relatedness	Need satisfaction
Daily						
1	Job demands	15	(Small*)	Small	(Small)	–
2	Emotional demands	6	(Small*)	(Small)	–	–
3	Physical demands	6	(Small*)	(Small*)	–	–
4	Cognitive demands	16	–	–	–	(Small)
5	Stress exposure	1	–	(Small*) to Medium*)	(Small*)	–
6	Work pressure	16	–	–	–	(Medium*)
7	Workload	6	(Small*)	Small	–	–
8	Family-work/work-family conflict	11	(Medium*)	(Medium*)	(Small*) to Medium*)	–
9	Time spent on core tasks	2	–	–	–	Small*
10	Time spent on administration	2	–	–	–	(Small)
11	Time spent on client interactions	2	–	–	–	Small*
12	Time spent on meetings	2	–	–	–	Small*
Weekly						
1	Job insecurity	4	–	–	–	(Medium*)
2	Job demands	13	(Small*) to Small	Small to Medium*	(Small*) to Small	–
3	Time spent working	20	(Small)	–	–	–
4	Regular work	20	Small*	–	–	–
5	Supplemental work	20	(Small)	–	–	
6	Progress	20	(Small)	–	–	–
7	**Unfinished tasks**	20,21	(Small)	(Small*)	–	–

, statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations; bolded variable, measured before basic psychological needs. The Article column refers to the study from which the finding was derived. Refer to* ***Table 2* *to identify the study referred to.*

job insecurity, work and family conflict, and time spent on work tasks. In general, fluctuating job demands correlated negatively with fluctuating needs, mostly with a small effect. The exceptions were time spent on core tasks, client interactions, and meetings, as they were positively related to need satisfaction. Associations between autonomy and relatedness satisfaction and job demands were mostly negative, but mixed findings existed for competence satisfaction. For example, some job demands (i.e., physical demands, stress, and conflict) were negatively related to competence satisfaction, whereas others were unrelated (i.e., workload and emotional demands) or even positively related (i.e., job demands).

Table 5 summarises an interpretation of the effect sizes of the within-person correlations between job resources and basic psychological need satisfaction from five studies. All job resources were measured concurrently with the needs. The job resources examined in the literature include skill utilisation, positive feedback, work and family aspects, job autonomy, and time spent on breaks. Job resources were positively related to variations in psychological need satisfaction, with a small to medium effect. There were some exceptions for the individual needs. For example, skill utilisation did not seem to affect daily autonomy and competence satisfaction. Job autonomy also did not have a significant relationship with weekly relatedness satisfaction.

Table 6 summarises an interpretation of the effect sizes of the within-person correlations between organisational resources and basic psychological need satisfaction from four studies. The organisational resources were measured concurrently with the needs. All the organisational resources in the diary studies were related to leader(ship) behaviours (or styles), which included transformational leadership and autonomy support vs. control. Organisational resources (in the form of supportive leader behaviours) were positively related to need satisfaction, mostly with a medium effect (four studies). A more controlling style was negatively associated with the need satisfaction, with a small effect (one study). Leaders(ship) behaviours always affected autonomy and relatedness satisfaction, while competence satisfaction was sometimes affected.

Based on the findings in **Tables 4–6**, the significant daily and weekly within-person correlations between the work environment and need satisfaction ranged from a small to a large effect. Therefore, it can be concluded that variations in job demands, job resources, and organisational resources are

TABLE 5 | Interpreted within-person associations between job resources and daily or weekly basic psychological needs.

	Job resource	Article	Autonomy	Competence	Relatedness	Need satisfaction
Daily						
1	Skill utilisation	6	Small	Small	–	–
2	Positive feedback	6, 19	Small*	Small to Small*	Small*	–
3	Family-work/work-family enrichment	11	Medium*	Small* to Medium*	Small*	–
4	Work-life balance	11	Medium*	Medium*	Small*	–
5	Time spent on colleague interactions	2	–	–	–	Small*
6	Time spent on breaks	2	–	–	–	Small*
Weekly						
1	Job autonomy	13	Medium*	Small* to Medium*	(Small) to Small	–

, statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations. The Article column refers to the study from which the finding was derived. Refer to **Table 2 to identify the study referred to.*

TABLE 6 | Interpreted within-person associations between organisational resources and daily or weekly basic psychological needs.

	Organisational resource	Article	Autonomy	Competence	Relatedness	Need satisfaction
Daily						
1	Autonomy support	11	Medium*	Medium*	Medium*	–
2	Transformational leadership	12	–	–	–	Small*
Weekly						
1	Autonomy-supportive communication	9, 10	Medium* to Large*	(Small)	Medium*	–
2	Controlling communication	10	(Small*)	(Small*)	(Small*)	–

, statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations. The Article column refers to the study from which the finding was derived. Refer to **Table 2 to identify the study referred to.*

associated with variations in psychological need satisfaction, as a whole or with specific needs (Review Objective 2a).

Employee Factors

Table 7 summarises an interpretation of the effect sizes of the within-person correlations between proactive employee behaviours/strivings and basic psychological need satisfaction from six studies. Proactive employee behaviours/strivings included proactiveness, job and leisure crafting, strivings, helping, enacted power, and performance. These behaviours/strivings were categorised as antecedents as some variables were measured before the basic psychological needs (striving behaviours, helping, and task performance). In contrast, the rest were measured concurrently (see **Table 7**). In the concurrent measurements (job/leisure crafting and proactive work behaviour), it was decided to include the behaviours as antecedents hypothesised in the included articles. Generally, fluctuating proactive employee behaviours/strivings correlated positively with fluctuating psychological need satisfaction, mostly with a small effect. However, there were some exceptions. Daily job crafting to reduce demands was not significantly related to need satisfaction, while weekly proactive behaviour did not relate to competence satisfaction.

Table 8 summarises an interpretation of the effect sizes of the within-person correlations between pre-work employee states (i.e., attitudes or well-being experienced in the morning before going to work) and basic psychological need satisfaction from four studies. These pre-work states were all measured before need satisfaction (i.e., antecedents). The positive attitudinal or well-being factors included energy and positive affect (measured in the morning before work), while the negative factors were fatigue, anxiety, and negative affect before work. Employees' daily experiences of well-being or positive attitudes before work were positively related to variations in need satisfaction, with a small to medium effect. The negative dimensions were all unrelated to need satisfaction, as evident in three studies.

Table 9 summarises an interpretation of the effect sizes of the within-person correlations between employee demographic characteristics and basic psychological need satisfaction from two studies. Demographic characteristics were related to daily need

TABLE 7 | Interpreted within-person associations between proactive employee behaviours/strivings and daily or weekly basic psychological needs.

	Proactive employee behaviour/striving	Article	Autonomy	Competence	Relatedness	Need satisfaction
Daily						
1	Daily job crafting to enhance social resources	3	Small*	Small*	Small*	–
2	Daily job crafting to enhance structural resources	3	Medium*	Medium*	Small*	–
3	Daily job crafting to reduce demands	3	Small	(Small)	(Small)	–
4	**Communion striving**	7	–	–	–	Small*
5	**Accomplishment striving**	7	–	–	–	Small*
6	**Status striving**	7	–	–	–	Small*
7	**Helping**	7	–	–	–	Small*
8	Enacted power	7	–	–	–	Small*
9	Proactive work behaviour	5	–	–	Medium*	–
10	**Task performance (engaging in achievement events)**	7, 19	Small*	Medium*	Small*	Small*
Weekly						
1	Leisure crafting	13	Small to Medium*	Small to Small*	Small to Medium*	–
2	Proactive work behaviour	21	–	Small	–	–

*, *statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations; bolded variables, measured before basic psychological needs. The Article column refers to the study from which the finding was derived. Refer to* ***Table 2*** *to identify the study referred to.*

TABLE 8 | Interpreted within-person associations between pre-work states (well-being/attitudes) and daily basic psychological needs.

	Pre-work state	Article	Autonomy	Competence	Relatedness	Need satisfaction
Positive factors						
1	**Work engagement/ energy (before work)**	5, 14, 16	Medium*	Small to Medium*	Small*	Small*
2	**Positive affect (before work)**	7	–	–	–	Small*
Negative factors						
1	**Fatigue (before work)**	16	–	–	–	(Small)
2	**Anxiety (before work)**	5	–	(Small)	–	–
3.	**Negative affect (before work)**	7	–	–	–	(Small)

*, *statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations; bolded variables, measured before basic psychological needs. The Article column refers to the study from which the finding was derived. Refer to* ***Table 2*** *to identify the study referred to.*

satisfaction, with a small effect. Gender was negatively related to competence satisfaction (in a sample with 39% females) and positively to general need satisfaction (in a sample with 50.8% females). Age only related negatively to competence satisfaction. Both characteristics were unrelated to the other two needs. The number of children an employee had negatively related to their autonomy satisfaction but positively related to their competence and relatedness satisfaction. Employees' relationship status was negatively associated with their autonomy satisfaction but positively with their relatedness satisfaction.

Based on the findings in **Tables 7**–**9**, the significant daily and weekly within-person correlations between employee factors and need satisfaction ranged from a small to medium effect. Therefore, it can be concluded that employee demographic characteristics, fluctuating proactive behaviours/strivings, and pre-work employee states (i.e., attitudes and well-being before going to work) are associated with varying need satisfaction (Review Objective 2b).

Relations Between Fluctuating Basic Psychological Need Satisfaction and Its "Outcomes"

Employee Attitudes and Well-Being

Table 10 summarises an interpretation of the effect sizes of the within-person correlations between basic psychological need satisfaction and employee outcomes (i.e., attitudes and well-being) from 17 studies. Most of the outcomes and the needs were measured concurrently, except for work engagement, striving behaviours, and psychological detachment. Attitudes and well-being were split into positive (e.g., work engagement, striving, detachment, self-control, positive affect, and relaxation) and negative (e.g., negative affect, burnout, stress, anxiety, and rumination) components. On a daily level, significant within-person correlations from 12 studies related positively to positive components and ranged from a small to large effect. On the other hand, these correlations were negatively related to negative components in eight studies, ranging from small to medium

TABLE 9 | Interpreted within-person associations between demographic characteristics and daily basic psychological needs.

Demographic characteristic	Article	Autonomy	Competence	Relatedness	Need satisfaction	
1	Gender	15, 16	(a) (Small)	(a) (Small*)	(a) Small	(b) (Small*)
2	Age	15, 16	(a) Small	(a) (Small*)	(a) (Small)	(b) Small
3	Number of children (Mean: 0.91)	15	(Small*)	Small*	Small*	–
4	Relationship status (75% partner)	15	(Small*)	(Small)	Small*	–

, statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations. Gender, a. 39% female; b. 50.8% female. Age, a. Mean age was 42.61; b. Mean age was 34.90. The Article column refers to the study from which the finding was derived. Refer to* ***Table 2* *to identify the study referred to.*

effect. On a weekly level, within-person correlations ranged from a small to large effect for both the positive (three studies) and negative (three studies) components of well-being and attitudes. Fluctuating need satisfaction was therefore associated with both positive and negative employee outcomes, varying from small to large effects. There were some exceptions. Autonomy satisfaction was related to all the employee outcomes, except for relaxation on a weekly basis. Similarly, competence and relatedness satisfaction are also related to all employee outcomes, except stress (not related to competence satisfaction daily or weekly), happiness (competence satisfaction), and negative affect (relatedness satisfaction).

Employee Behaviours and Motivation

Table 11 summarises an interpretation of the effect sizes of the within-person correlations between basic psychological need satisfaction and performance/job-related outcomes (i.e., behaviours and motivation) from seven studies. All the outcomes were measured concurrently, except for striving behaviour. Performance/job-related outcomes included performance, striving, co-operation, oppositional defiance, irritation, and intrinsic motivation. On a daily level, significant within-person correlations from five studies related positively to the performance/job-related outcomes, ranging from a small to large effect. Weekly, within-person correlations of two studies ranged from a mostly small to medium effect. However, there were some exceptions. Need satisfaction was unrelated to accomplishment striving. Autonomy and relatedness satisfaction related positively to performance on a daily level, but not weekly. Competence satisfaction did not relate to co-operation and irritation with management. Finally, relatedness was unrelated to oppositional defiance toward instructions.

Based on the findings in **Tables 10**, **11**, the significant daily and weekly within-person correlations between need satisfaction and employee outcomes ranged from a small to large effect. Therefore, needs satisfaction fluctuations are associated with employee outcomes, ranging from a small to large effect (Review Objective 3).

DISCUSSION

The objectives of this review were to evaluate if basic psychological need satisfaction varies on a daily and weekly level, and to judge on which level variations seem stronger, and to examine the relations between varying need satisfaction and its assumed antecedents and outcomes.

Variations in Basic Psychological Need Satisfaction

The results indicated that need satisfaction varied intra-individually. Variations at the daily level were large (the medians ranging between 54.00 and 56.40%; Average ME = 55.60%) (Podsakoff et al., 2019) and seemed somewhat larger than at the weekly level (the medians ranging between 39.00 and 47.00%; Average ME = 42.41%). Notably, on a daily level, within-person variations accounted for somewhat more fluctuations in need satisfaction than between-person variations, whereas the opposite was true on a weekly level. Although more data is necessary to test this formally, it may prudently be suggested that the needs were more variable on a daily level, with the variability levelling off when moving to a weekly level.

Theoretically, employees may experience more fluctuations in their daily need satisfaction because their work environment fluctuates more on a daily level (Xanthopoulou et al., 2009, 2012; Bakker and Bal, 2010; Simbula, 2010). Employees may have "off days" or experience some days as more demanding or stressful than others (Simbula, 2010). Individual experiences (such as need satisfaction) may also fluctuate more on a daily basis due to the state-like nature of these constructs. Podsakoff et al. (2019) found that within-person variability often depended on the constructs being measured.

Methodologically, need satisfaction may fluctuate more on a daily level due to recall bias. Diary studies focus on events as they naturally occur, meaning that researchers do not have to depend on participants' recall bias (or remembered selves) (Bolger et al., 2003; Sonnentag and Geurts, 2009; Ohly et al., 2010; Kahneman, 2011), but rather on their experienced selves (see Kahneman, 2011). This bias is reduced when data is collected close to the event (Ohly et al., 2010) because individuals access their episodic memories shortly after an event. However, the larger the interval between the event and the recall, the greater the chances of individuals relying on their semantic memory. Semantic memory is more concerned with generalised beliefs (Lischetzke, 2014). More research is needed to control for the impact of measurement artefacts and to draw definite conclusions regarding the causes of greater fluctuations on a daily compared to a weekly level. According to Podsakoff et al.

TABLE 10 | Interpreted within-person associations between employee outcomes (i.e., well-being and job attitudes) and daily or weekly basic psychological needs.

Employee outcome		Article	Autonomy	Competence	Relatedness	Need satisfaction
Daily						
1	Work enthusiasm/happiness	1, 2	–	Large*	Small*	Large*
2	**Work engagement**	3, 5, 11, 12, 14, 15, 16, 19	Small* to Medium*	Small* to Large*	Small* to Large*	Medium to Large*
3	**Next-morning communion striving**	7	–	–	–	Small*
4	**Next-morning status striving**	7	–	–	–	Small*
5	**Psychological detachment from work**	5	–	Small*	–	–
6	Self-control	16	–	–	–	(Small*) to (Medium*)
7	Positive affect	7, 18	Small* to Medium*	Small* to Medium*	Small*	–
8	Negative affect	18	(Small*)	(Small*)	Small	–
9	Burnout	1, 3, 11, 16	(Small*) to (Medium*)	(Small*) to (Medium*)	(Small*)	(Small*)
10	Anxiety	5, 15	(Medium*)	(Small*)	(Small*) to (Medium*)	-
11	Strain/stress	6	(Small*)	Small	–	–
Weekly						
1	Happiness	10	Small*	(Small)	Medium*	–
2	Prosocial voice	4	–	–	–	Large*
3	Detachment from work	20	Small*	–	–	–
4	Mastery experiences	20	Small*	–	–	–
5	Relaxation	20	Small	–	–	–
6	Stress	10	(Small*)	Small	(Medium*)	–
7	Silence	4	–	–	–	(Medium*)
8	Negative affect	4	–	–	–	(Large*)
9	Affective rumination	21	(Medium*)	–	–	–

, statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations; bolded variables, measured after basic psychological needs. The Article column refers to the study from which the finding was derived. Refer to **Table 2 to identify the study referred to.*

TABLE 11 | Interpreted within-person associations between performance/job-related outcomes (i.e., job behaviours and motivation) and daily or weekly basic psychological needs.

Performance/job-related outcome		Article	Autonomy	Competence	Relatedness	Need satisfaction
Daily						
1	Performance	6	Small*	Medium*	–	–
2	**Next-morning accomplishment striving**	7	–	–	–	Small
3	Intrinsic motivation	16, 17, 18	Small to Large*	Small to Large*	Small to Small*	Medium* to Large*
Weekly						
1	Performance	10	Small	(Small)	Medium*	–
2	Co-operation with management	9, 10	Small to Small*	Small	Medium*	–
3	Oppositional defiance toward instructions	9, 10	Small* to Medium*	(Small*)	(Small)	–
4	Irritation toward management	9, 10	(Small) to Small*	(Small)	(Small*)	–
5	Intrinsic motivation	9, 10	Medium* to Large*	Small*	Medium*	–

, statistically significant; –, variables not measured; effect sizes, small (±0.1 to ±0.29); medium (±0.30 to ±0.49); large (±0.50 to ±1.00); brackets, negative associations; bolded variables, measured before basic psychological needs. The Article column refers to the study from which the finding was derived. Refer to **Table 2 to identify the study referred to.*

(2019), the number of days surveyed may not impact within-person variations, but the number of measurement points did matter. Diary studies typically include more measurement points than weekly studies, which could pose methodological challenges when comparing daily vs. weekly variations.

Relations Between "Antecedents" and Fluctuating Basic Psychological Need Satisfaction

The results, furthermore, indicated that environmental and employee factors were related to employees experiencing more (or less) need satisfaction on some days (or in some weeks) than on/in others. In general, job demands were detrimental not only to overall need satisfaction but also to autonomy and relatedness satisfaction. Thus, on days or in weeks where employees had more job demands, they also experienced less need satisfaction. However, mixed findings existed for competence satisfaction. These findings are mostly in line with the findings from between-person studies (see Van den Broeck et al., 2016). Yet, there are some differences. For example, job demands related negatively to the three needs cross-sectionally (Van den Broeck et al., 2016), but only related negatively to daily and weekly autonomy and weekly relatedness. Several aspects may influence whether a demand is detrimental to need satisfaction. Firstly, employees' perception of a demand as a challenge or a hindrance determines whether it will relate positively or negatively to need satisfaction (Van den Broeck et al., 2010; Albrecht, 2015). Variability in how employees perceive or appraise demands (i.e., hindering or challenging) can also result in weak or non-significant associations between job demands and need satisfaction. These appraisals could explain additional variance in the effects of job demands on employee outcomes. Secondly, the level of the demand may play a role, with lower levels of demands (especially hindering demands) being more beneficial (i.e., curvilinear relationship) (Van den Broeck et al., 2010). Thirdly, the type of need measured may also play a role. For example, some job demands were negatively related to competence satisfaction, whereas others were unrelated or even positively related. More research is needed to understand the reasons for the differential relations between demands and need satisfaction.

In general, job and organisational resources were beneficial for need satisfaction. This finding aligns with the findings from between-person studies (see Van den Broeck et al., 2016). Thus, on days or in weeks where employees had more job and organisational (i.e., in the form of supportive behaviours) resources, they also experienced more need satisfaction. However, some of the relationships with job and organisational resources were unrelated (e.g., skill utilisation with daily autotomy and competence satisfaction and autonomy-supportive communication with weekly competence satisfaction). These findings are not surprising, as researchers argue that job (or organisational) resources are not equally beneficial; some resources may be more beneficial than others (Van Veldhoven et al., 2020). The reason for this is that the effects of job resources depend on the (a) nature and amount of the resource (i.e., how much value is attached to that resource), (b) individual context (i.e., personal resources, work behaviours, and attitudes of employees), (c) micro-context (i.e., level of job demands and other resources), (d) meso-context (i.e., organisation, supervisor, and employment practises), and (e) macro-context (i.e., country or culture) (Van Veldhoven et al., 2020). Future research should delve into this and examine when and why particular resources may be more beneficial than others.

In terms of employee factors, it was found that behaviours/strivings (engaged in to enhance work), attitudes, and well-being (as experienced before work) related positively to need satisfaction at work. Negative attitudes and ill-being (experienced in the morning before going to work) were unrelated. Need frustration refers to an active thwarting of psychological needs, which hinders psychological growth (Ryan and Deci, 2019), and should, thus, not be regarded as merely low need satisfaction (Vansteenkiste et al., 2020). These findings are mostly in line with between-person studies (see Van den Broeck et al., 2016). Thus, on days where employees experienced positive affect and energy in the morning before work, they also experienced more need satisfaction at work. However, their work-related need satisfaction remained unchanged when they experienced negative affect, anxiety, or fatigue before work. The non-significant relations with negative attitudes and ill-being before work might mean that other factors (in the work environment) helped to satisfy the needs, even when the employee was experiencing negative attitudes and ill-being before work. The non-significant relations could also indicate that negative attitudes and ill-being before work might rather be related to need frustration than to (low) need satisfaction. Similar to cross-sectional findings (see Van den Broeck et al., 2016), associations with demographic variables produced mixed results. Regardless of the direction of the relationship, employees' demographic characteristics only played a minor role in their daily experience of need satisfaction. This might be because demographic characteristics are more trait-like and often do not change.

Job and organisational resources and well-being and positive attitudes (before work) mattered more for need satisfaction than negative antecedents (e.g., job demands). This was even more true for organisational resources (such as supportive leader behaviours) because they mattered the most. Employees' behaviours showed the weakest associations with need satisfaction. So, providing employees with resources (especially supportive leaders) and facilitating their well-being and a positive attitude will have better outcomes for daily or weekly need satisfaction than focusing either on minimising job demands or addressing employee behaviours. Compared to the meta-analytic cross-sectional findings (see Van den Broeck et al., 2016), these findings differ somewhat. The meta-analytic confidence intervals (CIs) between job demands, job resources, and organisational resources overlapped, thus indicating that demands, resources, and factors in the organisational context were equally important for need satisfaction. Meta-analytic research focusing on diary studies is, therefore, needed to draw definite conclusions. However, from the literature, it is evident that the interpersonal behaviours of leaders are important for need satisfaction (Ryan and Deci, 2017; Slemp et al., 2018).

Relations Between Fluctuating Basic Psychological Need Satisfaction and Its "Outcomes"

Finally, the results indicated that fluctuating basic psychological need satisfaction are associated with employee and performance/job-related outcomes. Need satisfaction is generally related positively to positive employee attitudes and well-being and performance outcomes, and negatively to negative employee attitudes and ill-being. Thus, on days or in weeks where employees experienced need satisfaction, they also experienced positive attitudes and well-being and were more likely to be motivated. Hence, they displayed more positive job behaviours and fewer negative job behaviours when their needs were satisfied. The findings are consistent with between-person studies (see Van den Broeck et al., 2016). However, some of the relationships were unrelated (e.g., relatedness satisfaction with negative affect, competence satisfaction with happiness, relatedness satisfaction and oppositional defiance toward instructions). Again, different needs (i.e., autonomy, competence, and relatedness satisfaction) associated differently with different outcomes.

It appeared that need satisfaction mattered more for employee attitudes and well-being than performance, but the most for intrinsic motivation. This differs from cross-sectional meta-analytic findings (see Van den Broeck et al., 2016) that showed that the CIs between attitudes, well-being, and performance overlapped, meaning that need satisfaction mattered equally for these outcomes. It is, however, plausible that other factors such as ability might have a bigger influence on performance (Van Iddekinge et al., 2014) than need satisfaction. However, evidence from cross-sectional between- and within-person studies repeatedly showed that the basic psychological needs were essential for motivation, well-being, and performance (Vansteenkiste et al., 2020).

Notably, this review shows the vast diversity of work-related and personal antecedents of need satisfaction that has been studied in diary studies and the various outcomes of within-person fluctuations of need satisfaction. The majority of the diary research echoes research that has been conducted at the between-level, yet both streams of the literature also show some complementarity. Diary studies could further examine factors that have been tapped into in between-person research, such as job insecurity, social support from colleagues and/or counter-productive behaviour, but should particularly focus on capturing the dynamics that typically happen across experiences. For instance: How do breaks in the morning co-vary with need satisfaction in the afternoon or would need satisfaction in the morning influence helping behaviour later that day? Diary studies could also examine personality variables, as Van den Broeck et al. (2016) included in their meta-analysis (e.g., Big Five personality traits). Podsakoff et al. (2019) explained that factors (such as personality) that have traditionally been studied as stable between-person variables could show meaningful within-person variation when paired with certain antecedents.

In conclusion, daily (and, to some extent, weekly) need satisfaction matters in the workplace due to its relations with well-being and performance. However, needs seem to be more dynamic on a daily level, while the variability of needs tapers off when one measures it on a weekly level. Furthermore, the role of the daily variations in the work environment and the individual (in explaining variations in need satisfaction) and the role of daily variations in need satisfaction (in explaining variations in employee behaviour, well-being, and motivation) can not be ignored. Different "antecedents" and "outcomes" also associate differently with the different needs. Thus, one can draw greater insights by measuring the needs as separate constructs instead of unidimensional ones. Finally, need satisfaction is not irrelevant when studying negative outcomes, but measuring need frustration may be more valuable (Van den Broeck et al., 2016), especially in the context of antecedents. Although the general trends seem to be similar for diary and cross-sectional designs, much can still be learnt about need satisfaction if studied daily. As neither the experienced self nor the work environment is static, insights can be developed into employees' daily attitudes, behaviours, and well-being and how to manage these.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

One major limitation was the paucity of available research related to diary studies of basic psychological needs in the work context. In their meta-analysis, Van den Broeck et al. (2016) found 99 cross-sectional papers to review, whereas we had to draw conclusions based on 21 articles. Due to the limited number of diary studies, meta-analytic procedures were not possible. It should, furthermore, be noted that more daily studies than weekly studies were available for inclusion in this review, which may influence the conclusions drawn. This limitation makes it challenging to compare the results of between-person vs. within-person, and daily vs. weekly variations, as measures of central dispersion may be biassed. Also, one cannot employ commonly used techniques to test statistical significance, effect sizes, or confidence intervals.

Another limitation was that most of the diary studies in this review focused on need satisfaction only. Future diary studies should also include the dynamics of need frustration, as Vansteenkiste et al. (2020) mention that need satisfaction and frustration should be regarded as two-dimensional constructs with different antecedents and outcomes.

When designing diary studies, researchers must consider the impact of retrospective bias. Shorter periods (between the event and its measurement) may be more meaningful if the *experienced self* (Kahneman, 2011) is studied. Kahneman and Riis (2005) believe that evaluated well-being (i.e., recall and retrieval of the experience) differs from the actual experience (i.e., experienced well-being). Therefore, focusing on the *experienced self* instead of the *remembered self* could reduce retrospective bias. Focusing on diary studies and measuring a person's actual experiences (*experienced self*) is important, as relationships between constructs are sometimes different on the within-person compared to the between-person level (McCormick et al., 2018). Thus, how individuals vary from one another could be different

from how they vary within themselves. Given the above and the finding that need satisfaction varies more daily, it is thus recommended that need satisfaction be studied as a daily variable.

Podsakoff et al. (2019) emphasise that the construct type, measurement, and design of the study and the sample characteristics could account for differences in within-person variances. Once more diary research on need satisfaction becomes available, a recommendation could be to conduct a meta-analysis on diary studies to control for these factors.

Some of the studies included did not separate the constructs in time (i.e., the "antecedents" and "outcomes" were measured concurrently). As a result, the authors had to use existing theoretical justifications to classify variables as antecedents or outcomes. The original articles' objectives or hypotheses were also consulted in this regard. Definite conclusions on whether the concurrent measurements were antecedents or outcomes could therefore not be made. It is recommended that researchers measure the constructs at different time points to draw definite conclusions regarding the directions of the relationships.

MANAGERIAL IMPLICATIONS

Antecedents of need satisfaction, in the form of an employee's social context or environment (e.g., job resources, positive leadership), mattered more for varying need satisfaction than job demands and personal factors. The organisational context seemed to play the most crucial role in need satisfaction. Thus, interventions focused on the organisational context could be suggested. Organisations should consider prioritising organisational resources (e.g., leadership development to enhance leaders' need-supportive behaviours and organisational redesign and reformulation of policies and procedures) followed by job resources (e.g., ensuring social support and skill utilisation and providing positive feedback), instead of merely trying to reduce job demands (e.g., reducing stressors) or teaching employees to manage the demands. Specifically, based on our results, organisations should be aware that need satisfaction can vary considerably from day to day and—in response—should make sure that employees have access to job and organisational resources (e.g., task autonomy, social support, positive leadership, etc.) on a daily basis. For example, managers can have short daily check-ins with team members (if required) to understand their daily resource or demand experiences. This will enable management to keep track and facilitate employees' need satisfaction experiences. They can also ask team members to inform them if they have problems accessing certain resources or managing certain demands. The findings of this study might suggest that more hands-on leadership could be beneficial for need satisfaction.

DATA AVAILABILITY STATEMENT

The original contributions presented and used in the study are available from the corresponding author on request.

AUTHOR CONTRIBUTIONS

LC acted as the primary researcher as this study forms part of her doctoral research. LvdV, AV, and SR acted as supervisors. They played an advisory role, assisting in the conceptualisation of the study, assisting with the interpretation of the research results, and refining the manuscript. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.698526/full#supplementary-material

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