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Aimee Quickfall,
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REVIEWED BY

Louise Connolly,
Bishop Grosseteste University, United Kingdom
Jonathan Glazzard,
University of Hull, United Kingdom

*CORRESPONDENCE

Aileen S. Garcia
✉ aileen.garcia@missouri.edu

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Examining the interplay of teacher well-being, executive function, and adaptability in virtual instruction during COVID-19 disruptions

Aileen S. Garcia^{1*}, Shinyoung Jeon¹, Kyong-Ah Kwon² and
Diane M. Horm³

¹Department of Human Development and Family Science, University of Missouri, Columbia, MO, United States, ²Department of Instructional Leadership and Academic Curriculum, University of Oklahoma-Tulsa, Tulsa, OK, United States, ³Early Childhood Education Institute, University of Oklahoma-Tulsa, Tulsa, OK, United States

The documented challenges of the early care and education (ECE) workforce include poor well-being, inadequate compensation, and high turnover rates. The COVID-19 pandemic not only exacerbated these issues, but also imposed additional demands such as virtual instruction, highlighting the need to understand how teachers' well-being relates to their adaptability in teaching. The present study examined whether early childhood teachers' well-being is directly and indirectly related to adaptability to virtual instruction via teachers' executive function during the COVID-19 pandemic. With a research-practice partnership project in a Head Start program in a metropolitan area in the central United States, data were collected from the Early Head Start/Head Start annual teacher survey ($n = 148$). Mediation analysis showed that teachers who demonstrated higher well-being displayed higher levels of executive function, which in turn was associated with greater adaptability in virtual instruction. Beyond the pandemic, findings highlight the importance of supporting teachers' well-being and executive functions to promote adaptability, which is critical not only in virtual instruction, but also in successfully navigating other challenges of the teaching profession.

KEYWORDS

teacher well-being, executive function, adaptability, pandemic (COVID19), virtual instruction

Introduction

It is well-documented that early care and education (ECE) teachers who teach and care for children from birth to five in various educational settings (e.g., child care centers, Head Start programs, preschool/pre-kindergarten) in the U.S. play an essential role in shaping child development ([Institute of Medicine and National Research Council, 2015](#); [Bassok et al., 2021](#)). Poor psychological well-being (e.g., depressive symptoms, burnout) of early childhood teachers has received an increasing attention as a global public health concern ([Organization for Economic Cooperation and Development, 2020](#)). Simultaneously, a growing body of research highlights the ECE workforce's reported low overall well-being attributable to various

factors, including challenging working conditions (Eadie et al., 2021; Ford et al., 2021; Berger et al., 2022; Kwon et al., 2022), inadequate compensation (Herman et al., 2023), heightened levels of stress, and high staff turnover rates (McMullen et al., 2020; Bassok et al., 2021). The field is also generally undervalued as a profession (Rouse, 2012) and has become less competitive in attracting personnel compared to other occupations (Khattar and Coffey, 2023). The repercussions of teachers' poor well-being extend beyond the workforce, affecting children directly or indirectly, as teachers serve as the primary determinant of the quality of early learning and experiences that children receive (Peisner-Feinberg et al., 2001; Kwon et al., 2019). When teachers are overburdened, their ability to engage and provide a high-quality learning experience for their students is compromised (Friedman-Krauss et al., 2014a,b). As with other sectors of society, the COVID-19 pandemic exacerbated the country's problems related to ECE teachers' well-being (Eadie et al., 2021; Kwon et al., 2022).

Accordingly, it is crucial to understand the mechanisms by which teachers' well-being relates to their adaptability in teaching, especially within the context of unprecedented changes brought about by the COVID-19 pandemic. Although the pandemic has come to an end, its impact remains and many teachers and administrators expect that the needs for accommodation and needs for virtual instruction will continue after the COVID-19 era (Hu et al., 2021). This issue is particularly critical in the context of Early Head Start/Head Start (EHS/HS), a federally funded early care and education program providing comprehensive services to families and their children 0–5 years of age living in the context of poverty. EHS/HS staff have been found to face significant job demands, exceeding the reports from nationally available normative samples which include Americans aged 18 and older (Farewell et al., 2022). Also, as the pandemic has disproportionately impacted marginalized or vulnerable populations and amplified the existing educational inequity (Szulewicz, 2023), teachers' ability to regulate their cognitive process [e.g., executive function (EF)] and implement flexible and high-quality teaching becomes important to prevent the widening of learning gaps that have been exacerbated by the pandemic. Thus, the present study investigated how EHS/HS teachers' well-being (i.e., depressive symptoms and burnout) are associated with adaptability in virtual instruction, either directly or indirectly, through its relation to teachers' EF during the pandemic.

Theoretical framework

The current study builds upon existing research on ECE teachers' well-being during the COVID-19 pandemic and is informed by Viac and Fraser's (2020) teacher well-being framework. This framework underscores the four components that define teachers' well-being – physical and mental, cognitive, subjective, and social well-being and how working conditions and larger contexts at the school and system levels would shape and impact teachers' well-being. The framework further posits that well-being has two types of related outcomes. One is called inward outcomes or the teachers' level of stress or satisfaction with the job. The second is termed outward outcomes, which encompasses how teachers' well-being influences the quality of teaching and student outcomes. In this study, we examined teachers' well-being as measured by depression scores and feelings of burnout for the inward outcomes; and teachers' adaptability in implementing or practicing

virtual instructions for the outward outcome. This framework was used to conduct a large cross-cultural study that compares teachers' well-being (mostly focusing on K-12) across the Organization for Economic Cooperation and Development (OECD) countries. Our study extended Viac and Fraser's framework by focusing on ECE teachers who have unique challenges and needs and by examining EF, cognitive processes related to managing and regulating thoughts, emotions, and actions (Blair and Ursache, 2011), as a pathway through which well-being influences adaptability among preschool teachers. We also added to the framework by investigating teachers' well-being during the COVID-19 pandemic, which serves as an unprecedented and distinctive context for the ECE teachers' well-being and work.

Importance of teaching adaptability for ECE teachers during the COVID-19 pandemic

During the COVID-19 pandemic, teachers noted increased job demands and, consequently, heightened mental health concerns (Kwon et al., 2022). Mental health is an important component of general health and refers to the state of well-being that allows individuals to work and cope with life stressors (World Health Organization, 2022). Potential contributors to these mental health concerns include challenges for ECE programs such as staff shortages, financial stressors due to increased costs for protective equipment, and continuously changing protocols that required increased staff training (Jalongo, 2021; Kwon et al., 2022; Farewell et al., 2023). In addition, the pandemic imposed additional challenges on ECE teachers by forcing the adoption of a new instructional mode and significant shifts in teacher-child interactions [e.g., online, in-person, school closed, (Kwon et al., 2022; Martin et al., 2022)].

This rapid and abrupt change did not allow teachers to learn and prepare for the new mode of teaching and intensified job demands on teachers and families (Collie and Martin, 2016; Kwon et al., 2019, 2022; Allen et al., 2020). Research indicated that the vast majority of teachers did not have any experience teaching virtually, with limited training in this area before the pandemic (Ethridge et al., 2022). It is evident that many ECE teachers were committed to pivoting their teaching and used a variety of play-based strategies to facilitate children's learning through the virtual modality (Ethridge et al., 2022). They actively looked for resources and training and adopted various new strategies for teaching online effectively, such as modifying their traditional in-person classes via video conferencing platforms and creating new strategies to better engage children in developmentally appropriate ways (Allen et al., 2020; Ethridge et al., 2022; Kwon et al., 2022). Yet, they faced a unique set of stressors and poor well-being (MacIntyre et al., 2020; Besser et al., 2022; Kwon et al., 2022), which may have a negative impact on their perceived virtual teaching efficiency (e.g., adopting new strategies, using a variety of strategies).

Given the inherent challenges that come with the teaching profession, as well as COVID-related issues mentioned, being adaptable is a highly valued skill for teachers (Parsons, 2012; Granziera et al., 2019). Adaptability refers to individuals' disposition and capacity to regulate or adjust their thoughts, feelings, and behaviors in response to changing or uncertain situations (Martin et al., 2012). Martin et al. (2012) described adaptability as having three dimensions. The first is cognitive adaptability, which entails altering one's thinking or

perspective about a given circumstance. The second is behavioral adaptability which includes problem solving and adjusting one's actions to effectively cope with or manage the changes in the environment. The third dimension, emotional adaptability, refers to the ability to regulate or modify one's emotions to reduce negative emotions and increase positive feelings.

Previous research has linked teacher adaptability with both teacher and student outcomes (Collie and Martin, 2017). Teachers who were more adaptable were more likely to adjust their classroom teaching practices to accommodating their students' needs (Loughland and Alonzo, 2019). Another study among secondary teachers found that teachers' adaptability was linked to greater well-being and greater commitment to the school, as well as increased student achievement in numeracy (Collie and Martin, 2017). For ECE teachers, their teaching adaptability was positively correlated with their digital literacy and efficacy, and negatively correlated with job burnout (Kim et al., 2022). Indeed, adaptability is considered as a personal resource that contributes to individuals' success in and satisfaction with their jobs (Collie and Martin, 2017). Teachers who demonstrated high adaptability in unforeseen circumstances experienced reduced burnout in their profession. Further, correlational findings showed that those who exhibited high adaptability also upheld high levels of teaching efficacy and digital utilization for instruction, both of which were linked to decreased burnout levels (Kim et al., 2022).

During the COVID-19 pandemic, teachers' adaptability and flexibility are crucial for effective teaching (Ethridge et al., 2022). Some ECE teachers are more adaptable, open, and are more likely to adopt an approach that is flexible, creative, and oriented to problem-solving while teaching virtually (Ford et al., 2021; Ethridge et al., 2022). Other ECE teachers displayed resistance to virtual instruction and hesitated to try facilitating children's engagement through play virtually. This tendency may be in part due to their traditional beliefs and negative attitudes toward technology use and virtual teaching in the ECE classrooms and limited resources and support (Pyle and Danniels, 2017; Mertala, 2019; Ford et al., 2021; Ethridge et al., 2022).

Association between teacher well-being on teaching adaptability

The contributions of previous research on adaptability notwithstanding, it is not clear what other individual characteristics and resources (e.g., well-being) would be associated with teaching adaptability in ECE settings during the pandemic. More research is needed to understand the predictors of adaptability among teachers. Given the dearth of research on ECE teachers' adaptability during the COVID-19 pandemic, as well as the link between adaptability and effective functioning in the workplace (Collie and Martin, 2016), we drew from the literature of related constructs, such as the quality of instructions, to inform the current research. Previous studies have closely linked teacher well-being to the overall effectiveness of their teaching strategies and the classroom learning environment (Kwon et al., 2019; Byun and Jeon, 2023). This is an essential line of inquiry, given the multiple stressors cited above that teachers experience on a regular basis. A common indicator of psychological well-being in research is depressive symptoms. Depressive symptoms refer to persistent feelings of hopelessness, loneliness, and lack of interest in daily activities, among other indicators (Radloff, 1977). One study of

preschool classrooms, for example, found that teachers' depressive symptoms were related to lower quality of instructional support and classroom organization (Sandilos et al., 2015). A similar study revealed that preschool teachers' depressive symptom scores are related to global measures of child care quality (Jeon et al., 2014). Among Early Head Start and Head Start teachers, elevated depressive symptom scores were related to less emotional and behavioral support (Kwon et al., 2019) and with less high-quality conversations with children (Granger et al., 2023), respectively.

Feelings of burnout as another aspect of psychological well-being have also been widely reported among ECE teachers. Job burnout is characterized by emotional exhaustion (e.g., lack of energy and motivation, feeling fatigued and overwhelmed by responsibilities), depersonalization (e.g., feeling disconnected from one's own thoughts and feelings), and a reduced sense of personal accomplishment (e.g., lack of effectiveness, diminished ability to meet job demands) (Maslach et al., 1997). A meta-analysis on job burnout among elementary and high school teachers highlights how teacher burnout negatively relates to every level of the school system – the teachers themselves, the administrators as they deal with attrition and job performance, and the students (Aloe et al., 2014). In the context of ECE, similar to correlates of teacher depressive symptoms, burnout has been found to predict lower instructional support among Head Start teachers (Sandilos et al., 2020). Another study showed that emotional exhaustion among teachers is related to lower-quality interactions with their students (Ansari et al., 2022). These findings highlight the negative outcomes of poor teacher well-being. What remains to be studied, as imposed by the COVID-19 pandemic, is whether teachers' well-being is associated with how they adapt and transition to a different teaching modality as necessary. Moreover, it is also important to examine potential underlying mechanisms that link the two variables to gain a better understanding of the relation between teachers' well-being and their adaptability during COVID-19 when the flexibility and adaptability of teaching is more imperative and critical than ever.

Relations among well-being, executive function, and teaching adaptability

Executive function (EF) refers to cognitive processes that are critical for performing higher-order skills such as planning, problem-solving, and response inhibition, among others (Blair and Ursache, 2011). EF also includes attentional skills that enable individuals to adapt their current knowledge as needed to pursue their objectives related to work (Zelazo et al., 2016). There is significant research that shows how individual well-being can significantly impact EF skills among adults. There is limited research on how aspects of well-being predict EF among ECE teachers, but insights can be gleaned from broader EF research on adults. For example, empirical evidence shows high depression scores are related to impaired EF (Alves et al., 2014). Studies also found job burnout is significantly associated with difficulty in carrying out daily requiring EF (Koutsimani et al., 2021; Pihlaja et al., 2022). This is a cause for concern given that existing research on adults predominantly views EF as a psychological resource.

Teachers, in particular, can leverage EF in order to manage the changing demands of their job (Friedman-Krauss et al., 2014a,b). Leveraging EF skills can help manage stress and minimize the effects of stressors on desired outcomes. EF skills also allow individuals to

effectively modify their actions to achieve shifting goals, and this is linked to adaptability. Given that EF is a cognitive process that involves problem-solving, it is logical to associate it with adaptability which also has a cognitive component. When an individual has high EF skills, it is reasonable to think that they are also more likely to be adaptable and have the capacity to effectively modify their perspective as a response to evolving circumstances (Martin et al., 2012). For example, in the classroom, teachers may be better able to identify and use appropriate behavior management strategies if they demonstrate better EF skills. Those with low EF skills, on the other hand, may respond more impulsively with anger or annoyance (Friedman-Krauss et al., 2014a,b). In the context of the COVID-19 pandemic specifically, this can translate to teachers being more able to effectively manage social distancing guidelines and new protocols related to transitioning to virtual instruction (Atiles et al., 2021). This is especially important as past studies have pointed out that ECE teachers may not be as comfortable in using technology in their classroom instruction as they rely more on teaching through play (Ford et al., 2021; Ethridge et al., 2022; Steed et al., 2022).

Most studies on EF focus on children and students; there is limited research focused on ECE teachers, especially on how EF influences the adaptability or quality of their teaching practices (Bardack and Obradović, 2019). Nonetheless, current literature purports that teachers may use their EF skills to manage high job demands and stress and stay on track with their instruction amidst distractions and uncertainty, while also paying attention to the individual needs of students (Raver et al., 2012). Consequently, those with lower EF may struggle with managing classroom demands, which can then result in a decreased overall classroom climate (Jennings and Greenberg, 2009). Referring back to EF as a psychological resource for teachers, research has yet to determine how, in light of the many transitions in instruction that the pandemic necessitated, EF influences teachers' adaptability in teaching.

The current study

Guided by the theoretical framework and the review of related literature, the purpose of this study is to examine the associations among EHS/HS teachers' well-being, EF, and adaptability in virtual teaching during the pandemic. Specifically, the goal of this study was to answer two research questions (RQs):

RQ1: Was the well-being of teachers directly associated with their adaptability in virtual teaching during the COVID-19 pandemic?

RQ2: Was the well-being of teachers indirectly associated with their adaptability in virtual teaching through the influence of teachers' EF during the COVID-19 pandemic?

We hypothesized that teachers with better scores in well-being will demonstrate greater adaptability in transitioning to virtual instruction. Further, we hypothesized that teachers' well-being is related to their adaptability through its association with EF. This research addresses a gap in literature by focusing on the crucial aspect of teaching adaptability. The significance of teaching adaptability extends beyond the COVID-19 pandemic, encompassing potential disruptions such as natural disasters that HS programs and the ECE field may encounter.

Materials and methods

This study was approved by the Institutional Review Board at a comprehensive research university that employed the research group members who collected the data. Acknowledging a potential psychological risk as some questions related to mental health may be deemed sensitive, potential participants were presented with a consent form that explained the purpose of the study and highlighted the confidentiality of all data. Teachers were also informed that participation was optional and that there were no penalties for declining. They also can skip the questions or withdraw from the study anytime if they do not feel comfortable. Further, the research team developed an informational video that was viewed by the teachers that explained how data would be handled with confidentiality and that individual responses would not be disclosed to administrators or anyone outside of the research team.

Participants

We utilized existing data from a teacher survey conducted within a large EHS/HS program providing services to over 2,000 children and their families across nine centers in a metropolitan area in the central United States. In the spring of 2020, the EHS/HS program transitioned from in-person to virtual learning to ensure continuous services for children in their program during the early phase of the pandemic. Children ages 1 to 4 participated in virtual learning from July 2020 to Feb 2021 until the program resumed in-person classes in the spring of 2021. During this seven-month period, the program, teachers, children, and families actively engaged in the virtual education setting.

The EHS/HS program conducts an annual teacher survey to assess teachers' mental, economic, and physical health, as well as their needs and teaching practices. In the spring of 2021, the EHS/HS program collaborated with its university-based research team to develop a more comprehensive teacher survey. This questionnaire aimed to delve deeper into teachers' well-being, cognitive functions, adaptability, and teaching strategies during the COVID-19 pandemic. During a spring 2021 professional development session, teachers were invited to participate and 78% ($n = 202/260$) completed the full teacher survey. The data collected from this extensive survey formed the basis for this study. For the current analysis, we specifically selected lead (64%) and assistant teachers (36%) who primarily dealt with distance learning when EHS/HS centers were closed. This criterion led to the inclusion of 148 teachers in our final analyses. More than half of teachers hold degrees higher than a four-year bachelor's, demonstrating a wide range of teaching experiences in early childhood education. Teachers' characteristics, such as their role, age, education level, and years of teaching experience, were included in the research model as controls.

Measures

Teacher burnout

The Maslach Burnout Inventory (MBI) (Schaufeli et al., 1996) was used to evaluate teachers' occupational burnout, a condition marked by chronic physical and emotional exhaustion associated

with work-related stress. The MBI comprises three scales: the Emotional Exhaustion (EE) scale, the Depersonalization (DP) scale, and the reduced Personal Accomplishment (PA) scale. Emotional Exhaustion (EE) gauges feelings of being emotionally drained and depleted of emotional resources. Teachers with elevated scores on this scale may display symptoms such as fatigue, irritability, and a sense of being overwhelmed. Example items are “I feel used up at the end of the workday,” “I feel burned out from my job” and “Working directly with people puts too much stress on me.” Depersonalization (DP) examines an individual’s negative attitudes and feelings toward their clients or work recipients. Teachers with high scores on this scale may manifest a sense of cynicism, detachment, or impersonal reactions to the people being served. Example items include “I feel I treat some students as if they are impersonal ‘objects,’” and “I do not really care what happens to some students.” Personal Accomplishment (PA) assesses feelings of competence and successful achievement in teachers’ work. Teachers with low scores on this scale may suggest a diminished sense of achievement, effectiveness, and successful performance in their job. Example items are “I feel I am positively influencing other people’s lives through my work,” “I feel very energetic” and “In my work, I deal with emotional problems very calmly.” To ensure consistency with the other two scales, PA scores were reversed, signifying that higher MBI scores among teachers correspond to higher occupational burnout scores. The response scale ranged from 1 = never to 7 = every day. The total score of the three scales was used in this study; the scale reliability for the current sample is 0.78.

Teacher depressive symptoms

We employed the Center for Epidemiologic Studies Depression Scale [CES-D-10; (Radloff, 1977)], a widely used self-report questionnaire, to assess depressive symptoms in teachers. The CES-D-10 consists of 10 questions, each addressing specific aspects of depressive symptomatology. Items include “I had trouble keeping my mind on what I was doing,” “I felt depressed” and “My sleep was restless.” Participants are asked to rate the frequency of experiencing these symptoms over the past week. Response options include 0 = rarely or none of the time (less than 1 day), 1 = some or a little of the time (1–2 days), 2 = occasionally or a moderate amount of time (3–4 days), and 3 = all of the time (5–7 days). Higher scores on the CES-D-10 indicate a greater presence of depressive symptoms among teachers. It is essential to recognize that the CES-D-10 serves as a screening tool and not a diagnostic tool. The total score was computed and used for this study. The reliability of the CES-D-10 in this study was determined to be 0.77.

Teacher executive function

The Webexec scale (Buchanan et al., 2010) was used to assess teachers’ EF. It consists of 6 items describing concentration and attention problems. Examples of items include statements such as “difficulty seeing through something that you have started,” “difficulty carrying out more than one task at a time,” and “problems concentrating on a task.” Teachers rated each item on a 4-point scale, ranging from 1 (no problems experienced) to 4 (a great many problems experienced). Notably, all items were reverse-coded, and the scores were then summed to create a total score. Higher total scores on the Webexec scale indicate higher levels of EF. A reliability coefficient of 0.91, indicating a high level of

reliability or consistency among the items, is reported by the authors and the research manual.

Teacher adaptability

The research team designed a scale comprising six items to assess teachers’ adaptability amidst the challenges of distance learning, an emergent task with the onset of the pandemic. These items encompass various facets, including transferring curriculum/materials to remote/virtual instruction, providing virtual guidance and instruction, adapting lessons for children with special needs and dual-language learners, and collaborating with parents to support home learning. The scale also takes into account the reliance on technology and internet access for distance learning activities. Teachers provided ratings on a scale ranging from 1 = no problems experienced to 4 = a great many problems experienced. For improved interpretability, responses were reversed and summed to generate a total score. Thus, higher total scores indicate a heightened level of positive adaptation to the new teaching setting. This scale informs our understanding of the extent to which teachers effectively adjusted to the challenges posed by the transition to distance learning during the pandemic. The reliability of this scale is established at 0.85.

Control variables

We included teacher characteristics in the model to control potential confounds. These characteristics include teacher’s role, age, education level, and the number of years in teaching. Additionally, we incorporated the children’s age group that the teacher staffed (ranging from 1 to 4 years) as an additional control variable.

Data analysis

We conducted a descriptive analysis including statistics such as means, standard deviations, response ranges, and missing rates by using SPSS. Additionally, we conducted bivariate correlations to illustrate the zero-order correlations among variables in this study. Given the relatively high correlation between two mental health variables, burnout and depressive symptoms, we created a latent variable, teacher well-being. To align with the concept of well-being, burnout and depressive symptom scores were reversed. High reversed scores indicate higher mental well-being in both burnout and depression symptoms. To validate these constructs, we executed a measurement model to explore the associations among all variables, including the latent teacher well-being and other variables. All models were run using *Mplus8*.

Addressing RQ 1, we implemented a direct path model wherein teacher well-being served as an exogenous variable influencing adaptability in virtual instruction during the pandemic. Control variables were included, regressing on the outcome. For RQ 2, we employed an indirect path model, having teachers’ EF as a mediator between teacher well-being and adaptability in distance learning during the pandemic. To examine mediation, we employed a bootstrap model ($n=2000$), a resampling technique used to acquire bias-corrected confidence intervals for the indirect effect (Preacher and Hayes, 2008). This method helps in adjusting for non-normal sampling distributions. Control variables, encompassing teachers’ role, age, education level, and years in teaching, were also regressed on the mediator.

Results

Descriptive statistics

As shown in [Table 1](#), there are significant variations in most of the study variables. While depression exhibits a higher rate of missing data compared to other variables, the majority of variables have less than 10% missing data. [Table 2](#) shows the correlation among these variables. Notably, there exists a strong positive correlation between teachers' burnout and depressive symptoms. Furthermore, both burnout and depressive symptoms demonstrate negative correlations with teachers' EF and adaptability. Teacher's EF is also positively correlated with teacher's adaptability.

Direct path from well-being to teaching adaptability

Before running the direct and indirect models, we confirmed the acceptable measurement model for this study; χ^2 (5, $N = 148$) = 0.36, $p = 0.89$, CFI = 1.00, and TLI = 1.00. The result of the direct model showed ([Figure 1](#)) that teachers exhibiting higher well-being demonstrated a positive association with adaptability in virtual instruction ($\beta = 0.33$, $p < 0.01$) during the COVID-19 pandemic, after controlling for teacher's characteristics. In other words, Head Start teachers experiencing lower levels of job burnout and depressive symptoms were more likely to adapt to virtual instruction.

TABLE 1 Descriptive statistics ($n = 148$).

	Missing (%)	M (Range)	SD
Main variables			
Teacher burnout	4%	40.59 (20–88)	11.80
Teacher depressive symptoms	4%	5.69 (0–23)	4.85
Teacher executive function	7%	19.82 (6–24)	3.72
Teacher Adaptability	8%	15.20 (3–24)	4.72
Control variables			
Teacher role	0%		
Lead teacher		64%	
Assistant teacher		36%	
Teacher age	1%	5.40 (1–10)	2.35
Teacher education level	7%	3.33 (1–5)	1.20
High school diploma or GED		14%	
One-year degree		5%	
Two-year college degree		18%	
BA/BS degree		47%	
MA/MS degree		9%	
The number of year in teaching	1%	13.85 (0.58–45)	9.70
The age group of children	0%	2.51 (1–4)	0.95

Teacher age: (1 = 18–22, 2 = 23–27, 3 = 28–32, 4 = 33–37, 5 = 38–42, 6 = 43–47, 7 = 48–52, 8 = 53–57, 9 = 58–62, 10 = 63+).

Indirect path through teachers' EF

The indirect model showed that teachers who demonstrated lower levels of job burnout and depressive symptoms displayed higher levels of EF ($\beta = 0.58$, $p < 0.001$), which in turn was associated with greater adaptability in transitioning to virtual instruction ($\beta = 0.34$, $p < 0.01$) (see [Figure 2](#)). Our findings indicate complete mediation by teachers' EF between their well-being and adaptability ($\beta = 0.20$, 95% [CI: 0.06–0.33]). Once EF was included in the analysis as a mediator, the previously observed association between teacher well-being and teaching strategies disappeared. We included the results of the control variables used in the final model (see [Table 3](#)). There were no significant associations between the control, mediator, and outcome variables.

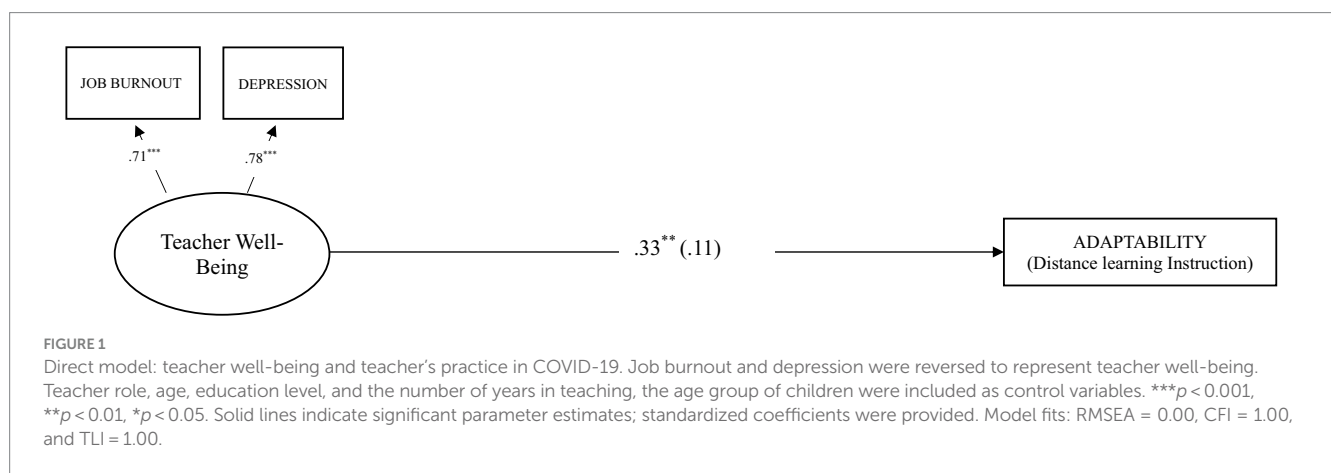
Discussion

This study aimed to examine EHS/HS teachers' well-being and how it directly relates to their adaptability to virtual instruction during the COVID-19 pandemic disruptions. Further, we investigated the indirect association between these variables via the relation of teachers' well-being to their EF. Our hypotheses on direct and indirect associations were supported and are in line with existing research. Following [Viac and Fraser's \(2020\)](#) teacher well-being framework, we found evidence to support that teachers' inward outcomes are related to their outward outcomes. For example, teachers' well-being, as measured by burnout and depressive symptoms scores (inward outcomes), is related to their adaptability to virtual instruction (outward outcome). This is similar to the finding with secondary teachers considering adaptability as a resource that is linked to teachers' well-being ([Collie and Martin, 2017](#)).

First, we found that teachers who exhibited lower levels of burnout and depressive symptoms were more highly adaptable to virtual instruction during the pandemic. The pandemic posed various demands on any teachers, but it added unique challenges and stressors to ECE teachers who were seldom prepared to teach young children virtually ([Allen et al., 2020](#); [Ford et al., 2021](#); [Ethridge et al., 2022](#); [Kwon et al., 2022](#)). Although prior studies have not explicitly investigated teaching adaptability as an outcome in ECE settings, teacher's well-being has been linked to the overall quality of instructional support and organization in the classroom ([Sandilos et al., 2015, 2020](#)) that are related to adaptability. Indeed, when teachers experience challenges related to their well-being, such as depressive symptoms and feelings of burnout, this may diminish their mental and cognitive energy and motivation to adapt to change ([Smith, 2013](#)). Poor well-being may also manifest through disengagement, which is a dimension of job burnout, or distancing oneself from their work ([Demerouti et al., 2010](#)). When teachers are disengaged, they may not only lack the motivation to respond to the demands of their job, but they may also demonstrate a general resistance to change ([Demerouti et al., 2010](#); [Smith, 2013](#)), as well as underperform at their job ([Kidger et al., 2016](#)). Considering the numerous stressors and uncertainties presented by the COVID-19 pandemic, it makes sense that teachers, grappling with overwhelming challenges, most of which they were not prepared and skilled to tackle ([Collie, 2021](#); [Crawford, 2021](#); [Ford et al., 2021](#); [Ethridge et al., 2022](#); [Kwon et al., 2022](#)), may not be able to smoothly

TABLE 2 Correlations among study variables used in analyses (n = 148).

Study variables	1	2	3	4	5	6	7	8	9
1. Teacher burnout	–								
2. Teacher depressive symptoms	0.55***	–							
3. Teacher executive function	–0.33**	–0.49***	–						
4. Teacher adaptability	–0.22*	–0.25**	0.41***	–					
5. Teacher role	0.02	0.04	0.07	0.08	–				
6. Teacher age (in years)	–0.30***	–0.32***	0.15*	0.14	–0.18*	–			
7. Teacher education level	–0.03	–0.01	–0.09	–0.04	–0.64***	0.09	–		
8. Number of years in teaching	–0.28***	–0.31***	0.22*	0.12	–0.26**	0.59***	–0.03	–	
9. Age group of children	0.06	0.04	–0.04	0.11	–0.08	–0.13	0.06	0.15*	–



transition to virtual instruction. On the other hand, when teachers have fewer mental health concerns, they are better positioned to invest their energy toward meeting the ongoing demands of their job, including adapting to the necessary and required teaching modality.

Second, our data supports an indirect association between EHS/HS teachers’ well-being and their adaptability via its relation to teachers’ EF, while the significant direct link disappears in the model. Our findings align with past research showing that teachers with poor well-being score lower in EF (Alves et al., 2014; Koutsimani et al., 2021), or vice versa. Certainly, when teachers’ well-being is compromised in the context of high job demands and uncertainty such as the pandemic, this can impair their cognitive functions, including EF. Individuals who experience depression and burnout, may struggle with job responsibilities and daily tasks that require EF, such as planning, sustained attention, and problem-solving (Gavelin et al., 2022). This difficulty may, in part, be attributed to an increased susceptibility to negativity bias, where individuals interpret information around them in a more negative light, which can distort the way they think and behave (Quigley et al., 2022). This is connected to our finding which is that EF skills are related to adaptability to virtual instruction in HS programs. Given the role of EF in problem-solving (Blair and Ursache, 2011) and enabling teachers to maintain focus and attention on their instruction and on their students’ needs (Raver et al., 2012), it is not surprising that teachers who report higher EF skills were also more able to adapt to their job demands.

Our research also shows that teachers’ EF serves as a mechanism by which well-being influences teaching adaptability. It is interesting that the significant direct link between teacher well-being and adaptability became absent when their EF was added as a mediator in the model. It indicates the important role of EF as a proxy for teachers’ adaptability to virtual instruction. This aligns with the conceptual definition of both EF and adaptability, emphasizing the capability to adjust thinking and perspectives in response to changes in the environment (Martin et al., 2012; Raver et al., 2012). Going beyond the immediate challenges of the pandemic, our study contributes to the existing body of literature by offering a more nuanced comprehension of the intricate relationships among well-being, cognitive processes, and adaptability in the realm of teaching. Given the inherently demanding nature of teaching (Granziera et al., 2019), together with the increasing complexity of the profession amidst the landscape of technological advancements (McCallum, 2020), adaptability is a necessary skill that holds value for educators in any context.

Aside from our main research questions, our study also showed that age and tenure were each negatively correlated with well-being and each positively correlated with EF. This suggests that teachers who are older and have accumulated more years of teaching experience tend to exhibit improved well-being, reflected in lower scores in depressive symptoms and burnout, as well as higher EF scores. This finding can be attributed to how those with more experience may have developed more mechanisms to cope with the demands of their job

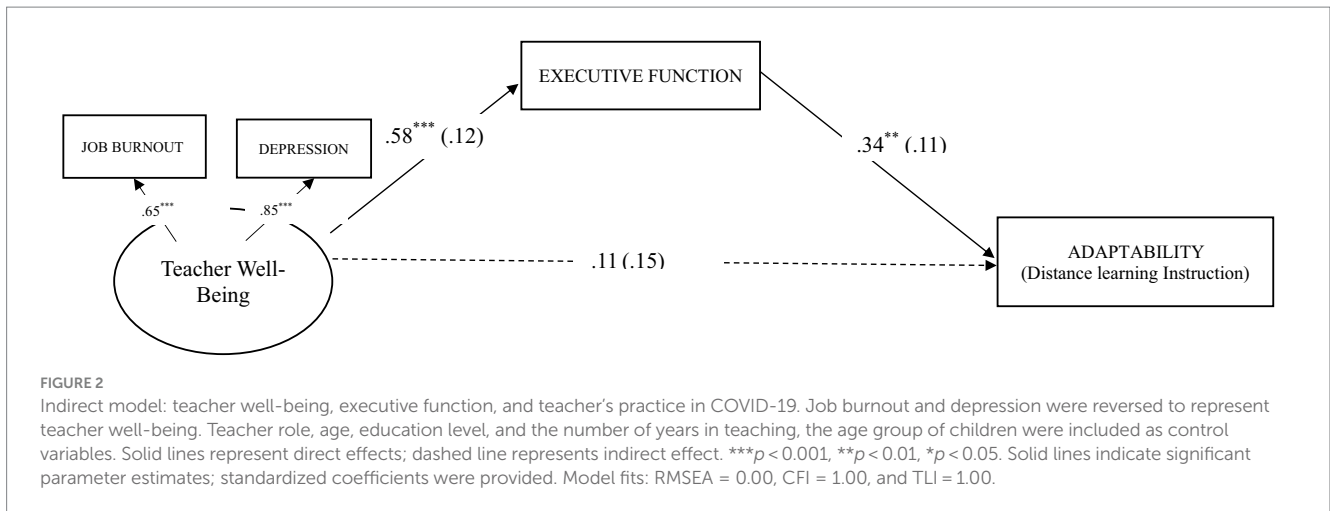


TABLE 3 Associations between covariates and main study outcomes in the final model.

	Executive function	Adaptability
Control variables	β (SE)	β (SE)
Teacher role	0.12 (0.09)	0.05 (0.11)
Teacher age (in years)	-0.14 (0.12)	0.04 (0.11)
Teacher education level	0.03 (0.12)	0.00 (0.11)
Number of years in teaching	0.10 (0.10)	-0.01 (0.11)
Age group of children	-0.03 (0.07)	0.14 (0.08)

The results above should be included in Figure 2, however since there are too many paths from covariates to a mediator and outcome, we separate the results in table. None of the paths were statistically significant.

over time. They also may have more social capital and established support systems that can provide them with mentorship and other resources that contribute to better overall well-being (Nyqvist et al., 2013). These resources may not necessarily be available to early career teachers who are also more likely to experience challenges related to adjusting to full-time teaching responsibilities, navigating relationships with parents and colleagues, and understanding the culture of the school (Buchanan et al., 2013). Our findings lend evidence to the importance of providing support to early career preschool teachers to help them become more adaptable and effective in their jobs, as well as strengthening programs that promote teacher retention. Administrators must also understand teachers' experiences of barriers and challenges and support them in overcoming these difficulties. More specifically, these could include providing more planning and preparation time, various educational materials, and offering access to diverse professional development opportunities and coaching tailored to their needs.

Limitations, strengths, and recommendations for future research

The findings of the present study should be interpreted in light of the following limitations. First, the use of cross-sectional data

precludes us from establishing temporal precedence. Using longitudinal data would help draw causal inferences and will also allow researchers to examine how teachers' adaptability influences child outcomes. As this study is correlational in design, we are not able to ascertain the direction of the associations among teachers' well-being, EF, and adaptability. The key insight from our findings is that these three variables are related. Second, given our focus on EHS/HS teachers, the study's generalizability is limited to this particular sample in this region. It is plausible that teachers in other preschool programs (i.e., private and public) may have different experiences depending on the resources available to them. Nevertheless, insights from this study can still offer valuable guidance to other preschool programs to enhance their support mechanisms for teachers' adaptability. Third, the data collected consisted of teachers' self-reports, which are susceptible to social desirability bias. Future studies could benefit from collecting data from other sources, such as EHS/HS administrators, students, and parents to triangulate findings. Fourth, more information about the context of virtual instruction would have enriched the study. For example, information related to how the school and administration provided support during the pandemic, the available technological platforms that teachers needed to use, as well as examining other facilitators and barriers (e.g., social support available to the teachers, if teachers were parents, etc.) could further contextualize how well teachers adapted to virtual instruction during this time. Although desirable, these data were not available in this existing dataset. Fifth, this study acknowledges the potential influence of teachers' information technology (IT) experiences on adaptability. Thus, it is crucial to emphasize that our findings revealed no significant associations between adaptability and demographic factors such as age and education levels. Traditionally, younger individuals and those who graduated from higher education more recently tend to have greater exposure to and proficiency with technology (Inan and Lowther, 2010). However, the lack of significant correlations with these demographic variables in the current study suggests that adaptability may encompass factors beyond mere technological proficiency. Therefore, our study suggests that understanding adaptability requires consideration of a broader set of factors beyond IT experiences alone.

Despite these limitations, the current study also has several strengths. One is the focus on the current context and challenges experienced by ECE teachers. Even after the Centers for Disease Control and Prevention declared the end of the COVID-19 pandemic in May 2023, the teaching profession, specifically those in EHS/HS programs, continues to face various challenges related to workforce shortages, insufficient funding, and navigating new policies to meet local, state, and federal guidelines (Shaw et al., 2023). Thus, teachers need to continue to be adaptable not only in virtual instruction, but also in other aspects of their job. Further, our study provides evidence on the impact of poor well-being on cognitive functions and job performance. Next, this study incorporated the role of EF in well-being and adaptability. With the identification of this mechanism, our findings add depth to the understanding of how well-being impacts adaptability, especially in a period where teachers must swiftly adjust to unforeseen changes for which they were unprepared. In addition, our study contributes to the limited research on EF among preschool teachers.

Implications for practice and policy

The findings of this study are relevant to the context of the pandemic and post-pandemic era and offer important implications for practice and policy on supporting EHS/HS teachers in the midst of crisis as many of the challenges continue to be experienced by ECE teachers. This can contribute to the growing awareness of the challenges faced by ECE teachers, especially those serving children from low-income families, as well as informing policies and programs on protecting them from heavy job demands and promoting their well-being during times of hardship. Our findings also highlight the importance of teachers' openness and adaptability, which may be related to positive perspectives and growth mindsets, as a critical skill to work in a rapidly changing society and to be prepared for other unforeseen future disruptions (e.g., natural disasters, public health emergencies). The program- and system-level supports are crucial to help ECE teachers prepare and minimize the negative impact of such events by providing professional development opportunities to diversify teaching modalities and broaden a repertoire of strategies. Also, our study underscores that capitalizing on and fostering teachers' EF will not only improve their cognitive processes but will also benefit preschool-aged children through teachers' adaptability and quality of instruction. The findings that EF mediates the influence of teachers' well-being on their adaptability in virtual instruction suggest that interventions or professional development programs aimed at enhancing EF could also help improve teaching adaptability.

References

- Allen, J., Rowan, L., and Singh, P. (2020). Teaching and teacher education in the time of COVID-19. *Asia Pac. J. Teach. Educ.* 48, 233–236. doi: 10.1080/1359866X.2020.1752051
- Aloe, A. M., Shisler, S. M., Norris, B. D., Nickerson, A. B., and Rinker, T. W. (2014). A multivariate meta-analysis of student misbehavior and teacher burnout. *Educ. Res. Rev.* 12, 30–44. doi: 10.1016/j.edurev.2014.05.003
- Alves, M. R. P., Yamamoto, T., Arias-Carrión, O., Rocha, N. B. F., Nardi, A. E., Machado, S., et al. (2014). Executive function impairments in patients with depression. *CNS Neurol. Disord. Drug Targets* 13, 1026–1040. doi: 10.2174/1871527313666140612102321

Data availability statement

The data analyzed in this study is subject to the following licenses/restrictions: we do not have consent from the participants to share the dataset publicly. Requests to access these datasets should be directed to sjeon@missouri.edu.

Ethics statement

The studies involving humans were approved by University of Oklahoma-Tulsa Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

AG: Conceptualization, Writing – original draft. SJ: Conceptualization, Formal analysis, Methodology, Writing – original draft. K-AK: Writing – original draft. DH: Funding acquisition, Writing – original draft.

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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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- Ansari, A., Pianta, R. C., Whittaker, J. V., Vitiello, V. E., and Ruzek, E. A. (2022). Preschool teachers' emotional exhaustion in relation to classroom instruction and teacher-child interactions. *Early Educ. Dev.* 33, 107–120. doi: 10.1080/10409289.2020.1848301

- Atiles, J. T., Almodóvar, M., Chavarría Vargas, A., Dias, M. J. A., and Zúñiga León, I. M. (2021). International responses to COVID-19: challenges faced by early childhood professionals. *Eur. Early Child. Educ. Res.* 29, 66–78. doi: 10.1080/1350293X.2021.1872674

- Bardack, S., and Obradović, J. (2019). Observing teachers' displays and scaffolding of executive functioning in the classroom context. *J. Appl. Dev. Psychol.* 62, 205–219. doi: 10.1016/j.appdev.2018.12.004

- Bassok, D., Markowitz, A. J., Bellows, L., and Sadowski, K. (2021). New evidence on teacher turnover in early childhood. *Edu. Eval. Policy An.* 43, 172–180. doi: 10.3102/0162373720985340
- Berger, E., Quinones, G., Barnes, M., and Reupert, A. (2022). Early childhood educators' psychological distress and wellbeing during the COVID-19 pandemic. *Early Child Res. Q.* 60, 298–306. doi: 10.1016/j.ecresq.2022.03.005
- Besser, A., Flett, G. L., and Zeigler-Hill, V. (2022). Adaptability to a sudden transition to online learning during the COVID-19 pandemic: understanding the challenges for students. *Scholarsh. Teach. Learn. Psychol.* 8, 85–105. doi: 10.1037/stl0000198
- Blair, C., and Ursache, A. (2011). "A bidirectional model of executive functions and self-regulation" in *Handbook of self-regulation: research, theory, and applications*. Eds. K. Vohs, & R. Baumeister. 2nd ed (New York, NY, US: The Guilford Press), 300–320.
- Buchanan, T., Heffernan, T. M., Parrott, A. C., Ling, J., Rodgers, J., and Scholey, A. B. (2010). A short self-report measure of problems with executive function suitable for administration via the internet. *Behav. Res. Method.* 42, 709–714. doi: 10.3758/BRM.42.3.709
- Buchanan, J., Prescott, A., Schuck, S., Aubusson, P., Burke, P., and Louviere, J. (2013). Teacher retention and attrition: views of early career teachers. *Aust. J. Teach. Educ.* 38, 112–129. doi: 10.14221/ajte.2013v38n3.9
- Byun, S., and Jeon, L. (2023). Preschool teachers' psychological wellbeing, emotion regulation, and emotional responsiveness: a US-Korea comparison. *Front. Psychol.* 14:1152557. doi: 10.3389/fpsyg.2023.1152557
- Collie, R. J. (2021). COVID-19 and teachers' somatic burden, stress, and emotional exhaustion: examining the role of principal leadership and workplace buoyancy. *AERA Open* 7:233285842098618. doi: 10.1177/2332858420986187
- Collie, R. J., and Martin, A. J. (2016). Adaptability: an important capacity for effective teachers. *Educ. Pract. Theory* 38, 27–39. doi: 10.7459/ept/38.1.03
- Collie, R. J., and Martin, A. J. (2017). Teachers' sense of adaptability: examining links with perceived autonomy support, teachers' psychological functioning, and students' numeracy achievement. *Learn. Individ. Differ.* 55, 29–39. doi: 10.1016/j.lindif.2017.03.003
- Crawford, J. (2021). During and beyond a pandemic: publishing learning and teaching research through COVID-19. *J. Univ. Teach. Learn. Pract.* 18. doi: 10.53761/1.18.3.2
- Demerouti, E., Mostert, K., and Bakker, A. B. (2010). Burnout and work engagement: a thorough investigation of the interdependency of both constructs. *J. Occup. Health Psychol.* 15, 209–222. doi: 10.1037/a0019408
- Eadie, P., Levickis, P., Murray, L., Page, J., Elek, C., and Church, A. (2021). Early childhood educators' wellbeing during the COVID-19 pandemic. *Early Child. Educ. J.* 49, 903–913. doi: 10.1007/s10643-021-01203-3
- Ethridge, E. A., Malek-Lasater, A. D., and Kwon, K.-A. (2022). Fostering play through virtual teaching: challenges, barriers, and strategies. *Early Child. Educ. J.* 1–11. doi: 10.1007/s10643-022-01419-x
- Farewell, C. V., Quinlan, J., Gonzales, L., and Puma, J. (2023). Changes in demands and resources faced by the early childhood education workforce due to COVID-19. *Early Child. Educ. J.* 50, 197–206. doi: 10.1007/s10643-020-01143-4
- Ford, T. G., Kwon, K.-A., and Tsotsoros, J. D. (2021). Early childhood distance learning in the U.S. during the COVID pandemic: challenges and opportunities. *Child Youth Serv. Rev.* 131:106297. doi: 10.1016/j.childyouth.2021.106297
- Friedman-Krauss, A. H., Raver, C. C., Morris, P. A., and Jones, S. M. (2014a). The role of classroom-level child behavior problems in predicting preschool teacher stress and classroom emotional climate. *Early Educ. Dev.* 25, 530–552. doi: 10.1080/10409289.2013.817030
- Friedman-Krauss, A. H., Raver, C. C., Neuspiel, J. M., and Kinsel, J. (2014b). Child behavior problems, teacher executive functions, and teacher stress in head start classrooms. *Early Educ. Dev.* 25, 681–702. doi: 10.1080/10409289.2013.825190
- Gavelin, H. M., Domellöf, M. E., Åström, E., Nelson, A., Launder, N. H., Neely, A. S., et al. (2022). Cognitive function in clinical burnout: a systematic review and meta-analysis. *Work Stress.* 36, 86–104. doi: 10.1080/02678373.2021.2002972
- Granger, K. L., Hanish, L. D., Abry, T., DeLay, D., and Bradley, R. H. (2023). Teachers' depressive symptoms and teacher-child conversation quality in early childhood classrooms. *Early Educ. Dev.* 34, 1850–1871. doi: 10.1080/10409289.2023.2229714
- Granziera, H., Collie, R. J., and Martin, A. J. (2019). Adaptability: an important capacity to cultivate among pre-service teachers in teacher education programmes. *Psychol. Teach. Rev.* 25, 60–66. doi: 10.53841/bpspr.2019.25.1.60
- Herman, A. N., Dearth-Wesley, T., and Whitaker, R. C. (2023). The association between work as a calling and turnover among early childhood education professionals. *Early Child. Educ. J.* 52, 481–491. doi: 10.1007/s10643-023-01450-6
- Hu, X., Chiu, M. M., Leung, W. M. V., and Yelland, N. (2021). Technology integration for young children during COVID-19: towards future online teaching. *Brit. J. Educ. Technol.* 52, 1513–1537. doi: 10.1111/bjet.13106
- Inan, F. A., and Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: a path model. *Educ. Technol. Res. Dev.* 58, 137–154. doi: 10.1007/s11423-009-9132-y
- Institute of Medicine and National Research Council, (2015). *Transforming the workforce for children birth through age 8: a unifying foundation*. Washington (DC): National Academies Press (US). Available from: <https://www.ncbi.nlm.nih.gov/books/NBK310532/> (Accessed July 23, 2015).
- Jalongo, M. R. (2021). The effects of COVID-19 on early childhood education and care: research and resources for children, families, teachers, and teacher educators. *Early Child. Educ. J.* 49, 763–774. doi: 10.1007/s10643-021-01208-y
- Jennings, P. A., and Greenberg, M. T. (2009). The prosocial classroom: teacher social and emotional competence in relation to student and classroom outcomes. *Rev. Educ. Res.* 79, 491–525. doi: 10.3102/0034654308325693
- Jeon, L., Buettner, C. K., and Snyder, A. R. (2014). Pathways from teacher depression and child-care quality to child behavioral problems. *J. Consult. Clin. Psychol.* 82, 225–235. doi: 10.1037/a0035720
- Khattar, R., and Coffey, M., (2023). The child care sector is still struggling to hire workers. Center for American Progress. Available at: <https://www.americanprogress.org/article/the-child-care-sector-is-still-struggling-to-hire-workers/>.
- Kidger, J., Brockman, R., Tilling, K., Campbell, R., Ford, T., Araya, R., et al. (2016). Teachers' wellbeing and depressive symptoms, and associated risk factors: a large cross-sectional study in English secondary schools. *J. Affect. Disord.* 192, 76–82. doi: 10.1016/j.jad.2015.11.054
- Kim, J., Kang, Y., and Kim, H. (2022). The influence of preschool teachers' adaptability on burnout through digital literacy and teaching efficacy during the COVID-19 pandemic: the role of the on-line teaching experience. *Korean J. Child Stud.* 43, 201–214. doi: 10.5723/kjcs.2022.43.3.201
- Koutsimani, P., Montgomery, A., Masoura, E., and Panagopoulou, E. (2021). Burnout and cognitive performance. *Int. J. Environ. Res. Public Health* 18:2145. doi: 10.3390/ijerph18042145
- Kwon, K.-A., Ford, T. G., Tsotsoros, J., Randall, K., Malek-Lasater, A., and Kim, S. G. (2022). Challenges in working conditions and well-being of early childhood teachers by teaching modality during the COVID-19 pandemic. *Int. J. Environ. Res. Public Health* 19:4919. doi: 10.3390/ijerph19084919
- Kwon, K.-A., Jeon, S., Jeon, L., and Castle, S. (2019). The role of teachers' depressive symptoms in classroom quality and child developmental outcomes in early head start programs. *Learn. Individ. Differ.* 74:101748. doi: 10.1016/j.lindif.2019.06.002
- Loughland, T., and Alonzo, D. (2019). Teacher adaptive practices: a key factor in teachers' implementation of assessment for learning. *Aust. J. Teach. Educ.* 44, 18–30. doi: 10.14221/ajte.2019v44n7.2
- MacIntyre, P. D., Gregersen, T., and Mercer, S. (2020). Language teachers' coping strategies during the COVID-19 conversion to online teaching: correlations with stress, wellbeing and negative emotions. *System* 94:102352. doi: 10.1016/j.system.2020.102352
- Martin, A. J., Nejad, H., Colmar, S., and Liem, G. A. D. (2012). Adaptability: conceptual and empirical perspectives on responses to change, novelty and uncertainty. *Aust. J. Guid. Couns.* 22, 58–81. doi: 10.1017/jgc.2012.8
- Martin, A., Partika, A., Castle, S., Horm, D., and Johnson, A. D. (2022). Both sides of the screen: predictors of parents' and teachers' depression and food insecurity during COVID-19-related distance learning. *Early Child Res. Q.* 60, 237–249. doi: 10.1016/j.ecresq.2022.02.001
- Maslach, C., Jackson, S. E., and Leiter, M. P. (1997). *Maslach burnout inventory*. *Scaercrow Education*.
- McCallum, F. (2020). "The changing nature of teachers' work and its impact on wellbeing" in *Critical perspectives on teaching, learning and leadership: Enhancing educational outcomes*. eds. M. A. White and F. McCallum (Singapore: Springer), 17–44.
- McMullen, M. B., Lee, M. S. C., McCormick, K. I., and Choi, J. (2020). Early childhood professional well-being as a predictor of the risk of turnover in child care: a matter of quality. *J. Res. Child. Educ.* 34, 331–345. doi: 10.1080/02568543.2019.1705446
- Mertala, P. (2019). Teachers' beliefs about technology integration in early childhood education: a meta-ethnographical synthesis of qualitative research. *Comput. Hum. Behav.* 101, 334–349. doi: 10.1016/j.chb.2019.08.003
- Nyqvist, F., Forsman, A. K., Giuntoli, G., and Cattan, M. (2013). Social capital as a resource for mental well-being in older people: a systematic review. *Aging Ment. Health* 17, 394–410. doi: 10.1080/13607863.2012.742490
- Organization for Economic Cooperation and Development (2020). *Building a high-quality early childhood education and care workforce: further results from the starting strong survey 2018*. Paris: TALIS, OECD Publishing.
- Parsons, S. A. (2012). Adaptive teaching in literacy instruction: case studies of two teachers. *J. Lit. Res.* 44, 149–170. doi: 10.1177/1086296X12440261
- Peisner-Feinberg, E. S., Burchinal, M. R., Clifford, R. M., Culkin, M. L., Howes, C., Kagan, S. L., et al. (2001). The relation of preschool child-care quality to children's cognitive and social developmental trajectories through second grade. *Child Dev.* 72, 1534–1553. doi: 10.1111/1467-8624.00364
- Pihlaja, M., Tuominen, P. P. A., Peräkylä, J., and Hartikainen, K. M. (2022). Occupational burnout is linked with inefficient executive functioning, elevated average heart rate, and decreased physical activity in daily life - initial evidence from teaching professionals. *Brain Sci.* 12:1723. doi: 10.3390/brainsci12121723
- Preacher, K. J., and Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav. Res. Methods* 40, 879–891. doi: 10.3758/BRM.40.3.879

- Pyle, A., and Danniels, E. (2017). A continuum of play-based learning: the role of the teacher in play-based pedagogy and the fear of hijacking play. *Early Educ. Dev.* 28, 274–289. doi: 10.1080/10409289.2016.1220771
- Quigley, L., Thiruchselvam, T., and Quilty, L. C. (2022). Cognitive control biases in depression: a systematic review and meta-analysis. *Psychol. Bull.* 148, 662–709. doi: 10.1037/bul0000372
- Radloff, L. S. (1977). The CES-D scale: a self-report depression scale for research in the general population. *Appl. Psychol. Meas.* 1, 385–401. doi: 10.1177/014662167700100306
- Raver, C., Blair, C., and Li-Grining, C. (2012). “Extending models of emotional self-regulation to classroom settings: implications for professional development” in *Effective early childhood professional development: improving teacher practice and child outcomes*. eds. C. Howes, B. Hamre and R. Pianta (Brookes Publishing), 113–130.
- Rouse, E. (2012). Partnerships in early childhood education and care: empowering parents or empowering practitioners. *Glob. Stud. Child.* 2, 14–25. doi: 10.2304/gsch.2012.2.1.14
- Sandilos, L., Cycyk, L. M., Scheffner Hammer, C., Sawyer, B. E., López, L., and Blair, C. (2015). Depression, control, and climate: an examination of factors impacting teaching quality in preschool classrooms. *Early Educ. Dev.* 26, 1111–1127. doi: 10.1080/10409289.2015.1027624
- Sandilos, L., Goble, P., and Schwartz, S. (2020). Burnout and teacher–child interactions: the moderating influence of SEL interventions in head start classrooms. *Early Educ. Dev.* 31, 1169–1185. doi: 10.1080/10409289.2020.1788331
- Schaufeli, W., Leiter, M., Maslach, C., and Jackson, S. (1996) Maslach Burnout Inventory-General Survey, in: *The Maslach Burnout Inventory: Test Manual*. Eds. C. Maslach, S. E. Jackson and M. P. Leiter. (Palo Alto, CA: Consulting Psychologists Press).
- Shaw, S., Franchett, A., LaForett, D., Maxwell, K., and Bultinck, E. (2023). “Head Start’s response to the COVID-19 pandemic (no. OPRE report #2023-025)” in *Office of planning, research, and evaluation, administration for children and families* (Washington, DC: U.S. Department of Health and Human Services).
- Smith, B. (2013). Depression and motivation. *Phenom. Cogn. Sci.* 12, 615–635. doi: 10.1007/s11097-012-9264-0
- Steed, E. A., Leech, N., Phan, N., and Benzel, E. (2022). Early childhood educators’ provision of remote learning during COVID-19. *Early Child Res. Q.* 60, 307–318. doi: 10.1016/j.ecresq.2022.03.003
- Viac, C., and Fraser, P. (2020). Teachers’ well-being: A framework for data collection and analysis (OECD Education Working Papers 213; *OECD Education Working Papers*, Vol. 213).
- World Health Organization. (2022). *Mental health*. Available at: <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>
- Zelazo, P. D., Blair, C. B., and Willoughby, M. T. (2016). *Executive function: implications for education (NCER 2017–2000)*. National Center for Education Research, Institute of Education Sciences, Washington, DC: U.S. Department of Education.