



Chinese Youths' Physical Activity and Flourishing During COVID-19: The Mediating Role of Meaning in Life and Self-Efficacy

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Physical activity has wide-ranging consequences for people's physical, mental, and social health. Although the beneficial effects of physical activity on well-being were widely studied, how it promotes well-being remained unclear. The present study utilized the measure of physical activity rating scale (PARS-3), flourishing scale (FS), Chinese-meaning in life questionnaire (C-MLQ), and general self-efficacy scale (GSES) to examine the connection between physical activity and flourishing and the multiple mediation effects of meaning and self-efficacy with 827 Chinese undergraduates. The results indicated that (a) physical activity positively predicted flourishing; (b) meaning in life and self-efficacy played mediating roles in physical activity and flourishing, separately and jointly. Our findings revealed the mechanism of physical activity fostering flourishing, thereby providing an empirical basis for promoting health and flourishing, especially during COVID-19.

Keywords: physical activity, flourishing, mediation, COVID-19, meaning, self-efficacy

INTRODUCTION

Vita in motu. Life is in motion. (Voltaire, French thinker).

The COVID-19 pandemic has made much impact on youths' physical, mental, and social health. The unpredictability, uncertainty tolerance, and overloading of information during COVID-19 caused worries, fear, insecurity, and psychological stress (Exner-Cortens et al., 2021; Tetreault et al., 2021). The lockdown, social distancing, and home confinement brought about self-isolation and loneliness, resulting in reductions in life satisfaction and flourishing (Duong, 2021; Sürücü et al., 2021). Meanwhile, emerging research has found that physical activity exerted advantageous effects on physical and psychological well-being during the COVID-19 epidemic (Randall et al., 2021), but little is known about how people's well-being benefits from their engagement in physical activity. Hence, it was of significance to reconsider the association between physical activity and flourishing and explore the underlying mechanism under the complicated condition of COVID-19 pandemic.

Flourishing and Physical Activity

Flourishing is defined as the holistic well-being of physical and psycho-social levels, reflecting a better functioning in a broad range of one's life (Keyes and Annas, 2009). Existing studies have found it is subject to the spread of COVID-19 and the subsequent adverse psychological effects (Elemo et al., 2021; Sürücü et al., 2021). *Physical activity* is conceptualized as body movements that

contract skeletal muscles and expend energy. Substantial literature supports that physical activity is a positive protective factor for mental health and well-being across various age groups (Kekäläinen et al., 2020; Zheng et al., 2020).

Physical activity has been found to benefit well-being by effectively buffering the adverse impact of quarantines under the COVID-19 outbreak (Amatriain-Fernández et al., 2020). First, physical activity helps mitigate perceived worries, fear, anxiety, stress, and other negative feelings to maintain well-being. For example, López-Bueno et al. (2020) showed that physical activity is associated with a lower level of anxiety and bad mood. The study by Randall et al. (2021) shows that physical activity protects people from the suffering of perceived stress and depressive symptoms and positively predicts their psychological well-being. Second, physical activity potentially promotes personal psychological resources, including self-efficacy, to cope with the greatly changing situations. Camp et al. (2022) found that physically active people experienced more self-control and self-efficacy than inactive people, which helped their life function well.

The Mediation of Meaning and Self-Efficacy

Meaning refers to finding and realizing things important or significant in people's lives (Steger et al., 2006) and is considered as one of the basic motivations that reflect human existential value (Frankl, 1985). Positive psychologists claim that meaning is essential to a good life and lays the foundation for flourishing (Ryff and Singer, 2008). However, a great amount of research reported that people experienced decreased meaning during the COVID-19 pandemic (Karataş and Tagay, 2021; Karataş et al., 2021). The fluctuations in perceived meaning may be caused by fear of COVID-19, home isolation, and a sense of confinement, which can be primarily changed by engaging in physical activities (Yu et al., 2021). Bodily movements are conducive to direct attention from the outside world toward own body and the inside world, which contribute to finding important life goals and thus promote meaning and enhance flourishing.

Self-efficacy is developed as the confidence or belief that individuals are capable of realizing anticipated goals and achievements. From a developmental perspective, self-efficacy is an important psychological asset that can protect people from the threat of adversity and challenges, such as exposure to the stress situation of COVID-19 (Talsma et al., 2021; Yenen and Çarkit, 2021). Cataldi et al. (2021) found that students assigned to the physical exercise group received a significant increase in self-efficacy compared to students without bodily exercise, indicating that self-efficacy could develop from regular engagement in physical activities. Besides, existing studies supported that self-efficacy was a critical antecedent and determinant factor of well-being (Céspedes et al., 2021; Wang et al., 2021). In line with these findings, we observed that physical activity fosters self-efficacy and thus nourishes flourishing, so we assumed another path that physical activity would boost flourishing *via* the mediation of self-efficacy.

Theoretical and empirical evidence support that meaning and self-efficacy may individually and together mediate the

connection between physical activity and flourishing. According to the risk and protective factor framework, meaning in life exerts a protective influence on self-efficacy under the risk of excessive stress (Masten, 2001). Moreover, Yuen and Datu (2021) suggest that meaning in life positively correlated with general self-efficacy and specific self-efficacy (Yuen and Datu, 2021). Self-efficacy has also been found to mediate the interrelation of meaning and psychological well-being (Krok and Gerymski, 2019; Czyżowska and Gurba, 2021). Both, perceived meaning and self-efficacy, are malleable psychological resources that directly or indirectly boost flourishing, which can be activated, maintained, and promoted by physical activities. Hence, the present study also tested the serial mediation effect of meaning and self-efficacy in the relationship between physical activity and flourishing.

Gender Differences

It also should be noted that gender differences existed in some of our main variables, including physical activity, self-efficacy, flourishing, and the response to stressful COVID-19. It is well-documented that boys reported significantly more engagement in physical activity and higher physical activity self-efficacy than girls, and girls experienced more barriers to exercise participation (Chen et al., 2019; Rosselli et al., 2020). Also, Sürücü et al. (2021) showed that females flourishing are more vulnerable to COVID-19 fear than males. Thus, the present study takes gender as a covariant in the mediation model to avoid the confusion induced by gender differences.

The Present Study

Under the complex and volatile situation of COVID-19, our primary purpose was to probe the positive cognitive and behavioral factors that may help people cope with the possible adverse psychological problems or even vicarious traumatization. The current study investigated the advantageous effects of physical activity on flourishing *via* the mediation effects of two kinds of psychological resources, meaning and self-efficacy. Four hypotheses were proposed:

- H1: Physical activity positively predicts flourishing.
- H2: Meaning mediates the connection between physical activity and flourishing.
- H3: Self-efficacy mediates the connection between physical activity and flourishing.
- H4: Meaning and self-efficacy mediate the connection between physical activity and flourishing together.

MATERIALS AND METHODS

Participants and Procedure

A total of 873 students from 3 universities in Xi'an, a provincial capital city in northwest China, participated in an online survey. After asking for informed consent, we sent the website of Questionnaire Star to the students, and they voluntarily and anonymously completed four well-validated questionnaires and related information (major, gender, and age). The data of 46 participants were dropped out due to reasons such as failing

attention-check questions (e.g., “please choose strongly disagree to this item”), too short answer time (less than 60 s), and similar response styles (e.g., selecting the same answer in all items). The final sample consisted of 827 participants (recovery rate = 94.73%, 59.7% females; Mean (M_{age}) = 19.23, Standard deviation (SD_{age}) = 1.39). According to the analysis in G-power, the sample size was sufficient to detect a medium-sized effect ($r = 0.30$, $\alpha = 0.05$, $1 - \beta = 0.80$).

Measure

Physical Activity

The physical activity rating scale (PARS-3), designed by Hashimoto (1990) and translated and revised by Liang and Liu (1994), was a 3-item measure assessing the level of physical activity. Participants were asked to rate the frequency, duration, and intensity of their bodily movements from 1 to 5. The total score for physical activities was the product of the scores on frequency, duration (minus 1), and intensity. The scale has good psychometric properties and has been widely used for young adults in Chinese culture (Chen and Ji, 2006; Zheng et al., 2020). The test-retest reliability in Liang and Liu (1994)'s study was 0.82. The Cronbach alpha coefficient of PARS-3 in this study was 0.65.

Flourishing

The 8-item flourishing scale (FS) was used for assessing the level of flourishing (Diener et al., 2010). Participants were asked to rate each item on a Likert scale (1-7) anchored from “strongly disagree” to “strongly agree.” The FS shows good psychometric properties and has been validated in various countries and populations (Kazak et al., 2021). The Cronbach alpha coefficient of FS in this study was 0.93. The measurement performed a good fit: $\chi^2/df = 4.26$, goodness of fit index (GFI) = 0.982, comparative fit index (CFI) = 0.990, Tucker-Lewis index (TLI) = 0.980, root mean squared error of approximation (RMSEA) = 0.063, and standardized root mean square residual (SRMR) = 0.019.

Meaning

We employed the meaning in life questionnaire (MLQ), developed by Steger et al. (2006), to quantify how students perceive their life as purposeful or meaningful (POM). It has ten sentences that describe the perception of important life purpose or searching for life purpose, scored on a Likert scale (1-7). The MLQ has good psychometric properties and has been validated in various countries and populations (Elizabeth and Chang, 2021). The POM sub-scale was applied to this study and yielded an alpha of 0.79. The measurement performed a good fit: $\chi^2/df = 2.52$, GFI = 0.994, CFI = 0.996, TLI = 0.993, RMSEA = 0.043, and SRMR = 0.015.

Self-Efficacy

The present study employed the general self-efficacy scale (GSES) to quantify students' perceived self-efficacy at the broadest level (Schwarzer and Jerusalem, 1995; Wang et al., 2001). The 10-item scale was scored on a Likert scale from 1 to 4 (1 = not at all true, 4 = exactly true). Individuals with higher scores perceive a high level of self-efficacy. Meanwhile, the psychometric properties of GSES have been examined in various countries

(Sekerdej and Szwed, 2021). Its Cronbach's alpha coefficient was 0.87 in the current study. The measurement performed a good fit: $\chi^2/df = 3.58$, GFI = 0.975, CFI = 0.974, TLI = 0.960, RMSEA = 0.056, and SRMR = 0.030.

Data Analysis

SPSS 25.0 and PROCESS MACRO V 3.4 were utilized to analyze data as follows:

- (1) The means, standard deviations, and bivariate correlation coefficients of primary variables were calculated in SPSS 25.0.
- (2) The independent *t*-test was conducted to examine the differences between male and female students in their physical activity engagement because previous studies have found gender differences in this variable.
- (3) A multiple mediation model was established to investigate the single and serial mediation effects of meaning and self-efficacy on the connection between physical activity and flourishing using PROCESS MACRO V 3.4.

RESULTS

Descriptive Statistics and Correlation Analysis

The results are presented in **Table 1**, including means, *SD*, and correlation coefficients of primary variables. Physical activity, flourishing, meaning, and self-efficacy were significantly and positively correlated with each other ($ps < 0.001$).

Before examining the effect of mediators, an independent *t*-test was applied to analyze the gender differences. As shown in **Table 2**, the difference between female and male participants was significant ($t_{(825)} = 19.37$, $p < 0.001$, 95% C.I. = [9.14, 11.20], $r = 0.55$). Male students reported more physical activities than females. For this reason, we controlled gender in the following mediation analysis.

Mediation Effect Analysis

PROCESS macro was used to test the multiple mediating effects of meaning and self-efficacy in the connection between physical activity and flourishing, by selecting model 6 and setting the sample size as 5,000, physical activity as the independent variable, flourishing as the dependent variable, perceived meaning and self-efficacy as two mediators, and gender as a covariate. The regression analysis results (see **Table 3**) showed that students' physical activity positively predicted their perceived meaning in life ($\beta = 0.121$, $p = 0.004$), self-efficacy ($\beta = 0.126$, $p = 0.001$), and flourishing ($\beta = 0.127$, $p = 0.003$); meaning predicted self-efficacy ($\beta = 0.282$, $p < 0.001$) and both of them predicted flourishing ($\beta_{meaning} = 0.519$, $p < 0.001$; $\beta_{self-efficacy} = 0.406$, $p < 0.001$). The hypothesis H1 was proved.

The bias-corrected percentile bootstrap method was applied to examine the indirect effects, and the results showed that three indirect paths were significant (see **Figure 1** and **Table 4**). Specifically, neither the 95% credit interval of the mediating effect of meaning in life overlapped zero (from 0.016 to 0.110) nor

TABLE 1 | Means, SD, and correlation coefficients of major variables.

	<i>M</i>	<i>SD</i>	1	2	3	4
1. Physical activity	9.59	8.93	–			
2. Meaning in life	5.49	0.98	0.13***	–		
3. Self-efficacy	2.89	0.40	0.23***	0.31***	–	
4. Flourishing	5.66	0.87	0.11**	0.64***	0.55***	–

p* < 0.01 and *p* < 0.001.

TABLE 2 | Difference between male and female students engaging in physical activity.

	<i>M</i>	<i>SD</i>	<i>t</i>	Cohen's <i>d</i>
Female students (<i>n</i> = 494)	5.49	6.09	19.37***	1.32
Male students (<i>n</i> = 333)	15.66	9.01		

****p* < 0.001.

TABLE 3 | Model fit indices and standardized regression coefficients.

Model		Model fit indice			Standardized coefficient	
Outcome	Predictor	<i>R</i>	<i>R</i> ²	<i>F</i>	<i>β</i>	<i>t</i>
Meaning	Gender	0.133	0.018	7.453	0.021	0.418
	Physical activity				0.121	2.896**
Self-efficacy	Gender	0.372	0.138	43.964	0.111	2.847**
	Physical activity				0.126	3.198**
	Meaning				0.282	8.638***
Flourishing	Gender	0.741	0.549	250.065	–0.082	–2.897**
	Physical activity				–0.001	–0.018
	Meaning				0.519	21.006***
	Self-efficacy				0.406	16.089***

p* < 0.01 and *p* < 0.001.

the 95% credit interval of the mediating effect of self-efficacy included 0 (from 0.018 to 0.086). Supporting the hypotheses H2 and H3, meaning and self-efficacy individually mediate the relationship between physical activity and flourishing. Notably, the serial mediation of meaning in life and self-efficacy was significant because the 95% credit interval was from 0.003 to 0.028, which did not overlap with zero. The hypothesis H4 was proved, indicating that flourishing is promoted by physical activity through the sequential path of meaning and self-efficacy.

DISCUSSION

There's no denying how COVID-19 has created many differences in our lives, and we have no idea of its end yet. To discover the contributing factors that facilitate people to fight the crisis, the present study tested the relationship between youths' physical activity and flourishing and uncovered the inner mechanism of how flourishing benefits from physical activity by conducting a cross-sectional study among Chinese undergraduates. The results suggested that physical activity positively predicted flourishing *via* the individual and joint mediation effects of meaning and self-efficacy. It was of great significance to examine the underlying pathways from physical activity to flourishing for

developing practical solutions that protect people from the stressful situation of COVID-19.

The first finding was that more engagement in physical activities predicted a higher level of flourishing, implying the buffering effect of physical activity on flourishing under the pressure of COVID-19. Much research proves that the COVID-19 pandemic impairs people's physical and mental health and well-being, triggering tension, panic, fear, anxiety, and depression (Duong, 2021; Elemen et al., 2021; Exner-Cortens et al., 2021; Zammiti et al., 2021). Even if one did not get COVID-19, one might experience vicarious traumatization (Xu and Liu, 2021). Physical activity is a protective buffering factor in facing this complex situation. It is helpful to divert our attention from the overloading information on COVID-19, relax our bodies, and ease our tension, thereby obviating the possibility of emotional problems (López-Bueno et al., 2020; Randall et al., 2021). Our study supported the advantageous effects of physical activity on mental health and well-being.

Importantly, our second finding was that flourishing could benefit from physical activity from three mediating paths: meaning, self-efficacy, and together. Based on the embodied cognition theory (Shapiro, 2019), the body is the prerequisite for developing the mind, and action and experience of the body shape and boost the development of cognition and affection

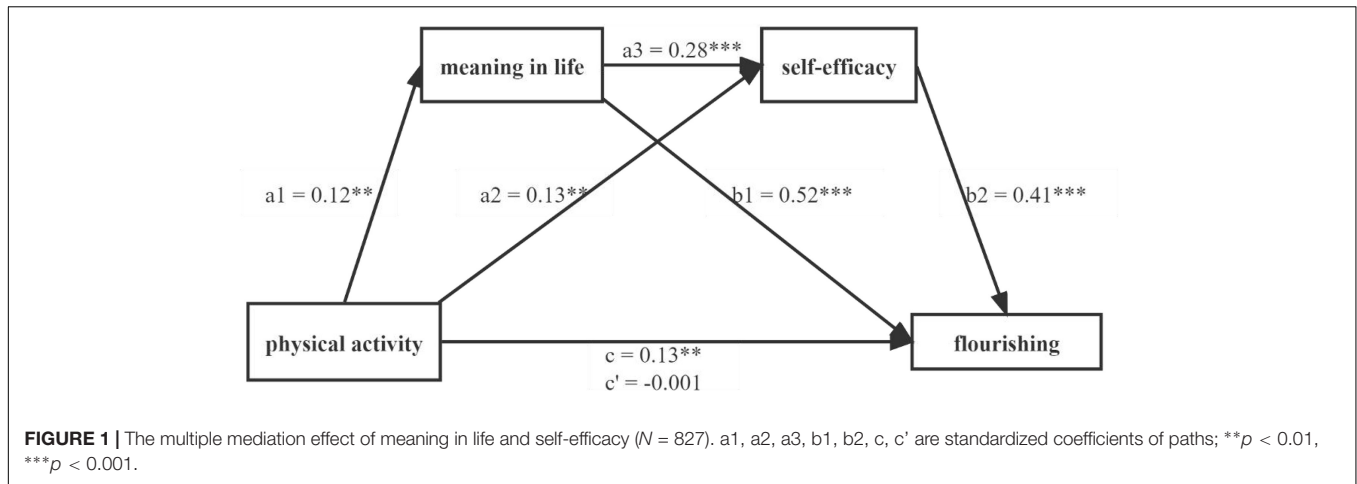


TABLE 4 | The multiple mediation effects of meaning in life and self-efficacy.

Path	Indirect effect	Boot SE	95% CI		Relative indirect effect%
Total	0.127	0.032	0.066	0.190	
Ind1	0.063	0.024	0.016	0.110	49.61%
Ind2	0.051	0.017	0.018	0.086	40.16%
Ind3	0.014	0.006	0.003	0.028	11.02%

Ind1: physical activity → meaning in life → flourishing;

Ind2: physical activity → self-efficacy → flourishing;

Ind3: physical activity → meaning in life → self-efficacy → flourishing.

and further leverage over well-being. González-Hernández et al. (2019) advocated that the development of psychological resources should be taken into account for teenagers' perfect way of doing sports. Supporting this point, our study showed that increased engagement in physical activity could help one focus on the self, physically and psychologically, which enriched psychological resources like promoted perceived meaning (Hooker and Masters, 2016) and self-efficacy (Suorsa et al., 2016), and could also facilitate recovery from the depletion of psychological resources (Hoover et al., 2021). In addition, our findings also approve the theoretical viewpoint that meaning and self-efficacy are two crucial psychological assets to deal with the stressful situation of the COVID-19 pandemic (Cataldi et al., 2021; Talsma et al., 2021; Yu et al., 2021).

The current research has revealed the psychological mechanism of how individuals benefit from physical efforts and vital psychological resources. However, several limitations need to be considered. First, this study unveiled the mediating role of meaning and self-efficacy, but its effect size was small to medium. There might be other inner mediators or moderators in the link between physical activity and flourishing that should be explored in the future, like gender (Sürücü et al., 2021). Second, a cross-sectional design was applied in our work, and a longitudinal study could be used in future work, for it might be more helpful to probe the contributing factors and causal relations. Third, we evaluated the total number of participants engaging in physical activity but did not include the types of physical activity, thereby limiting our findings in providing more specific recommendations for developing practical strategies

to promote psychological resources and enhance flourishing. Fourth, a recent study shows a potential reciprocal relationship between physical activity and flourishing (O'Rourke et al., 2021), indicating the bidirectional relation needs to be considered in future research.

The COVID-19 epidemic has brought unmeasurable negative effects to the economy and society, and it is still looming large in our lives, but we can fight against it with our own positive psychological strengths, such as meaning and self-efficacy. Physical activity is an effective way to build these psychological strengths and shield us from bad influences, whether now or before the COVID-19 pandemic. Our study validated the positive effects of body movement on flourishing, and examined the mediation role of meaning and self-efficacy on the positive relation of physical activity and flourishing, thereby providing an empirical basis for an embodied way to launch life meaning education and improve flourishing during COVID-19.

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.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics Committee of Shaanxi Normal University.

The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

YH instructed JZ to conduct this study, including the initial idea, language polishing, and method. JZ was a doctoral candidate of YH and collected, analyzed the data, wrote the manuscript, made tables, and drew figures. Both authors contributed to the article and approved the submitted version.

REFERENCES

- Amatriain-Fernández, S., Murillo-Rodríguez, E. S., Gronwald, T., Machado, S., and Budde, H. (2020). Benefits of physical activity and physical exercise in the time of pandemic. *Psychol. Trauma* 12:S264. doi: 10.1037/tra0000643
- Camp, N., Fernandes Ramos, A. C., Hunter, K., Boat, R., and Magistro, D. (2022). Differences in self-control, self-efficacy and depressive symptoms between active and inactive middle-aged and older adults after 1 year of COVID restrictions. *Aging Mental Health* 1–6. doi: 10.1080/13607863.2022.2046691 [Epub ahead of print].
- Cataldi, S., Francavilla, V. C., Bonavolontà, V., De Florio, O., Carvutto, R., De Candia, M., et al. (2021). Proposal for a fitness program in the school setting during the COVID 19 pandemic: effects of an 8-week crossfit program on psychophysical well-being in healthy adolescents. *Int. J. Environ. Res. Public Health* 18:3141. doi: 10.3390/ijerph18063141
- Céspedes, C., Rubio, A., Viñas, F., Cerrato, S. M., Lara-Órdenes, E., and Ríos, J. (2021). Relationship between self-concept, self-efficacy, and subjective well-being of native and migrant adolescents. *Front. Psychol.* 11:3821. doi: 10.3389/fpsyg.2020.620782
- Chen, H., Dai, J., and Gao, Y. (2019). Measurement invariance and latent mean differences of the Chinese version physical activity self-efficacy scale across gender and education levels. *J. Sport Health Sci.* 8, 46–54. doi: 10.1016/j.jshs.2017.01.004
- Chen, Z., and Ji, L. (2006). The effects of physical exercise on subjective well-being of senior high school students and their psychological mechanism. *Acta Psychol. Sin.* 04, 562–575.
- Czyżowska, N., and Gurba, E. (2021). Does reflection on everyday events enhance meaning in life and well-being among emerging adults? Self-efficacy as mediator between meaning in life and well-being. *Int. J. Environ. Res. Public Health* 18:9714. doi: 10.3390/ijerph18189714
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D.-W., Oishi, S., et al. (2010). New well-being measures: short scales to assess flourishing and positive and negative feelings. *Soc. Indic. Res.* 97, 143–156. doi: 10.1007/s11205-009-9493-y
- Duong, C. D. (2021). The impact of fear and anxiety of COVID-19 on life satisfaction: psychological distress and sleep disturbance as mediators. *Pers. Individ. Dif.* 178:110869. doi: 10.1016/j.paid.2021.110869
- Elemo, A. S., Ahmed, A. H., Kara, E., and Zerkeshi, M. K. (2021). The Fear of COVID-19 and flourishing: assessing the mediating role of sense of control in international students. *Int. J. Ment. Health Addict.* 1–11. doi: 10.1007/s11469-021-00522-1 [Epub ahead of print].
- Elizabeth, A. Y., and Chang, E. C. (2021). Relational meaning in life as a predictor of interpersonal well-being: a prospective analysis. *Pers. Individ. Dif.* 168:110377. doi: 10.1016/j.paid.2020.110377
- Exner-Cortens, D., Schwartz, K. D., McMorris, C., and Makarenko, E. (2021). Stress among Asian youth during COVID-19: moderation by educational, spiritual, and cultural sources of belonging. *J. Adolesc. Health* 70, 500–503. doi: 10.1016/j.jadohealth.2021.10.007
- Frankl, V. E. (1985). *Man's Search for Meaning*. New York, NY: Simon and Schuster.
- González-Hernández, J., Gómez-López, M., Pérez-Turpin, J. A., Muñoz-Villena, A. J., and Andreu-Cabrera, E. (2019). Perfectly active teenagers. When does physical exercise help psychological well-being in adolescents? *Int. J. Environ. Res. Public Health* 16:4525. doi: 10.3390/ijerph16224525
- Hashimoto, K. (1990). *Stress, Exercise and Quality of Life*. Beijing: Asian Games Scientific Congress.
- Hooker, S. A., and Masters, K. S. (2016). Purpose in life is associated with physical activity measured by accelerometer. *J. Health Psychol.* 21, 962–971. doi: 10.1177/1359105314542822
- Hoover, C. S., Ragsdale, J. M., and Ayres, T. B. (2021). An experimental test of resource recovery from physical and relaxation work break activities. *Stress Health* 1–13. doi: 10.1002/smi.3108 [Epub ahead of print].
- Karataş, Z., and Tagay, Ö (2021). The relationships between resilience of the adults affected by the COVID pandemic in Turkey and COVID-19 fear, meaning in life, life satisfaction, intolerance of uncertainty and hope. *Pers. Individ. Dif.* 172:110592. doi: 10.1016/j.paid.2020.110592
- Karataş, Z., Uzun, K., and Tagay, Ö (2021). Relationships between the life satisfaction, meaning in life, hope and COVID-19 fear for Turkish adults during the COVID-19 outbreak. *Front. Psychol.* 12:778. doi: 10.3389/fpsyg.2021.633384
- Kazak, Z., Lochbaum, M., and Canpolat, A. M. (2021). Flourishing in young adults: the role of achievement goals, participation motivation, and self-perception levels in physical activity contexts. *Sustainability* 13:7450. doi: 10.3390/su13137450
- Kekäläinen, T., Freund, A. M., Sipilä, S., and Kokko, K. (2020). Cross-sectional and longitudinal associations between leisure time physical activity, mental well-being and subjective health in middle adulthood. *Appl. Res. Qual. Life* 15, 1099–1116. doi: 10.1007/s11482-019-09721-4
- Keyes, C. L., and Annas, J. (2009). Feeling good and functioning well: distinctive concepts in ancient philosophy and contemporary science. *J. Posit. Psychol.* 4, 197–201. doi: 10.1080/17439760902844228
- Krok, D., and Gerymski, R. (2019). Self-efficacy as a mediator of the relationship between meaning in life and subjective well-being in cardiac patients. *Curr. Issues Pers. Psychol.* 7, 242–251–242–251. doi: 10.5114/cipp.2019.89168
- Liang, D., and Liu, S. (1994). Stress level of college students and its relationship with physical exercise. *Chin. Ment. Health J.* 8, 5–6.
- López-Bueno, R., Calatayud, J., Ezzatvar, Y., Casajús, J. A., Smith, L., Andersen, L. L., et al. (2020). Association between current physical activity and current perceived anxiety and mood in the initial phase of COVID-19 confinement. *Front. Psychiatry* 11:729. doi: 10.3389/fpsyg.2020.00729
- Masten, A. S. (2001). Ordinary magic: resilience processes in development. *Am. Psychol.* 56:227. doi: 10.1037/0003-066X.56.3.227
- O'Rourke, R. H., Doré, I., Sylvester, B. D., and Sabiston, C. M. (2021). Flourishing or physical activity? Identifying temporal precedence in supporting the transition to university. *J. Am. College Health* 1–6. doi: 10.1080/07448481.2021.1879815 [Epub ahead of print].
- Randall, K., Ford, T. G., Kwon, K.-A., Sisson, S. S., Bice, M. R., Dinkel, D., et al. (2021). Physical activity, physical well-being, and psychological well-being: associations with life satisfaction during the COVID-19 pandemic among early childhood educators. *Int. J. Environ. Res. Public Health* 18:9430. doi: 10.3390/ijerph18189430
- Rosselli, M., Ermini, E., Tosi, B., Boddi, M., Stefani, L., Toncelli, L., et al. (2020). Gender differences in barriers to physical activity among adolescents. *Nutr. Metab. Cardiovasc. Dis.* 30, 1582–1589. doi: 10.1016/j.numecd.2020.05.005
- Ryff, C. D., and Singer, B. H. (2008). Know thyself and become what you are: a eudaimonic approach to psychological well-being. *J. Happiness Stud.* 9, 13–39. doi: 10.1007/s10902-006-9019-0
- Schwarzer, R., and Jerusalem, M. (1995). "Generalized self-efficacy scale," in *Measures in Health Psychology: A User's Portfolio. Causal and Control Beliefs*, eds J. Weinman, S. Wright, and M. Johnston (Windsor: NFER-NELSON), 35–37.

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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.2022.867599/full#supplementary-material>

- Sekerdej, M., and Szwed, P. (2021). Perceived self-efficacy facilitates critical reflection on one's own group. *Pers. Individ. Dif.* 168:110302. doi: 10.1016/j.paid.2020.110302
- Shapiro, L. (2019). *Embodied Cognition*. London: Routledge.
- Steger, M. F., Frazier, P., Oishi, S., and Kaler, M. (2006). The meaning in life questionnaire: assessing the presence of and search for meaning in life. *J. Counsel. Psychol.* 53:80. doi: 10.1037/0022-0167.53.1.80
- Suorsa, K. I., Cushing, C. C., Mullins, A. J., Meier, E., Tackett, A. P., Junghans, A., et al. (2016). Adolescents and young adults with asthma and allergies: physical activity, self-efficacy, social support, and subsequent psychosocial outcomes. *Child. Health Care* 45, 414–427. doi: 10.1080/02739615.2015.1065741
- Sürücü, L., Ertan, ŞS., Bağlarbaşı, E., and Maslakçı, A. (2021). COVID-19 and human flourishing: the moderating role of gender. *Pers. Individ. Diff.* 183:111111. doi: 10.1016/j.paid.2021.111111
- Talsma, K., Robertson, K., Thomas, C., and Norris, K. (2021). COVID-19 beliefs, self-efficacy and academic performance in first-year university students: cohort comparison and mediation analysis. *Front. Psychol.* 12:2289. doi: 10.3389/fpsyg.2021.643408
- Tetreault, E., Teferra, A. A., Keller-Hamilton, B., Shaw, S., Kahassai, S., Curran, H., et al. (2021). Perceived changes in mood and anxiety among male youth during the COVID-19 pandemic: findings from a mixed-methods study. *J. Adolesc. Health* 69, 227–233. doi: 10.1016/j.jadohealth.2021.05.004
- Wang, C., Hu, Z., and Liu, Y. (2001). Evidences for reliability and validity of the Chinese version of general self-efficacy scale. *Chin. J. Appl. Psychol.* 1, 37–40.
- Wang, X., Zhang, J., Wu, S., Xiao, W., Wang, Z., Li, F., et al. (2021). Effects of meaning in life on subjective well-being: the mediating role of self-efficacy. *Soc. Behav. Pers. Int. J.* 49, 1–11. doi: 10.2224/sbp.9975
- Xu, J., and Liu, C. (2021). Infodemic vs. Pandemic factors associated to public anxiety in the early stage of the COVID-19 outbreak: a cross-sectional study in China. *Front. Public Health* 9:723648. doi: 10.3389/fpubh.2021.723648
- Yenen, E. T., and Çarkit, E. (2021). Fear of COVID-19 and general self-efficacy among Turkish teachers: mediating role of perceived social support. *Curr. Psychol.* 1–9. doi: 10.1007/s12144-021-02306-1 [Epub ahead of print].
- Yu, Y., Yu, Y., and Hu, J. (2021). COVID-19 among Chinese high school graduates: psychological distress, growth, meaning in life and resilience. *J. Health Psychol.* 27, 1057–1069. doi: 10.1177/1359105321990819
- Yuen, M., and Datu, J. A. D. (2021). Meaning in life, connectedness, academic self-efficacy, and personal self-efficacy: a winning combination. *Sch. Psychol. Int.* 42, 79–99. doi: 10.1177/0143034320973370
- Zammitti, A., Imbroglia, C., Russo, A., Zarbo, R., and Magnano, P. (2021). The psychological impact of Coronavirus pandemic restrictions in Italy. The mediating role of the fear of COVID-19 in the relationship between positive and negative affect with positive and negative outcomes. *Eur. J. Invest. Health Psychol. Educ.* 11, 697–710. doi: 10.3390/ejihpe11030050
- Zheng, X., Chen, J., Guo, Y., Xiong, Q., Hu, Y., Shi, S., et al. (2020). The buffer effect of physical activity: why does parental marital satisfaction affect adolescents' problematic internet use. *Addict. Behav. Rep.* 11:100271. doi: 10.1016/j.abrep.2020.100271

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