



How does psychological capital lead to better well-being for students? The roles of family support and problem-focused coping

Haobi Wang¹ · Ting Kin Ng² · Oi-ling Siu²

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Abstract

Recent studies have shifted the attention on the beneficial role of psychological capital from workplace to academic contexts. Moreover, the mediating role of psychological capital in the effect of social support on student outcomes remains unknown. This topic has become more imperative under the pandemic. The current study aimed to investigate the impact of psychological capital on students' well-being with family support as an antecedent and problem-focused coping as a mediator. Two hundred and eighty-one students completed the questionnaire at two time points. Results of the cross-lagged mediation analysis showed that family support positively predicted psychological capital, psychological capital positively predicted problem-focused coping, and problem-focused coping predicted well-being. Moreover, the chain mediation path between family support and well-being via psychological capital and problem-focused coping was significant. The current findings identify the antecedent and underlying mechanism behind the relationship between psychological capital and well-being, providing insights into psychological capital interventions for students.

Keyword Psychological capital; Family support; Problem-focused coping; Well-being; COVID-19 pandemic

World Health Organization explicates that it is important to “address the psychological impact of the pandemic” in 2017 (p 0.39). From January 2020 till now, the COVID-19 pandemic has brought increased uncertainty and drastic changes, continuing to deteriorate individuals' mental health (Li et al., 2020; Yang & Ma, 2020). Since the COVID-19 pandemic, positive psychology researchers have started to reflect on the roles of positive psychological resources in sustaining and promoting individuals' mental health both in the short term and long term during the pandemic (Waters et al., 2022). Psychological capital, one of the major positive psychological states that draws researchers' attention,

has been found to promote employees' work outcomes in organizational settings (Avey et al., 2010; Heled et al., 2016; Roche et al., 2014; Siu, 2013; Siu et al., 2021a). Recently, researchers have begun to explore the beneficial roles of psychological capital in school settings (e.g., Datu et al., 2018; Siu et al., 2021b). As psychological capital could be cultivated through interventions (Luthans et al., 2006, 2008, 2010), it is of great importance to investigate whether and how psychological capital could promote students' positive outcomes during the pandemic. We aim to gain a broader understanding of this topic by collecting two-wave self-report data before and after the COVID-19 outbreak.

In contrast to the common sense that childhood and adolescence are happy and worryless periods, these periods have been found to be accompanied by stress. In North America, more than 20% of children and adolescents suffer from at least one psychiatric disorder (Steele et al., 2008; Winter & Bienvenu, 2011). Other children may encounter adjustment problems without meeting the clinical criteria. Children in late childhood and early adolescence are especially vulnerable to intrapersonal demands, interpersonal demands, and academic demands (Adams & Berzonsky, 2003; Dahl & Gunnar, 2009; Quevedo et al., 2009). Researchers have suggested that childhood stress can lead to poor psychological

✉ Ting Kin Ng
ngtingkin@gmail.com

Haobi Wang
haobiwang@ln.edu.hk

Oi-ling Siu
siuol@ln.edu.hk

¹ Wofoo Joseph Lee Consulting and Counselling Psychology Research Centre, Lingnan University, Tuen Mun, N. T., Hong Kong

² Department of Applied Psychology, Lingnan University, Tuen Mun, N. T., Hong Kong

functioning and physical diseases in adulthood (Miller et al., 2011). However, the recent COVID-19 pandemic has brought even more undesirable changes to children and adolescents, fueling the psychological stress. Thus, identifying protective factors for children's subjective well-being under the stressful pandemic is of substantial importance.

Life satisfaction has been recognized as one of the key indicators of subjective well-being (Huebner et al., 2006). It is defined as one's subjective evaluation about his or her whole life (Diener et al., 1985). Research has suggested that life satisfaction engenders individuals' success in physiological health, performance, and interpersonal relations (see review: Lyubomirsky et al., 2005). However, life satisfaction tends to decrease in a linear pattern from late childhood to late adolescence (Goldbeck et al., 2007; González-Carrasco et al., 2017). The COVID-19 pandemic may make the decrease even worse. Magson et al. (2021) found that adolescents' life satisfaction significantly decreased during the pandemic. Thus, the current study aims at exploring the protective role and the mechanism of psychological capital on children's life satisfaction.

Psychological capital

Capital refers to assets and resources invested for expected future returns (Luthans et al., 2004). While human capital (e.g., knowledge, skills) is concerned with “what you know” and social capital (e.g., relationships, networks) is concerned with “who you know”, psychological capital is concerned with “who you are” (Luthans et al., 2007b). Psychological capital comprises a set of positive psychological resources that can be developed and managed for improved performance (Luthans et al., 2004; Luthans et al., 2007b). Psychological capital has been conceptualized as an umbrella state-like construct comprising self-efficacy, optimism, hope, and resilience (Luthans et al., 2007b). Self-efficacy is defined as the positive expectation about succeeding in demanding tasks; optimism is defined as a clear assumption of achieving positive results; hope is defined as figuring out solutions and tackling problems despite facing difficulty; and resilience is defined as an ability to recover from stressful feelings and persist to succeed in challenging tasks (Luthans et al., 2007b). Instead of a simple constellation of the above four constructs, psychological capital serves as a higher-order construct of the four positive psychological resources (self-efficacy, optimism, hope, and resilience; Luthans et al., 2007b; Martínez et al., 2021), predicting work outcomes beyond its four components (Luthans et al., 2007a). As noted above, it has also been shown that employees' psychological capital is state-like and malleable, and hence can be improved through effort and learning (Luthans et al., 2010). Research has shown that psychological capital can be enhanced by psychological capital interventions (Dello

Luthans et al., 2014; Russo & Stoykova, 2015). Being identified as the best represented positive construct deserving investigation to well-being, psychological capital was found to predict job satisfaction and well-being among employee samples and athletes (Avey et al., 2010; Cheung et al., 2011; Ruan & Liu, 2021). However, only recently did researchers begin to explore the benefits of psychological capital on student outcomes (Siu et al., 2021b).

There are strong reasons that the beneficial role of psychological capital in organizational settings can be extended to school settings as these two settings exhibit similarity in behavioral expectations, task nature, and predicted outcomes (Datu & Valdez, 2016; Siu et al., 2014; Siu et al., 2021b). First, students are expected to achieve good grades in academic tasks, similar to the expectation of performing well in job duties for employees (behavioral expectations). Second, the academic tasks for students are similar to employees' work tasks (task nature). Third, the beneficial effect of psychological capital on positive organizational outcomes might be similar to that on positive educational outcomes (Datu & Valdez, 2016; Siu et al., 2014; Siu et al., 2021b). Up to now, a considerable amount of research among student samples has focused on the positive impact of psychological capital on academic outcomes including study engagement (Datu & Valdez, 2016; Siu et al., 2014) and academic performance (Carmona-Halty et al., 2019; Datu et al., 2018; Liran & Miller, 2019; Martínez et al., 2021). Recently, psychological capital has been found to associate with better student well-being (Datu & Valdez, 2016; Martínez et al., 2021; Poots & Cassidy, 2020). Avey et al. (2010) and Wright et al. (2007) noted that well-being itself can serve as a primary resource, which is most likely to occur when individuals preserve and obtain resources. Thus, the conservation of resources (COR) theory (Hobfoll, 1989) is of particular relevance for the beneficial role of psychological capital in well-being. By drawing from the COR theory (Hobfoll, 1989), individuals strive to invest extant psychological resources in order to gain more resources. Psychological capital could be viewed as one kind of personal psychological resources (Luthans et al., 2007a). Specifically, children with higher psychological capital may be more likely to believe they can succeed in daily life (self-efficacy and optimism), find out solutions (hope), and bounce back quickly in stressful events (resilience), thus cultivating better well-being.

Limitations of previous research

Previous studies contained several limitations. First, most studies have examined the positive role of psychological capital in samples of university students and high school students (i.e., Datu & Valdez, 2016; Datu et al., 2018; Martínez et al., 2021; Selvaraj & Bhat, 2018; Siu et al., 2014;

Vîrgă et al., 2020). Only one study (Siu et al., 2021b) has revealed the beneficial role of psychological capital in student outcomes among primary school students. Thus, more empirical evidence from younger age groups is required. Second, many of the previous studies have used a cross-sectional design (Luthans et al., 2019; Siu et al., 2021b), which cannot draw causal inferences. More research with a longitudinal design is required to verify the positive impact of psychological capital. Third, although the positive effect of psychological capital on students' well-being has been supported, the underlying mechanism remains unclear (Datu & Valdez, 2016; Selvaraj & Bhat, 2018). Dawkins et al. (2013) proposed the urgent need to investigate the potential mechanisms. A recent cross-sectional study (Siu et al., 2021b) revealed that study engagement and problem-focused coping served as mechanisms for the positive impact of psychological capital on students' well-being. It is thus imperative to utilize more robust designs to investigate the potential mechanisms. Fourth, although the positive role of psychological capital has been supported, few studies have explored the antecedents that cultivate individuals' psychological capital. Avey (2014) found that intrapersonal, interpersonal, and environmental factors can shape employees' psychological capital concurrently. The antecedents of psychological capital for students in younger ages require further investigations. Fifth, previous research on the positive impact of psychological capital on student outcomes has been mainly conducted before the COVID-19 pandemic (e.g., Datu et al., 2018; Siu et al., 2014). During the pandemic, schools were closed and reopened repeatedly due to the fluctuated confirmed cases. Students also need to cope with other stressors related to the COVID-19 outbreak. It remains unknown whether the past findings could be extended to the pandemic. A recent study found that psychological capital still positively predicted university employees' well-being during the COVID-19 pandemic (Prasath et al., 2021). The current study aims to investigate whether psychological capital could promote younger students' well-being under the pandemic by using a longitudinal design. Moreover, we would like to examine the antecedent and the mediator in this relationship.

Family support as an antecedent of psychological capital

Social support may serve as an antecedent of psychological capital. Social support is defined as emotional support, instrumental help, and informational support provided by the helpers to assist someone who is encountering difficulties (Cohen, 2004; Ng et al., 2014, 2017). According to the COR theory (Hobfoll, 1989), social support represents social resources, which can motivate individuals to obtain and reserve other resources such as psychological resources

(e.g., psychological capital). Consistent with the COR theory, Nielsen et al.'s (2017) study supported that social support from instructors was associated to higher psychological capital among postgraduate business students. Carmona-Halty et al. (2022) indicated that parent support prospectively predicted psychological capital among high school students. A recent study (Siu et al., 2021b) also showed that social support from family, peers, and teachers was positively related to psychological capital among primary school students.

Moreover, psychological capital may mediate the relationship between social support and students' well-being. The COR theory postulates that individuals with more resources tend to invest more in resources gain, which leads to well-being (Hobfoll, 1989). Consistent with the COR theory, optimism, one of the four components of psychological capital, was found to mediate the relationship between social support and well-being in organizational settings (Karademas, 2006). Specifically, it was found that higher social support led to higher optimism, which in turn led to higher well-being among employees (Karademas, 2006). Siu et al. (2021b) also found that psychological capital mediated the relationship between social support and well-being among primary school students using a cross-sectional design. The current study seeks to investigate whether psychological capital could serve as a potential mechanism of social support in promoting well-being among primary school students in a longitudinal design.

Researchers have identified three kinds of social support for youths: family support, peer support, and teacher support (Cauce & Srebnik, 1990; Malecki & Demary, 2002). It is unsurprising that family support serves as a salient source of social support that promotes psychological and physical functioning for youths (Brannan et al., 2012). For instance, it was found that family support served as the important predictor of moderate to vigorous physical activity when compared to peer support among middle school students (Hsu et al., 2011). In addition, in a longitudinal study examining the effects of family support, peer support, and teacher support on life satisfaction, only family support significantly predicted youths' global life satisfaction (Siddall et al., 2013).

Family support may exert a more crucial influence on students' psychological resources under the COVID-19 pandemic when compared to other sources of social support (Mariani et al., 2020; Permatasari et al., 2021). During the pandemic, students attended online courses at home, reducing the face-to-face communication with teachers and peers and increasing the family time and activities. The confined situations may decrease the availability of direct support from teachers and peers, while increasing the availability of direct support from other family members. Studies have indicated that during the COVID-19 outbreak, the effect of

family support are stronger than peer support and teacher support on student outcomes (Mariani et al., 2020; Permatasari et al., 2021). In this case, clinical psychologists have identified family support as a crucial intervention for youths under the pandemic (Rousseau & Miconi, 2020). Thus, the current study aims to focus on the mediating role of psychological capital in the effect of family support on well-being. By deriving from the above empirical and theoretical evidence, the following hypothesis was formulated:

Hypothesis 1 Psychological capital would mediate the relationship between family support and well-being.

Problem-focused coping as a mediator

Problem-focused coping may serve as one potential mechanism underlying the effects of social support and psychological capital on students' well-being. Coping refers to an effortful cognitive and behavioral processes aiming at handling with stressful events (Lazarus & Folkman, 1984). Researchers have classified coping strategies into two categories according to coping functions: problem-focused coping and emotion-focused coping (Folkman & Lazarus, 1980; Skinner et al., 2003). Problem-focused coping refers to cognitive and behavioral processes aiming at solving the stressful events directly (Lazarus & Folkman, 1984). Emotion-focused coping refers to cognitive and behavioral processes aiming at regulating the emotions elicited by stressful events (Lazarus & Folkman, 1984). Recently, researchers have identified meaning-focused coping, which aims at modifying the appraisal about a stressful event to fit individuals' internal beliefs (Pearlin, 1991). It has generally been suggested that problem-focused coping performs better than emotion-focused coping and meaning-focused coping in predicting well-being (Rabenu et al., 2017; Riley & Park, 2014), and emotion-focused coping may have detrimental impact on well-being (Chen 2016). Thus, the current study focuses on problem-focused coping.

According to Lazarus and Folkman's (1984) stress and coping model, coping exhausts one's energy and resources. Individuals need to mobilize resources including family support and psychological capital to cope with stressful individual-environmental relationship. Previous research has found that both social support from family, teachers, and peers and psychological capital were positively related to problem-focused coping in a primary school student sample (Siu et al., 2021b). In addition, problem-focused coping mediated the prediction of well-being by social support (Siu et al., 2021b). Siu et al. (2021b) also found that psychological capital and problem-focused coping sequentially mediated the effect of social support on well-being. However, Siu et al. (2021b) used a cross-sectional design, which limits the

validity of the finding. The current study seeks to further investigate these relationships using a longitudinal design. Thus, the following hypothesis was formulated:

Hypothesis 2 Psychological capital and problem-focused coping would sequentially mediate the relationship between family support and well-being.

Method

Participants and procedures

A total of 281 grade-four students from seven primary schools in Hong Kong participated in the current study. There were 157 males (55.9%) and 124 females (44.1%). Their age ranged from 9.46 to 12.15 ($M = 10.07$, $SD = 0.42$). Some students were a bit older as they came from Mainland China or other countries and had completed the fourth grade in their home towns. We have sought principals' approval and parents' consent before conducting the study at two time points. The questionnaire was administered eight months before the COVID-19 at the first time point (T1) and eight months after the outbreak of COVID-19 in Hong Kong at the second time point (T2). Students were asked to fill in the questionnaire in the classroom at T1. If they had any problems, research assistants and student helpers were present to answer any questions. Sixteen months later, students were asked to fill in the questionnaire again. At T2, 168 students (59.8%) filled in the hardcopy questionnaire. Moreover, 113 students (40.2%) filled in the online questionnaire via Qualtrics links at home, as face-to-face classes in their schools were suspended due to the COVID-19 outbreak. Results of independent samples *t* tests showed no significant differences in the study variables between hardcopy questionnaire respondents and online questionnaire respondents, $ps > 0.05$.

Measures

All of the following measures were condensed into one questionnaire for students to fill in, along with demographic variables such as age and gender. All measures were written in Chinese. The original English items were translated into Chinese with back-translation to ensure conceptual equivalence.

Family support The 7-item family social support subscale of the Multi-Dimensional Support Scale (MDSS) was utilized to measure the frequency and adequacy of help and support from family members toward children when facing setbacks (Winefield et al., 1992). In this scale, children were asked to rate the items (e.g., "How often did they try to take your mind off your problems by telling jokes or chattering

about other things?") on a 4-point Likert scale (1 = *never*, 4 = *always*). The MDSS has exhibited satisfactory internal reliability among primary student samples (Siu et al., 2021b).

Psychological capital The 12-item Psychological Capital Questionnaire (PCQ-12, Luthans et al., 2007b; Martínez et al., 2021) was adopted to measure psychological capital in school settings. The PCQ contains four subscales: self-efficacy (3 items; e.g., "I feel confident presenting information to a group of classmates"), optimism (2 items; e.g., "I am optimistic about what will happen to me in the future as it pertains to academic work"), hope (4 items; e.g., "I can think of many ways to reach my current learning goals"), and resilience (3 items; e.g., "I can get through difficult times at academic work because I have experienced difficulty before"). Participants were asked to evaluate each item on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The PCQ-12 has shown good internal reliability among primary and secondary student samples (Carmona-Halty et al., 2019; Siu et al., 2021b).

Problem-focused coping The 4-item problem-focused coping subscale of the Kids Coping Scale (KCS) was used to measure the frequency of utilizing problem-focused coping strategies in the face of problems for children (Maybery et al., 2009). Participants were asked to rate the items (e.g., "You tried to think of different ways to solve the problem") on a 3-point Likert scale ranging from 0 (*never*) to 2 (*a lot*). This subscale has exhibited adequate internal reliability and criterion-related validity with related constructs in previous studies (Maybery et al., 2009; Siu et al., 2021b).

Well-being The Satisfaction with Life Scale (SWLS) was employed to measure students' well-being (Diener et al., 1985). The SWLS includes 5 items such as "The conditions of my life are excellent". Participants were required to rate each item on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The SWLS has exhibited good construct validity, internal reliability, and test–retest reliability among different age groups (see a review: Pavot & Diener, 2009).

Data analysis

Following Cole and Maxwell's (2003) recommendation, a two-wave cross-lagged mediation model was tested with Mplus version 8. As the sample size was relatively low compared to the numbers of items, item parcels were created. For unidimensional constructs like life satisfaction and family support, items were randomly distributed to three item parcels (Little et al., 2002). For the multidimensional construct like psychological capital, items from four dimensions

were equally distributed to three item parcels according to the domain-representative method (Little et al., 2002). As problem-focused coping only contains four items, we did not create any item parcels for it. Weighted least squares means and variance adjusted estimation (WLSMV) was adopted as items of problem-focused coping are ordered-categorical (Beauducel & Herzberg, 2006). Before testing the hypothesized model, a measurement model with covariances between the study variables at two time points and the error covariances of the same items or item parcels at the two time points were estimated. As suggested by Cole and Maxwell (2003), three structural equation models were further constructed and compared: the hypothesized causality model (Fig. 1), the reversed model (Fig. 2), and the reciprocal model (Fig. 3) including all the paths in the hypothesized model and reversed model. A combination of fit indices was used to evaluate the models. Specifically, CFI > 0.95, TLI > 0.95, RMSEA < 0.06, and WRMR < 1.0 reflect a satisfactory model fit (Browne & Cudeck, 1993; DiStefano et al., 2018; Hu & Bentler, 1999). Chi-square differences were used for model comparison between nested models including the comparison between the reciprocal model and reversed model as well as between the reciprocal model and the hypothesized model. Bootstrapping technique with 95% biased-corrected confidence interval (95% BCCI) was adopted to evaluate the significance of the indirect effects with 1000 bootstrap resamples. The bootstrapping technique was used because of its advantages over other tests of indirect effects, which have weaker statistical power and rely on the assumption of normal distribution (Ye et al., 2016). When the 95% BCCI contains zero, the indirect effect is non-significant. When the 95% BCCI does not contain zero, the indirect effect is significant.

Results

The means, standard deviations, and correlations between the study variables are shown in Table 1. The study variables indicated acceptable to satisfactory internal consistency reliability at T1 (0.68 to 0.89) and T2 (0.56 to 0.91).

The results showed that the measurement model attained a satisfactory model fit, $\chi^2(258) = 249.87$, $p = 0.63$, CFI = 1.00, TLI = 1.01, RMSEA = 0.00, 90% CI = [0.00, 0.02], $p = 1.00$, SRMR = 0.033. The standardized factor loadings for the study variables were strong, ranging from 0.36 to 0.96.

The reciprocal model exhibited a good model fit, $\chi^2(258) = 249.87$, $p = 0.63$, CFI = 1.00, TLI = 1.01, RMSEA = 0.00, 90% CI = [0.00, 0.02], $p = 1.00$, SRMR = 0.03. The reversed model also showed good model fit, $\chi^2(264) = 275.52$, $p = 0.30$, CFI = 0.99, TLI = 0.99, RMSEA = 0.01, 90% CI = [0.00, 0.03], $p = 1.00$,

Fig. 1 The hypothesized model

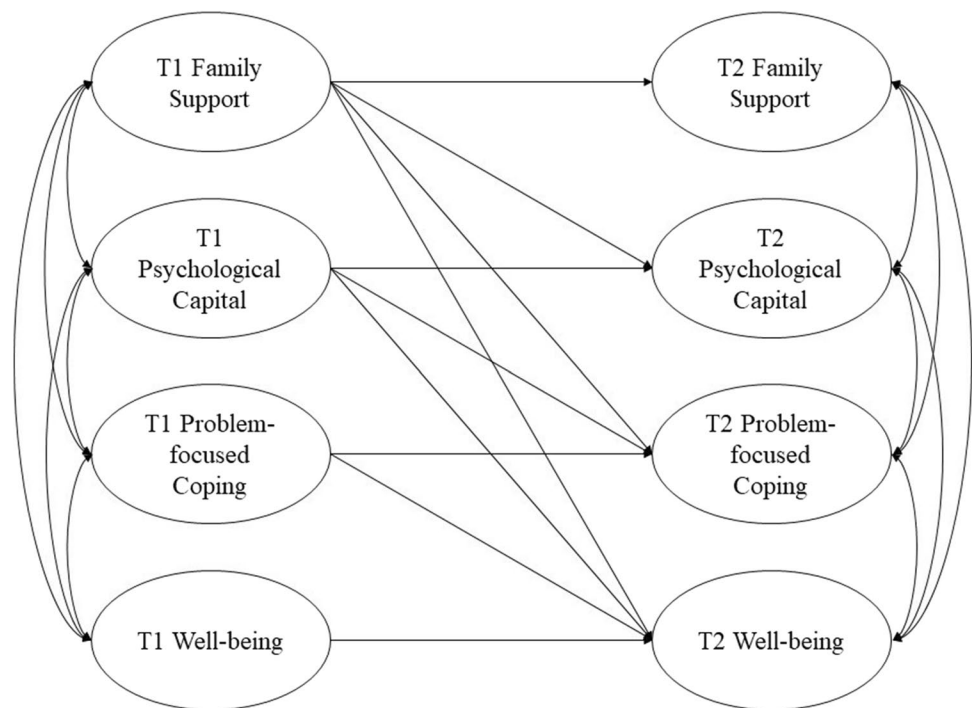
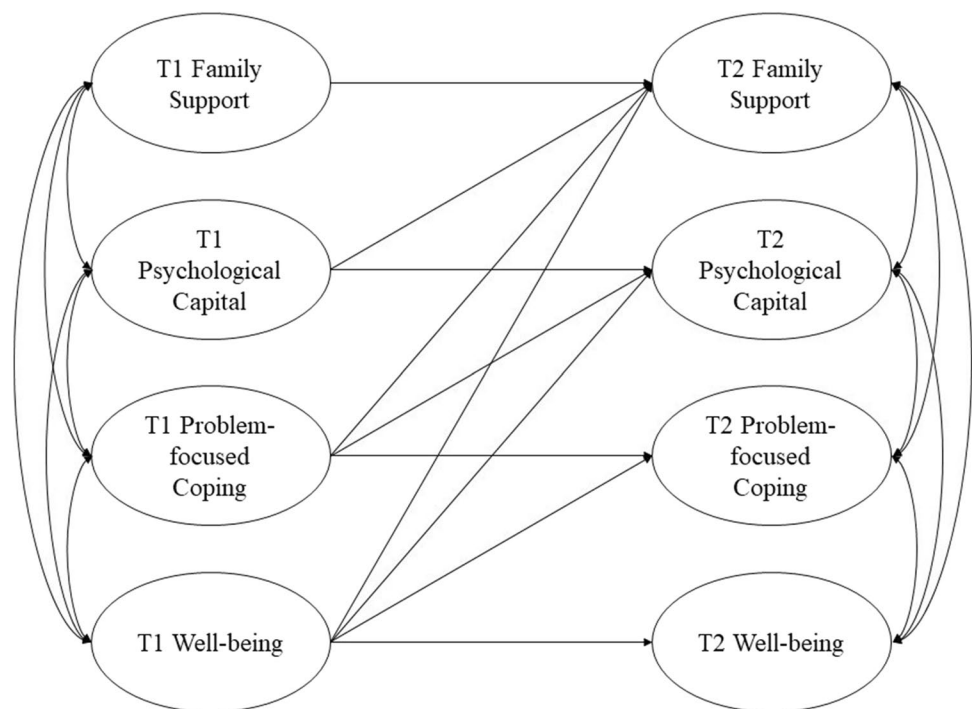


Fig. 2 The reversed model



SRMR = 0.04. However, the results of model comparison showed that it was significantly worse than the reciprocal model, $\Delta\chi^2(6) = 14.23, p = 0.03$. The hypothesized model also exhibited satisfactory model fit, $\chi^2(264) = 256.28, p = 0.62, CFI = 1.00, TLI = 1.01, RMSEA = 0.00, 90\% CI = [0.00, 0.02], p = 1.00, SRMR = 0.03$. In addition, the results of model comparison showed that the model fit of

hypothesized causality model was not significantly worse than the reciprocal model, $\Delta\chi^2(6) = 6.00, p = 0.42$. Thus, the hypothesized causality model was retained according to the principle of parsimony.

We followed James et al.'s (2006) suggestion to examine a complete mediation model by deleting the non-significant direct effect from T1 family support to T2

Fig. 3 The reciprocal model

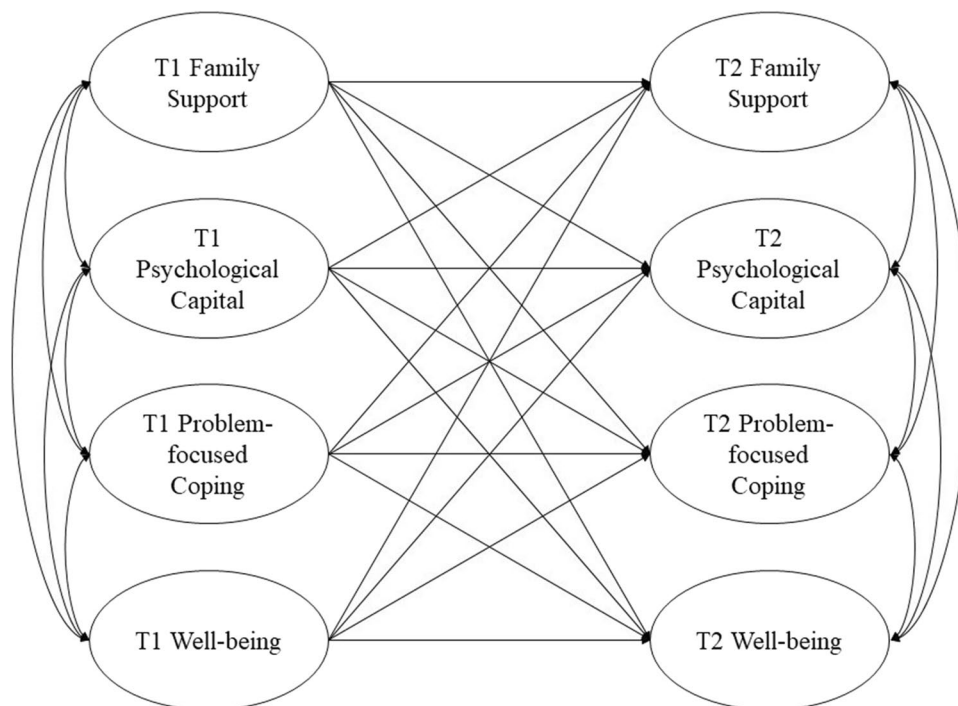


Table 1 Correlations and descriptive statistics for the study variables

Variable	1	2	3	4	5	6	7	8
1. T1 Family Support	(.87)							
2. T1 Psychological Capital	.31***	(.89)						
3. T1 Problem-focused Coping	.37***	.45***	(.68)					
4. T1 Well-being	.56***	.43***	.35***	(.88)				
5. T2 Family Support	.34***	.14*	.22***	.25***	(.89)			
6. T2 Psychological Capital	.29***	.47***	.35***	.31***	.39***	(.91)		
7. T2 Problem-focused Coping	.21***	.28***	.28***	.19**	.35***	.50***	(.56)	
8. T2 Well-being	.26***	.24***	.25***	.35***	.52***	.47***	.38***	(.89)

Cronbach’s alpha values are shown in the diagonals. * $p < .05$. ** $p < .01$. *** $p < .001$

well-being. The revised model exhibited satisfactory model fit, $\chi^2(265) = 255.67, p = 0.65, CFI = 1.00, TLI = 1.01, RMSEA = 0.00, 90\% CI = [0.00, 0.02], p = 1.00, SRMR = 0.03$. In addition, it did not show significant deterioration in model fit when compared to the hypothesized causality model, $\Delta\chi^2(1) = 0.002, p = 0.97$. Thus, the revised model that was more parsimonious was retained (as shown in Fig. 4).

In the final model, T1 family support positively predicted T2 psychological capital, $\beta = 0.17, p < 0.001$. T1 psychological capital positively predicted T2 problem-focused coping, $\beta = 0.21, p < 0.05$. T1 problem-focused coping positively predicted T2 well-being, $\beta = 0.22, p < 0.05$.

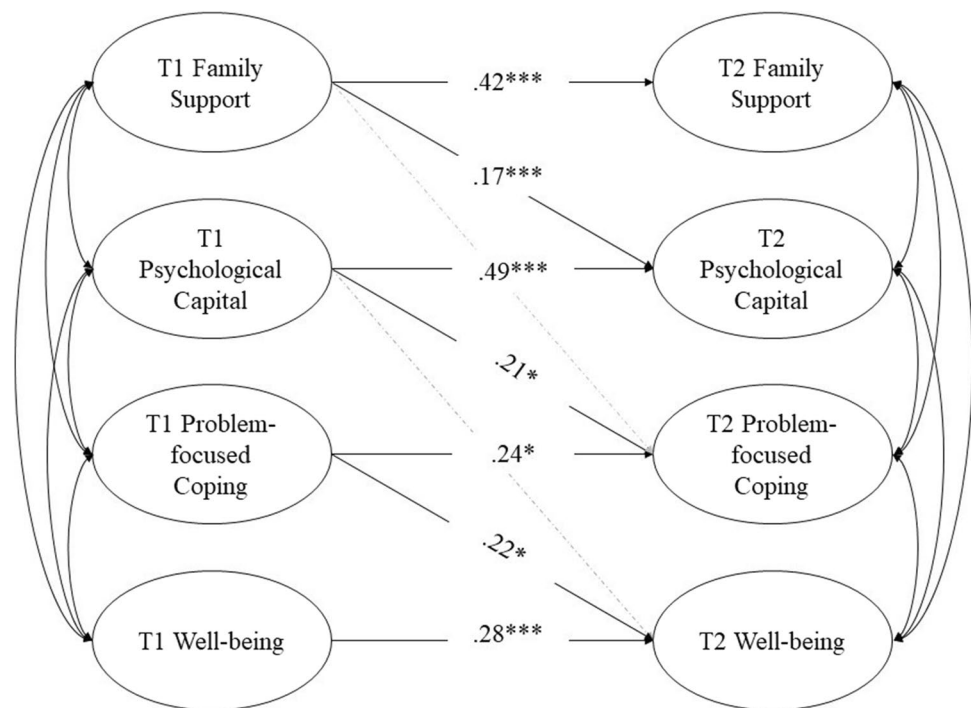
The results of bootstrapping showed that the indirect effect of family support on life satisfaction via psychological capital was non-significant, $b = 0.00, 95\% BCCI = [-0.08, 0.10], \beta = 0.0002$. The indirect effect of family support on

well-being via problem-focused coping was non-significant, $b = 0.04, 95\% BCCI = [-0.04, 0.18], \beta = 0.02$. However, the indirect effect of family support on well-being through psychological capital and problem-focused coping was significant, $b = 0.02, 95\% BCCI = [0.00, 0.07], \beta = 0.01$. Thus, H1 was not supported while H2 was supported.

Discussion

Psychological capital is a constellation of four crucial psychological resources, especially during the COVID-19 pandemic. Identifying its antecedents and mechanisms are thus of theoretical and practical importance for students. To expand the previous research on psychological capital in workplace and academic contexts (Avey et al., 2010; Nielsen et al., 2017; Siu et al., 2014; Siu et al., 2021b), the current

Fig. 4 The final model. *Note.* Light dash paths are non-significant. Standardized coefficients are represented. Items and item parcels as well as error covariances of items are not displayed. * $p < .05$. ** $p < .01$. *** $p < .001$ (one-tailed)



two-wave study seeks to better understand the positive role of psychological capital in well-being among primary school students. Moreover, the current study aims to explore family support as an antecedent and problem-focused coping as a mediator. Specifically, the results revealed that family support predicted psychological capital prospectively. Psychological capital predicted problem-focused coping prospectively. Problem-focused coping predicted well-being prospectively. Moreover, family support predicted better well-being prospectively through the sequential mediating effects of psychological capital and problem-focused coping. Thus, this study provides preliminary evidence that students' psychological capital could be cultivated by family support and lead to better well-being through enhancing problem-focused coping.

The results showed that family support served as a significant antecedent of children's psychological capital under pandemic. This finding is consistent with the COR theory that social resources motivate individuals to strive for additional social, psychological, or coping resources (Hobfoll, 1989). Moreover, previous research has suggested the important roles of parent support and teacher support in cultivating students' psychological capital (Carmona-Halty et al., 2019, 2022). The current finding expands the extant literature by showing that supportive environment created by family members contributed to children's positive psychological resources under the pandemic. Family support may help alleviate children's negative emotions while increasing children's positive emotions by increasing the probability of finishing the academic tasks successfully, thus building

children's positive beliefs toward themselves (Luthans & Youssef-Morgan, 2017).

The current findings indicated that family support prospectively predicted students' well-being through the sequential mediating effects of psychological capital and problem-focused coping. This finding is consistent with past findings that social support from family, peers, and teachers was associated with well-being through psychological capital and problem-focused coping (Siu et al., 2021b). As Siu et al. (2021b) study adopted a cross-sectional design, our study expanded the chain mediation path specifically from family support to well-being using a longitudinal design. However, previous research has suggested that different sources of social support may exert distinct influences on student outcomes (Chu et al., 2010). It is thus of practical importance for researchers to further explore the dynamics of social support from different networks on students' well-being. Moreover, the significant chain mediation path could expand the COR theory by disentangling the resources-building process (Hobfoll, 1989). Specifically, the current findings suggested that social resources are required to be internalized as psychological resources, which in turn could be adopted to mobilize energies to employ adaptive coping strategies to maintain well-being.

The current findings have significant theoretical and practical implications for psychological capital. Researchers have recently begun to investigate its role in academic contexts (Carmona-Halty et al., 2019, 2022; Datu et al., 2018; Liran & Miller, 2019; Martínez et al., 2021; Siu et al., 2014; Siu et al., 2021b). To our best knowledge, only one

cross-sectional study revealed the beneficial role of psychological capital among primary school students (Siu et al., 2021b). The current findings further contributed to the generalizability of the psychological capital theory to primary students (Luthans et al., 2007b). In addition, the current findings step further to provide initial support that primary school students may benefit from psychological capital interventions in the pandemic.

The current findings spotlight the importance of family support in cultivating psychological capital at the early stage of life. Family has been recognized as one of the core micro-systems in the social ecological systems theory (Bronfenbrenner, 2005). This theory postulates that individuals develop through the dynamic exchange with other systems including family, schools, communities, and even cultures. By using this systematic perspective in the developmental process, our findings further provide preliminary evidence that it may be effective to incorporate support from other systems into consideration when designing psychological capital interventions for students.

Moreover, the findings enrich the evidence of the channels through which psychological capital promotes well-being among student samples. Past research has found that academic engagement (Datu & Valdez, 2016) and study engagement (Siu et al., 2021b) served as mechanisms in the relationship between psychological capital and well-being among student samples. The significant indirect effect of family support on well-being via psychological capital and problem-focused coping found in the present study suggested that psychological capital also increases students' ability to adopt problem-focused coping strategies like actively appraising the stressful situations and listing possible solutions, thus maintaining well-being. Future research is required to investigate other underlying mechanisms.

The chain mediation path also hints at the importance of targeting all the components orderly in positive psychology interventions for younger students. For instance, we might need to provide adequate social resources and psychological resources first for promoting problem-focused coping behaviors. Both intervening solely one path from this chain indirect effect or all the paths at the same time may limit the intervention effect (Kraemer et al., 2001). Future research could explore whether the intervention integrating family support, psychological capital, and problem-focused coping sequentially could benefit students' well-being.

Limitations

The current study contains several limitations. Firstly, the current study only utilized self-report measures, which may bias the results with socially desirable response (Roberts et al., 2006). Recently, the implicit psychological capital questionnaire has shown to be less likely to be distorted

than the PCQ (Harms et al., 2018). Future research could apply implicit or other-rated measures to verify the findings. Secondly, the current study targeted primary school students. Future research could investigate the hypothesized model among various age groups. Thirdly, the current study only explored the mediating role of problem-focused coping. Future research could further compare the mediating roles of problem-focused coping with emotion-focused coping and meaning-focused coping. Fourth, the study only explored family support as a unidimensional construct. Previous research has subdivided social support as instrumental, informational, appraisal or emotional support (Malecki & Demaray, 2003). Future research could explore the impacts of different types of family support on psychological capital. Fifth, the two-wave mediation model limited the establishment of the causal chain mediation relationship. Future research could adopt a four-wave longitudinal design to verify the findings. Sixth, the internal reliabilities of problem-focused coping in both timepoints were low, which may bias the results. Future research could adopt a more reliable measure to investigate the mediating role of problem-focused coping (i.e., Patterson & McCubbin, 1996).

Conclusions

Although the functions of psychological capital at workplace have been well established, the dynamic process of psychological capital in academic contexts has remained unclear. The current study aimed to investigate whether psychological capital could predict students' well-being with family support as an antecedent and problem-focused coping as an underlying mechanism by adopting a two-wave longitudinal design during the pandemic. The results showed that family support predicted psychological capital, which predicted problem-focused coping subsequently. Furthermore, psychological capital and problem-focused coping sequentially mediated the relationship between family support and students' well-being. The findings provide preliminary support on designing psychological capital interventions for primary school students under the pandemic.

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Data availability No additional data are available.

Declarations

Informed consent Informed consent was obtained from parents or guardians prior to the students' participation in the study.

Disclosure of potential conflicts of interest The authors declare that they have no conflict of interest.

Research involving human participants All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

References

- Adams, G. R., & Berzonsky, M. D. (Eds.). (2003). *Blackwell handbook of adolescence*. Blackwell.
- Avey, J. B. (2014). The left side of psychological capital: New evidence on the antecedents of PsyCap. *Journal of Leadership and Organizational Studies*, 21(2), 141–149.
- Avey, J. B., Luthans, F., Smith, R. M., & Palmer, N. F. (2010). Impact of positive psychological capital on employee well-being over time. *Journal of Occupational Health Psychology*, 15(1), 17–28.
- Beauducel, A., & Herzberg, P. Y. (2006). On the performance of maximum likelihood versus means and variance adjusted weighted least squares estimation in CFA. *Structural Equation Modeling*, 13(2), 186–203.
- Brannan, D., Biswas-Diener, R., Mohr, C. D., Mortazavi, S., & Stein, N. (2013). Friends and family: A cross-cultural investigation of social support and subjective well-being among college students. *The Journal of Positive Psychology*, 8(1), 65–75.
- Bronfenbrenner, U. (2005). *Making human beings human: Bioecological perspectives on human development*. Sage.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Sage.
- Carmona-Halty, M., Schaufeli, W. B., & Salanova, M. (2019). Good relationships, good performance: The mediating role of psychological capital—a three-wave study among students. *Frontiers in Psychology*, 10, 306.
- Carmona-Halty, M., Salanova, M., & Schaufeli, W. B. (2022). The strengthening starts at home: Parent–child relationships, psychological capital, and academic performance—a longitudinal mediation analysis. *Current Psychology*, 41, 3788–3796.
- Cauce, A. M., & Srebniak, D. S. (1990). Returning to social support systems: A morphological analysis of social networks. *American Journal of Community Psychology*, 18(4), 609.
- Chen, C. (2016). The role of resilience and coping styles in subjective well-being among Chinese university students. *The Asia-Pacific Education Researcher*, 25, 377–387.
- Cheung, F., Tang, C. S. K., & Tang, S. (2011). Psychological capital as a moderator between emotional labor, burnout, and job satisfaction among school teachers in China. *International Journal of Stress Management*, 18(4), 348–371.
- Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-analysis of the relationships between social support and well-being in children and adolescents. *Journal of Social and Clinical Psychology*, 29(6), 624–645.
- Cohen, S. (2004). Social relationships and health. *American Psychologist*, 59(8), 676–684.
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112(4), 558–577.
- Dahl, R. E., & Gunnar, M. R. (2009). Heightened stress responsiveness and emotional reactivity during pubertal maturation: Implications for psychopathology. *Development and Psychopathology*, 21(1), 1–6.
- Datu, J. A. D., & Valdez, J. P. M. (2016). Psychological capital predicts academic engagement and well-being in Filipino high school students. *The Asia-Pacific Education Researcher*, 25(3), 399–405.
- Datu, J. A. D., King, R. B., & Valdez, J. P. M. (2018). Psychological capital bolsters motivation, engagement, and achievement: Cross-sectional and longitudinal studies. *The Journal of Positive Psychology*, 13(3), 260–270.
- Dawkins, S., Martin, A., Scott, J., & Sanderson, K. (2013). Building on the positives: A psychometric review and critical analysis of the construct of Psychological Capital. *Journal of Occupational and Organizational Psychology*, 86(3), 348–370.
- Dello Russo, S., & Stoykova, P. (2015). Psychological capital intervention (PCI): A replication and extension. *Human Resource Development Quarterly*, 26, 329–347.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71–75.
- DiStefano, C., Liu, J., Jiang, N., & Shi, D. (2018). Examination of the weighted root mean square residual: Evidence for trustworthiness? *Structural Equation Modeling: A Multidisciplinary Journal*, 25, 453–466.
- Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior*, 21, (3), 219–239.
- Goldbeck, L., Schmitz, T. G., Besier, T., Herschbach, P., & Henrich, G. (2007). Life satisfaction decreases during adolescence. *Quality of Life Research*, 16(6), 969–979.
- González-Carrasco, M., Casas, F., Malo, S., Viñas, F., & Dinisman, T. (2017). Changes with age in subjective well-being through the adolescent years: Differences by gender. *Journal of Happiness Studies*, 18(1), 63–88.
- Harms, P. D., Krasikova, D. V., & Luthans, F. (2018). Not me, but reflects me: Validating a simple implicit measure of psychological capital. *Journal of Personality Assessment*, 100(5), 551–562.
- Heled, E., Somech, A., & Waters, L. (2016). Psychological capital as a team phenomenon: Mediating the relationship between learning climate and outcomes at the individual and team levels. *The Journal of Positive Psychology*, 11(3), 303–314.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44(3), 513–524.
- Hsu, Y. W., Chou, C. P., Nguyen-Rodriguez, S. T., McClain, A. D., Belcher, B. R., & Spruijt-Metz, D. (2011). Influences of social support, perceived barriers, and negative meanings of physical activity on physical activity in middle school students. *Journal of Physical Activity and Health*, 8(2), 210–219.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Huebner, E. S., Suldo, S. M., & Gilman, R. (2006). Life Satisfaction. In G. G. Bear & K. M. Minke (Eds.), *Children's needs III: Development, prevention, and intervention* (pp. 357–368). National Association of School Psychologists.
- Karademas, E. C. (2006). Self-efficacy, social support and well-being: The mediating role of optimism. *Personality and Individual Differences*, 40(6), 1281–1290.
- Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry*, 158(6), 848–856.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer publishing company.
- Li, S., Wang, Y., Xue, J., Zhao, N., & Zhu, T. (2020). The impact of COVID-19 epidemic declaration on psychological consequences:

- A study of active Weibo users. *International Journal of Environmental Research and Public Health*, 17(6), 2032.
- Liran, B. H., & Miller, P. (2019). The role of psychological capital in academic adjustment among university students. *Journal of Happiness Studies*, 20(1), 51–65.
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9(2), 151–173.
- Luthans, F., & Youssef-Morgan, C. M. (2017). Psychological capital: An evidence-based positive approach. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 339–366.
- Luthans, F., Luthans, K. W., & Luthans, B. C. (2004). Positive psychological capital beyond human and social capital. *Business Horizons*, 47, 45–50.
- Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. M. (2006). Psychological capital development: Toward a micro-intervention. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 27(3), 387–393.
- Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007a). Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel Psychology*, 60(3), 541–572.
- Luthans, F., Youssef, C. M., & Avolio, B. J. (2007b). *Psychological capital: Developing the human competitive edge*. Oxford University Press.
- Luthans, F., Avey, J. B., & Patera, J. L. (2008). Experimental analysis of a web-based training intervention to develop positive psychological capital. *Academy of Management Learning and Education*, 7(2), 209–221.
- Luthans, F., Avey, J. B., Avolio, B. J., & Peterson, S. J. (2010). The development and resulting performance impact of positive psychological capital. *Human Resource Development Quarterly*, 21(1), 41–67.
- Luthans, B. C., Luthans, K. W., & Avey, J. B. (2014). Building the leaders of tomorrow: The development of academic psychological capital. *Journal of Leadership & Organizational Studies*, 21, 191–199.
- Luthans, K. W., Luthans, B. C., & Chaffin, T. D. (2019). Refining grit in academic performance: The mediational role of psychological capital. *Journal of Management Education*, 43(1), 35–61.
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, 131(6), 803–855.
- Magson, N. R., Freeman, J. Y., Rapee, R. M., Richardson, C. E., Oar, E. L., & Fardouly, J. (2021). Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *Journal of Youth and Adolescence*, 50(1), 44–57.
- Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School Psychology Quarterly*, 18(3), 231.
- Malecki, C. K., & Demaray, M. K. (2002). Measuring perceived social support: Development of the child and adolescent social support scale (CASSS). *Psychology in the Schools*, 39(1), 1–18.
- Mariani, R., Renzi, A., Di Trani, M., Trabucchi, G., Danskin, K., & Tambelli, R. (2020). The impact of coping strategies and perceived family support on depressive and anxious symptomatology during the coronavirus pandemic (COVID-19) lockdown. *Frontiers in Psychiatry*, 11, 587724.
- Martínez, I. M., Meneghel, I., Carmona-Halty, M., & Youssef-Morgan, C. M. (2021). Adaptation and validation to Spanish of the Psychological Capital Questionnaire–12 (PCQ–12) in academic contexts. *Current Psychology*, 40, 3409–3416.
- Maybery, D., Steer, S., Reupert, A., & Goodyear, M. (2009). The kids coping scale. *Stress and Health: Journal of the International Society for the Investigation of Stress*, 25(1), 31–40.
- Miller, G. E., Chen, E., & Parker, K. J. (2011). Psychological stress in childhood and susceptibility to the chronic diseases of aging: Moving toward a model of behavioral and biological mechanisms. *Psychological Bulletin*, 137(6), 959–997.
- Ng, T. K., Rochelle, T. L., Shardlow, S. M., & Ng, S. H. (2014). A transnational bicultural place model of cultural selves and psychological citizenship: The case of Chinese immigrants in Britain. *Journal of Environmental Psychology*, 40, 440–450.
- Ng, T. K., Wang, K. W. C., & Chan, W. (2017). Acculturation and cross-cultural adaptation: The moderating role of social support. *International Journal of Intercultural Relations*, 59, 19–30.
- Nielsen, I., Newman, A., Smyth, R., Hirst, G., & Heilemann, B. (2017). The influence of instructor support, family support and psychological capital on the well-being of postgraduate students: A moderated mediation model. *Studies in Higher Education*, 42(11), 2099–2115.
- Patterson, J. M., & McCubbin, H. I. (1996). Adolescent coping orientation for problem experiences (ACOPE). In H. I. McCubbin, A. I. Thompson, & M. A. McCubbin (Eds.), *Family assessment: Resiliency, coping and adaptation: Inventories for research and practice* (pp. 537–583). University of Wisconsin Press.
- Pavot, W., & Diener, E. (2009). Review of the satisfaction with life scale. In Diener, E. (Ed.), *Assessing well-being: The collected works of Ed Diener* (pp. 101–117). New York, NY: Springer.
- Pearlin, L. I. (1991). The study of coping: An overview of problems and directions. In J. Eckenrode (Ed.), *The social context of coping* (pp. 261–276). Plenum.
- Permatasari, N., Ashari, F. R., & Ismail, N. (2021). Contribution of perceived social support (peer, family, and teacher) to academic resilience during COVID-19. *Golden Ratio of Social Science and Education*, 1(1), 01–12.
- Poots, A., & Cassidy, T. (2020). Academic expectation, self-compassion, psychological capital, social support and student wellbeing. *International Journal of Educational Research*, 99, 101506.
- Prasath, P. R., Bhat, C. S., Mather, P. C., Foreman, T., & James, J. K. (2021). Wellbeing, Psychological Capital, and Coping of University Employees during the COVID-19 Pandemic. *Journal of the Professoriate*, 12(1), 1–30.
- Quevedo, K. M., Benning, S. D., Gunnar, M. R., & Dahl, R. E. (2009). The onset of puberty: Effects on the psychophysiology of defensive and appetitive motivation. *Development and Psychopathology*, 21(1), 27–45.
- Rabenu, E., Yaniv, E., & Elizur, D. (2017). The relationship between psychological capital, coping with stress, well-being, and performance. *Current Psychology*, 36(4), 875–887.
- Riley, K. E., & Park, C. L. (2014). Problem-focused vs. meaning-focused coping as mediators of the appraisal-adjustment relationship in chronic stressors. *Journal of Social and Clinical Psychology*, 33(7), 587–611.
- Roberts, B. W., Harms, P. D., Smith, J., Wood, D., & Webb, M. (2006). Methods in personality psychology. In M. Eid & E. Diener (Eds.), *Handbook of psychological assessment: A multimethod perspective* (pp. 321–335). American Psychological Association.
- Roche, M., Haar, J. M., & Luthans, F. (2014). The role of mindfulness and psychological capital on the well-being of leaders. *Journal of Occupational Health Psychology*, 19(4), 476–489.
- Rousseau, C., & Miconi, D. (2020). Protecting youth mental health during the COVID-19 pandemic: A challenging engagement and learning process. *Journal of the American Academy and Child Adolescence Psychiatry*, 59(11), 1203–1207.
- Ruan, Z., & Liu, W. (2021). Coach authentic leadership connected with performance satisfaction and psychological well-being of team: The mediating role of team cohesion and psychological capital.

- Revista De Psicología Del Deporte (journal of Sport Psychology)*, 30(1), 189–203.
- Selvaraj, P. R., & Bhat, C. S. (2018). Predicting the mental health of college students with psychological capital. *Journal of Mental Health*, 27(3), 279–287.
- Siddall, J., Huebner, E. S., & Jiang, X. (2013). A prospective study of differential sources of school-related social support and adolescent global life satisfaction. *American Journal of Orthopsychiatry*, 83(1), 107–114.
- Siu, O. L. (2013). Psychological capital, work well-being, and work-life balance among Chinese employees: A cross-lagged analysis. *Journal of Personnel Psychology*, 12(4), 170–181.
- Siu, O. L., Bakker, A. B., & Jiang, X. (2014). Psychological capital among university students: Relationships with study engagement and intrinsic motivation. *Journal of Happiness Studies*, 15(4), 979–994.
- Siu, O. L., Kong, Q., & Ng, T. K. (2021a). Psychological capital and family satisfaction among employees: Do occupational stressors moderate the relationship? *International Journal of Environmental Research and Public Health*, 18(22), 12260.
- Siu, O. L., Lo, B. C. Y., Ng, T. K., & Wang, H. (2021b). Social support and student outcomes: The mediating roles of psychological capital, study engagement, and problem-focused coping. *Current Psychology*. Advance online publication. <https://doi.org/10.1007/s12144-021-01621-x>
- Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, 129(2), 216–269.
- Steele, R. G., Roberts, M. C., & Elkin, T. D. (2008). Evidence-based therapies for children and adolescents: Problems and prospects. In R. G. Steele, T. D. Elkin, & M. C. Roberts (Eds.), *Handbook of evidence-based therapies for children and adolescents: Bridging science and practice*. Springer.
- Vîrgă, D., Pattusamy, M., & Kumar, D. P. (2020). How psychological capital is related to academic performance, burnout, and boredom? The mediating role of study engagement. *Current Psychology*. Advance online publication. <https://doi.org/10.1007/s12144-020-01162-9>
- Waters, L., Algoe, S. B., Dutton, J., Emmons, R., Fredrickson, B. L., Heaphy, E., & Steger, M. (2022). Positive psychology in a pandemic: Buffering, bolstering, and building mental health. *The Journal of Positive Psychology*, 17(3), 303–323.
- Winefield, H. R., Winefield, A. H., & Tiggemann, M. (1992). Social support and psychological well-being in young adults: The Multi-Dimensional Support Scale. *Journal of Personality Assessment*, 58(1), 198–210.
- Winter, E. C., & Bienvenu, O. J. (2011). Temperament and anxiety disorders. In McKay, D., & Storch E. A. (Eds.), *Handbook of child and adolescent anxiety disorders* (pp. 203–212). Springer, New York, NY
- World Health Organization (WHO). (2017). Pandemic influenza risk management: A WHO guide to inform and harmonize national and international pandemic preparedness and response. Retrieved 30 July, 2021 from <https://apps.who.int/iris/bitstream/handle/10665/259893/WHO-WHE-IHM-GIP-2017.1-eng.pdf?sequence=1&isAllowed=y>
- Wright, T. A., Cropanzano, R., & Bonett, D. G. (2007). The moderating role of employee positive well-being on the relation between job satisfaction and job performance. *Journal of Occupational Health Psychology*, 12, 93–104.
- Yang, H., & Ma, J. (2020). How an epidemic outbreak impacts happiness: Factors that worsen (vs. protect) emotional well-being during the coronavirus pandemic. *Psychiatry Research*, 289, 113045.
- Ye, S., Ng, T. K., Wang, J., & Lee, T. K. (2016). Curiosity and student learning in general education in Hong Kong. In R. B. King & A. B. I. Bernardo (Eds.), *The psychology of Asian learners: A festschrift in honor of David Watkins* (pp. 269–288). Springer.

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