

POSITIVE PSYCHOLOGY STUDIES IN EDUCATION

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POSITIVE PSYCHOLOGY STUDIES IN EDUCATION

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Table of Contents

- 05 Editorial: Positive Psychology Studies in Education**
S. Abdolvahab Samavi
- 08 Hope and Creative Self-Efficacy as Sequential Mediators in the Relationship Between Family Socioeconomic Status and Creativity**
Yinyinzi Yang, Xiaobo Xu, Wenling Liu and Weiguo Pang
- 16 Advancing the Study of Positive Psychology: The Use of a Multifaceted Structure of Mindfulness for Development**
Huy P. Phan, Bing H. Ngu, Si Chi Chen, Lijung Wu, Sheng-Ying Shi, Ruey-Yih Lin, Jen-Hwa Shih and Hui-Wen Wang
- 35 Higher Education, Happiness, and Residents' Health**
Hong Tan, Jin Luo and Ming Zhang
- 44 The Hummingbird Project: A Positive Psychology Intervention for Secondary School Students**
Ian Andrew Platt, Chathurika Kannangara, Michelle Tytherleigh and Jerome Carson
- 54 Mental Health in Academia: The Role of Workplace Relationships**
Thiago C. Moulin
- 57 'When They Struggle, I Cannot Sleep Well Either': Perceptions and Interactions Surrounding University Student and Teacher Well-Being**
Lisa Kiltz, Raven Rinas, Martin Daumiller, Marjon Fokkens-Bruinsma and Ellen P. W. A. Jansen
- 75 Enhancing Internal Learning in Teams: The Role of Network Centrality and Psychological Capital of Undergraduate Students**
Rosa Lutete Geremias, Miguel Pereira Lopes and André Escórcio Soares
- 85 Effects of a Mindfulness Intervention Among Arab Teachers Are Mediated by Decentering: A Pilot Study**
Aviva Berkovich-Ohana, Shiri Lavy and Kholoud Shanboor
- 94 Introducing the Study of Life and Death Education to Support the Importance of Positive Psychology: An Integrated Model of Philosophical Beliefs, Religious Faith, and Spirituality**
Huy P. Phan, Bing H. Ngu, Si Chi Chen, Lijung Wu, Wei-Wen Lin and Chao-Sheng Hsu
- 110 Increasing Students' Long-Term Well-Being by Mandatory Intervention – A Positive Psychology Field Study**
Frida Skarin and Erik Wästlund
- 119 Book Review: The Emotional Rollercoaster of Language Teaching**
Wenxiu Chu and Honggang Liu
- 122 Beyond Passion and Perseverance: Review and Future Research Initiatives on the Science of Grit**
Jesus Alfonso D. Datu

139 *Introducing the Concept of Consonance-Disconsonance of Best Practice: A Focus on the Development of 'Student Profiling'*

Huy P. Phan and Bing H. Ngu

157 *Psychological Capital Mediates the Relationship Between Problematic Smartphone Use and Learning Burnout in Chinese Medical Undergraduates and Postgraduates: A Cross-Sectional Study*

Changhong Zhang, Ge Li, Zhaoya Fan, Xiaojun Tang and Fan Zhang



Editorial: Positive Psychology Studies in Education

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Keywords: Editorial, positive psychology, education, hope, self-efficacy

Editorial on the Research Topic

Positive Psychology Studies in Education

INTRODUCTION

While the positive psychology movement officially began two decades ago, the theories and ideas of a positive-oriented psychology are not entirely new, dating back to decades ago and even to the beginnings of psychology. Perhaps the first comment on positivist psychology came from William James, who introduced the concept of a healthy mindset years ago (Joseph and Linley, 2006). However, positive psychology—as we know it today—can be traced back to 1998; When Martin Seligman, the founder of positive psychology and then president of the American Psychological Association, introduced the concept. Seligman emphasized that psychologists should pay attention to the main missions of psychology, namely helping others to identify and nurture own potentials, and expand the definition of psychology to include positive mental health, rather than the absence of disease (Seligman, 2002). Positive psychological manifestations have emerged in many aspects of life, including treatment, parenting, marital life and education (Bradley and Hojjat, 2017; David et al., 2017; Samavi et al., 2019; Waters et al., 2021).

Education is one of the important tools of societies in socializing students and preparing them for life in the future world. The effects of positive psychology on education have been numerous (Chodkiewicz and Boyle, 2017; Shoshani and Slone, 2017). In particular, one approach in education is positive Schooling approach that supports individual care, trust, and respect for differences. In such a positive environment, teachers set an appropriate goal for each student to be interested in learning and help other students achieve the goals. This causes the hope and self-efficacy of learners to increase simultaneously (Deb, 2018).

Numerous concepts have been introduced in positive psychology related to education, the most important of which are academic hope, self-efficacy, mental wellbeing, and quality of life in school. Several studies have supported the positive role of these constructs in students' academic, motivational, and emotional outcomes (Rand, 2009; Honicke and Broadbent, 2016; Esmaeili et al., 2019). Also, other studies have pointed to the effect of positive psychological constructs on teachers' performance (Sezgin and Erdogan, 2015; Poulou et al., 2019). However, the theory of hope (Snyder, 2000), and the theory of self-efficacy (Bandura, 2006) are two positive psychological constructs that have widely influenced students' academic and motivational behaviors. The construct of self-efficacy has been considered in cognitive and motivational domains and its effect has been confirmed on academic and motivational variables. Self-efficacy refers to an individual's beliefs about his or her ability to learn or perform a behavior at an acceptable level (Maddux and Gosselin, 2012).

Academic self-efficacy refers to an individual's belief in the ability to successfully complete an academic task at a set level or to achieve an academic goal (Schunk and Pajares, 2002). Beliefs

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in academic self-efficacy affect task choice, effort, perseverance, sustainability, and achievement (Schunk and DiBenedetto, 2021). Also, academic self-efficacy affects motivation, learning and academic achievement (Usher and Pajares, 2006; Yusuf, 2011).

On the other hand, numerous studies have pointed to hope as a positive component that affects people's cognitive and emotional outcomes. High levels of hope have been associated with psychological wellbeing, coping with stress, adjusting to emotional distress, self-esteem, social competence, self-efficacy, and academic achievement.

In Snyder's research, hope is related to purposeful behavior and causes a person to use the skill, ability and perseverance to find a way to the goal. Hope is a positive expectation for achieving a goal that consists of two components namely, agency and path. Agent thinking is a motivational component that motivates a person to achieve a goal, while path thinking refers to choosing and finding appropriate paths to the goal (Snyder, 2000).

Hope is not only a goal-oriented cognitive process, but also an organized hierarchical system of beliefs about one's ability to engage in such a cognitive process. These beliefs are organized into three specific levels of abstraction: the general level or trait hope, domain-specific hope, and goal-specific hope (Snyder et al., 1997). People who have high levels of general hope are also hopeful in most areas of life. But in the case of students, there is usually a gap between these two levels of hope. For example, students who have high levels of hope in their lives in general may have low levels of hope in a particular field of study. In general, a comprehensive approach to understanding students' goals in education and life requires an evaluation of their hierarchy of beliefs of hope. However, since these three levels affect each other, in most cases, strengths or weaknesses are transferred from one level to another.

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CONCLUSION

Positive psychology, along with other areas of life, has been broadly discussed in education, and research evidence has supported many effects of this approach on learners' cognitive and emotional outcomes. It seems that in the current complex situation with the negative impact of Covid-19 Epidemic on various aspects of learning and motivation of learners, a positive psychological approach and positive interventions can be considered a good strategy for educational interventions. In the special issue related to positive psychology in education, an attempt was made to study various aspects of the positive psychology system in education, which was relatively successful. It is suggested that in order to deal more effectively with the negative consequences of Covid-19 Epidemic, positive interventions to increase the hope and self-efficacy of learners should be designed and implemented in schools. Also, due to the reopening of schools in many countries, it is necessary to design a positive educational environment in schools since it will have several consequences on the mental health of learners. Teachers can also have a strong positive impact on any student in terms of creating an environment free of fear and encouraging students to express their wants. Although the design of intervention programs based on positive psychology can be of great value, the development of a curriculum based on the concepts of positive psychology can help prepare the ground for the effectiveness of these interventions.

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The author confirms being the sole contributor of this work and has approved it for publication.

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Hope and Creative Self-Efficacy as Sequential Mediators in the Relationship Between Family Socioeconomic Status and Creativity

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The purpose of this study was to evaluate how socioeconomic status (SES) predicts individual creativity through the mediating roles of hope and creative self-efficacy (CSE). Participants were recruited from ten universities in Mainland China. Students' SES, hope, CSE, and creativity were assessed via the socioeconomic status scale, the adult hope scale, the creative self-efficacy scale, and the Runco Ideational Behavior Scale. Correlational analyses indicate that SES, creative ideation, hope, and CSE were significantly and positively associated with each other. Path analyses revealed that hope and CSE played sequential mediating roles in the link between SES and creative ideation. These findings suggest that hope and CSE underlie the effect of SES on individuals' creative ideation.

Keywords: socioeconomic status, hope, creative self-efficacy, creative ideation, creativity

INTRODUCTION

Creativity is defined as the ability to generate original and useful ideas or solutions to problems (Sternberg and Lubart, 1999). As an important human ability, creativity vital to the arts, technology, and science and it is affected by numerous factors (Simonton, 2004; Weisberg, 2006; Tillander, 2011). According to the Investment theory of Sternberg and Lubart (1992), creativity is co-influenced by intelligence, knowledge, personality, thinking style, motivation, and many environmental variables, among which family socioeconomic status (SES) is a variable worthy of in-depth investigation.

A number of relational studies have established a positive link between SES and creativity (Kaltsounis, 1974; Daugherty and White, 2008; Dai et al., 2012). However, the mechanism by which SES influences creativity is not fully understood. For instance, although previous research has illustrated the mediating roles of intelligence (Shi and Shen, 2007), motivation (Dai et al., 2012) and personality (Zhang et al., 2018), fewer studies focused on the mediating effect of the expectational factors (e.g., hope). In his 30-year longitudinal study, Torrance (2004) found that personal perceptions of the future are far more predictive of later creative achievement than past achievements or traits. Moran (2010) suggested that individuals' future perceptions toward creativity (e.g., the hopes and risks of being creative in the future) can affect their future creative achievement. Thus, the main purpose of this study was to explore the possible effect of hope on the association of SES and creativity.

The second purpose of this study is to investigate the roles of creative self-efficacy (CSE) in the association of SES and creativity. This is because previous research has documented that hope is strongly influence self-efficacy (Sezgin and Erdogan, 2015).

Many studies have found a creativity gap between individuals from low and high SES families (Mitchell, 1975; Shi and Shen, 2007). Investment theory (Sternberg and Lubart, 1992) suggests that creativity is influenced by cognitive as well as environmental factors. The environment is shaped by family SES, which encompasses parental education, parental occupation, and family income (Duncan et al., 1972). SES has been associated with different facets of creativity, such as everyday creativity, social creativity, and creative ideation (Richards et al., 1988; Dai et al., 2012; Zhang et al., 2018). For instance, research has shown high SES background students have higher levels of creativity than do low SES background students (Dai et al., 2012).

Many conditions associated with low SES are related to creativity. Low SES students have fewer resources, such as books, electronic products, and opportunities to travel, which limits their knowledge-related background (Brooks-Gunn and Duncan, 1997; Evans, 2004). This, in turn, reduces knowledge activation in creative idea generation tasks (Rietzschel et al., 2007). Meanwhile, diminished access to resources also leads to adverse cognitive, financial, and emotional states (Kraus et al., 2012). Consequently, when faced with unmet needs and external threats or problems, those from low SES families find it difficult to be creative (Collins and Amabile, 1999).

Socioeconomic status as a contextual factor can also have a positive relationship with creativity self-efficacy (Karwowski, 2011), a well-known predictor of creativity that is typically defined as the confidence one has in his/her ability to handle problems that require creative thinking and functioning (Barron and Harrington, 1981). For example, Beghetto (2006) claims that SES is one of the key factors which are related to middle and secondary school students' CSE. Additionally, Karwowski (2004) found that parental education level creates a variety of micro milieus in the home, therefore positively exerting and influence on their children's CSE.

Hope refers to goal-directed thinking and consists of two elements, the motivation to achieve desired goals (agency) and the pathways to goal achievement (pathway) (Snyder et al., 1991, 1997; Snyder, 2000). Empirically, studies have revealed that hope is positively associated with SES and creativity (Snyder, 2002; Kraus et al., 2012; Rego et al., 2012).

Snyder (2002) asserts that low SES individuals tend to have lower hope compared to high SES individuals. Specifically, contextual factors constrain low SES individuals by restricting their goals, knowledge, and social connections (Bradley and Corwyn, 2002; Kraus et al., 2012) and making it difficult for them to find viable pathways to achieve their goals. Additionally, these stressful contexts increase an individual's focus on external forces that cannot be controlled, thus reducing internal motivation to complete tasks (Dixson et al., 2017). To summarize, low SES reduces hope through the constraint of resources on viable pathways and through the reduction of attention to goals (Snyder, 2000).

Recently, some studies have found that hope predicts a series of positive outcomes, including academic achievement (Dixson et al., 2017), well-being (Guse and Vermaak, 2011), and creativity (Rego et al., 2012). The influence of hope on creativity can be illustrated by the creative dual-process model (Baas et al., 2013). According to this model, approach-traits can enhance creativity through cognitive flexibility and avoidance-traits can enhance creativity through cognitive persistence. In the present study, we propose that hope has the capacity to function as a type of approach-trait and thus increases creativity through cognitive flexibility. Specifically, based on the definition of hope, individuals with higher levels of hope are not only good at finding viable pathways but also generating more alternative pathways to reach their goals. Accordingly, high hope individuals can be more flexible, allowing for greater creativity. For example, Rego et al. (2014) found that most hopeful individuals seek creative ways to pursue their goals. Further, when they face difficulties, they seek creative ways to overcome obstacles (Luthans et al., 2007). Additionally, compared to those with low levels of hope, individuals with higher hope have greater agency and are more willing to invest in goal-directed efforts (Snyder, 2002). For instance, previous research indicates that hopeful employees enjoy pursuing their goals (Oldham and Cummings, 1996). As a result, they are more intrinsically motivated and prefer to implement their agency in creative ways.

Hope has also been found to increase self-efficacy (Avey et al., 2008). As such, CSE may mediate the relationship between hope and creativity. In the creative domain, CSE is an example of self-efficacy, which originates from four sources (Bandura, 1977, 1986): experience with solving problems, watching familiar individuals cope, encouragement, and emotional and physical motivation. Hope affects each of these four sources of self-efficacy. More specifically, high hope individuals have more successful experiences, because they have more chances to try, and they are more willing to face challenges (Snyder, 2000). Also, as mentioned before, high SES individuals have both high hope and abundant social resources, giving them examples of success and encouragement, thus leading to higher levels of CSE. Finally, high hope individuals are highly motivated to find viable pathways to accomplish tasks and achieve goals (Snyder, 2002; Shalley and Gilson, 2004). Thus, this greater agency also can generate higher CSE when coping with creative problems.

A number of research has indicated that CSE can increase creativity by enhancing perceptions of self-competence and promoting interests in engagement in creative activities (Beghetto and Karwowski, 2017; Puente-Díaz and Cavazos-Arroyo, 2018). Accordingly, many previous studies have identified CSE as an important predictor of different forms of creativity (Beghetto et al., 2011; Jaiswal and Dhar, 2016). For example, CSE has a stronger predictive effect than any other individual or context predictors of creativity (Hammond et al., 2011). Furthermore, CSE also can mediate the relationship between many environmental and personal factors and creativity. For example, Puente-Díaz et al. (2019) found that CSE mediated the association between multicultural experiences and creative potential.

The current study explores the sequential mediation model of SES, hope, CSE, and creativity by assessing creative ideation to represent creativity. Creative ideation, a cognitive ability to generate many creative ideas, is a pivotal part of everyday creativity and eminent creativity. It is also an important aspect of creativity, referred to as creative potential, that is often measured by creativity tests (e.g., Alternate Uses Test) as well as self-report questionnaires (Runco Ideation Behavior Scale) (Runco et al., 2001; Plucker et al., 2006).

The literature review suggests the following hypothesis.

Hypothesis 1: SES, creativity, hope, and CSE are positively related to each other.

Hypothesis 2: SES has an indirect effect on creativity as mediated by hope.

Hypothesis 3: SES has an indirect effect on creativity as mediated by CSE.

Hypothesis 4: SES has an indirect effect on creativity as mediated by hope and then CSE.

The purpose of this study is to illustrate the route from SES to creativity through hope and CSE. The mediation roles of hope and CSE are important because if hope, and CSE, do partially mediate the relationship between SES and creativity, they might provide possible ways to diminish low SES's negative impact on creativity. In other words, effective hope or CSE interventions might improve the creativity for low SES individuals (Kraus et al., 2012).

MATERIALS AND METHODS

Participants and Procedure

To test our hypotheses, we surveyed 1003 undergraduate students from 10 different universities which are located in five different provinces of Mainland China. The students spent roughly 15 min completing the survey during breaks between their classes. We excluded the cases for which the data were missing, reducing the number of participants to 607 (females = 378). Some data were missing for 396 participants, mainly due to participants' null response to family income ($N = 329$), a somewhat sensitive item in SES research field (Hoff et al., 2002; Karwowski, 2011). All the students were undergraduates (freshman = 49.3%, sophomore = 34.9%, junior = 11.5%, senior = 1.8%, fifth-year = 2.5%). Ages ranged from 18 to 26 years ($M = 20.24$ years, $SD = 1.28$ years). The students' majors included art, engineering, education, management, and medicine. None of the students had answered these questionnaires previously and whose participation in the survey was voluntary, and respondents were compensated for completing it.

This study was carried out in accordance with the recommendations of the ethics committee of East China Normal University with written informed consent from all subjects in accordance with the Declaration of Helsinki. The protocol was approved by the ethics committee of East China Normal University.

Measurements

Family Social and Economic Status

Socioeconomic status was measured using the Duncan Socioeconomic Index (SEI) (Stevens and Featherman, 1981). SEI includes three key factors; parental education, parental occupation, and family income. First, we assigned respondents one of five possible scores for parental education (below elementary school and elementary school = 1; junior high school = 2, senior high school = 3; bachelor's degree = 4; postgraduate and doctoral degrees = 5). Second, following Nan and Bian (1991), parental occupation was divided into five major groups: farming (= 1), manufacturing (= 2), transportation (= 3), service and office work (= 4), administrative and professional (= 5). Third, we added the scores of the father and mother for parental education and for parental occupation. Fourth, family income was measured as the 1 total family monthly income. Fifth, we standardized the scores. Finally, a principal component analysis was conducted to check whether the three SES-factors could be seen as one single factor. The PCA and the screeplot gave support for a one-factor solution. Then according to the procedure presented by previous researchers (Vyas and Kumaranayake, 2006; Krishnan, 2010; Heshmat et al., 2016) the factor loadings of the three standardized factors was used to weight their respective contribution to the combined SES-variable ($SES = Z_{income} * 0.265 + Z_{education} * 0.491 + Z_{occupation} * 0.496$).

Hope

The adult hope scale (AHS) consists of 12 items along three dimensions (Snyder et al., 1991). Two main dimensions include four items for hope-agency (HA) and four items for hope-pathway (HP). The last dimension is a filler. Data for the AHS were self-reported and rated using a 5-point Likert scale, which ranged from 1 (*definitely false*) to 5 (*definitely true*). Examples of HA and HP were as follows: "My past experiences have prepared me well for my future" (HA); "I can think of many ways to get the things in life that are most important to me" (HP). The internal reliability of HA and HP were 0.68 and 0.73, respectively. The total scale of AHS showed good reliability with $\alpha = 0.82$.

Creative Self-Efficacy

Creative self-efficacy was measured using a subscale of the Short Scale of Creative Self (SSCS) consisting of six items (Karwowski et al., 2013). An example of an item in the CSE scale is: "I am sure I can deal with problems requiring creative thinking." All the items were self-rated using a 5-point Likert scale, which ranged from 1 (*definitely not*) to 5 (*definitely yes*). The CSE scale demonstrated good internal reliability ($\alpha = 0.73$).

Creative Ideation

Creative ideation was assessed using the Runco Ideational Behavior Scale (RIBS) (Runco et al., 2001). It contains 23 items that were rated on a 5-point Likert-type scale from 1 (*never*) to 5 (*very often*). An example of an item from this scale is "I have ideas about new inventions or about how to improve things." It showed good internal reliability ($\alpha = 0.85$ for the total scale).

Control Variable

Gender is considered to be an important control variable (Liu et al., 2017) and as such was included in data analyses (female was coded as 0, male was coded as 1).

Analytic Strategy

All data were analyzed using SPSS 24. First, descriptive analyses were conducted with the variables of interest for the total sample. Then, the Pearson's correlations between variables were calculated to provide a preliminary test of the *Hypotheses 1*. Next, serial mediation analysis was conducted using PROCESS 3.3 macro (Model 6) for SPSS (Hayes, 2017) to test *Hypotheses 2*, *Hypotheses 3*, and *Hypotheses 4*. SES was entered as the predictor. Hope and CSE were entered as mediators. Gender was entered as covariate. The mediation analyses were conducted for creative ideation. We used 5000 bootstrapping resamples to generate a 95% percentile confidence interval (CI) for the indirect effects we estimated. If the CI of the indirect effect does not include zero, the null hypothesis is rejected.

RESULTS

Common Method Variance Test

We used Harman's single factor analysis to test the common method variance. The results indicated that the first factor explained only 31.48% (lower than 40%) of the total variance. Therefore, common method bias was unlikely to be a concern in this study.

Preliminary Analyses

The results of descriptive statistics and correlations are presented in **Table 1**. As predicted, the score for SES was significantly and positively correlated with the total score of RIBS. Further, the score of hope was positively correlated with SES and RIBS individually. In addition, CSE was positively associated with SES, hope, and RIBS.

Test of Mediation

We used the Hayes macro PROCESS (Hayes, 2017) to explore the sequential mediation relationship. Hope and CSE were entered as mediators between SES and creativity. Gender was controlled for as a potential confounding factor in the mediation analysis. We conducted serial mediation analysis to test the mediating role of

hope and CSE between the SES and creative ideation. The results are presented in **Figure 1** and **Table 2**.

The total effect of SES on RIBS was 1.40 (95% CI: 0.58, 2.23). The direct effect of SES on creative ideation was positive and significant (direct effect = 0.82, 95% CI: 0.07, 1.57). The indirect effect of SES on creative ideation through hope was significant (indirect effect = 0.17, 95% CI = 0.02, 0.40). The indirect effect of SES on creative ideation through CSE was not significant (indirect effect = 0.17, 95% CI = -0.05, 0.41). There was a significant positive indirect effect of SES on creative ideation (RIBS score) through hope and then CSE (indirect effect = 0.24, 95% CI: 0.09, 0.44). These results indicate that hope and CSE partially mediate the relationship between SES and creative ideation. In addition, the results of pairwise contrast of three indirect effects showed no significant difference.

DISCUSSION

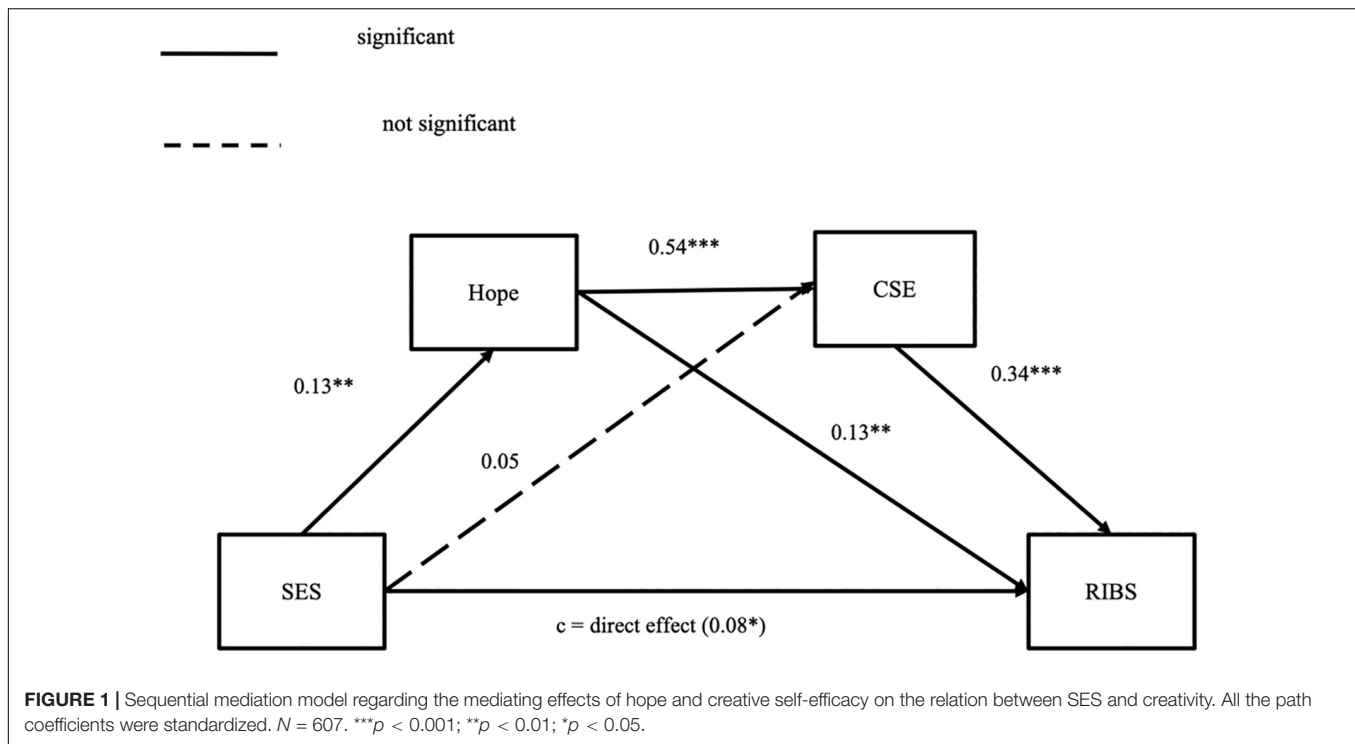
The purpose of the current study was to explore the relationship between SES and creativity through the mediators of hope and CSE. First, the descriptive results are consistent with previous research that suggests that these variables are positively related (*Hypothesis 1*) (Tierney and Farmer, 2002; Avey et al., 2008; Dai et al., 2012; Kraus et al., 2012). Further, the mediation analysis revealed that hope partially mediates the effect of SES on creative ideation (*Hypothesis 2*); Hope and CSE partially mediate the relationship between SES and creative ideation (*Hypothesis 4*).

The results support *Hypothesis 1*, that SES significantly and positively relates to creativity, reconfirming previous research demonstrating that individuals with high SES have high levels of creativity (Dai et al., 2012). The results also indicate that high SES individuals who have ample resources tend to possess high levels of hope. These findings support previous research showing that individuals with different levels of SES perceive different levels of hope in similar situations. Low SES individuals are limited by context factors; therefore, they may not be able to collect enough information to develop an effective goal toward the future (Dixon et al., 2017). SES also shows a significant and positive link with CSE, thus supporting the view that higher SES is beneficial to the development of CSE (Beghetto, 2006; Karwowski, 2011). Additionally, these results also suggest that hope significantly and positively relates to CSE, confirming the positive relationship between hope and self-efficacy that has been found in previous literature (Sezgin and Erdogan, 2015) and extending this relationship to the creative domain. According to the definition of hope, Avey et al. (2008) interpreted self-efficacy as the conviction in one's ability to generate multiple pathways, take actions and ultimately succeed in goal attainment. Hence, based on our results, CSE can be interpreted as the conviction in one's ability to (a) generate multiple creative pathways, (b) take actions toward creative problem solving, and (c) ultimately be successful in creative problem-solving. As hypothesized, CSE also shows a significant and positive link with creativity. It supports the previous findings on the relationship between creativity and CSE (Beghetto et al., 2011; Richter et al., 2012). For instance, Farmer and Tierney (2017) revealed that a series of studies has

TABLE 1 | Means, standard deviations, and correlations of all variables ($N = 607$).

Variables	M	SD	SES	AHS	CSE
SES	0.00	1.00	–	–	–
AHS	28.43	4.62	0.13**	–	–
CSE	3.27	0.72	0.12**	0.55**	–
RIBS	67.66	10.48	0.14**	0.33**	0.43**

SES, social and economical statuses; AHS, the adult hope scale; CSE, creative self-efficacy, subscale of short scale of creative scale; RIBS, the Runco Ideational Behavior Scale; ** $p < 0.01$.



reported the positive link between CSE and creativity relates outcomes. It suggests that the confidence in creative problem-solving will influence the creative performance (Karwowski, 2011; Puente-Diaz and Cavazos-Arroyo, 2016).

Additionally, the results from the correlation analyses indicate a significant positive link between hope and creativity (*Hypothesis 1*). The mediation analysis revealed a significant direct effect of hope on creativity and mediation roles of hope between SES and creativity (*Hypothesis 2*). The mediation analysis helps to explain the processes of how SES affects creativity. SES promote individual's creativity because those individuals in high SES develop greater hope, thus being more creative. Unlike previous research (Shi and Shen, 2007; Zhang et al., 2018) which focused on the mediating roles of past achievement or personal traits (e.g., intelligence, personality), this study explored the mechanisms involved in how SES shapes creativity

from the perspective of personal perceptions toward the future. Specifically, SES dictates what resources individuals have had access to in the past (I have the necessary resources to be creative). As we emphasized previously, how those resources are used to create a better future is a significant issue in the creativity research domain, and the indirect effect of SES on creativity suggest that hope play an important role in the facilitation of creativity. Kraus et al. (2012) have found that high SES individuals with abundant resources perceive themselves in more agentic ways. They tend to focus on their own internal state, goals. Similarly, high SES individuals with abundant resources can broaden their thinking pathways and agentic thoughts in the pursuit of their goals (Lopez et al., 2000b). Moreover, these pathways and agentic thoughts are two key elements of hope (Snyder, 2002). In addition, Moran (2010) has suggested that creativity can benefit from hope. High hope individuals may abound in flexible thinking and creativity because they believe they can follow more alternative pathways toward the future (Lopez et al., 2000a).

Notably, the indirect effect of SES on creativity through CSE was not significant in this sequential mediation model (*Hypothesis 3*). Similarly, the direct effect of SES on CSE was also not significant in this integrative model, although the correlation between these two variables was significant ($r = 0.12$). To our knowledge, these results may suggest that hope can play a fully mediating roles in the relationship between SES and CSE. In another words, high SES individuals may foster greater hope to develop a higher level of CSE. This result expands the findings of Karwowski (2011)'s research regarding the relationship between SES and CSE by taking a new possible mediator (hope) into account. Accordingly, the indirect effect of SES on creativity through CSE may be diminished when taking hope into account

TABLE 2 | Indirect effects and confidence intervals of meditational analyses, controlling for gender.

Model pathways	Effect value	SE	95% CI	
			Lower	Upper
SES→HOPE→RIBS	0.17 ^a	0.10	0.02	0.40
SES→CSE→RIBS	0.17	0.12	-0.05	0.41
SES→HOPE→CSE→RIBS	0.24 ^a	0.09	0.09	0.44

SES, social and economical statuses; AHS, the Adult Hope Scale; CSE, creative self-efficacy, subscale of short scale of creative scale; RIBS, the Runco Ideational Behavior Scale; RIBS, the Runco Ideational Behavior Scale; SE, standard error. CI, confidence interval. ^aEmpirical 95% confidence interval does not overlap with zero.

in the sequential mediation model. Our findings also suggest that there is an indirect effect of hope on creativity through CSE. Previous research indicates that employees' hope as psychological capital can predict their creativity (Rego et al., 2014). Based on our results, a possible explanation of this result may be that hope affects employees' creativity by increasing their CSE.

Furthermore, the sequential mediation analyses result supports our *Hypothesis 4*. It takes a new important mediator (CSE) into account to explain the mechanism by which SES affects creativity. The findings suggest that SES promote creativity because individuals in high SES develop greater hope, and this greater hope promote their CSE, thus being more creative. The *Hypothesis 2* has suggested that hope is an important mediator in the relationship between SES and creativity. Further, researchers have illustrated that high hope individuals have positive perceptions of their competence to solve future problems creatively (Snyder et al., 1997). Similarly, Michael (2000) has suggested that increased hope can promote self-efficacy's role in future behavioral changes. In other words, hope can increase individuals' CSE in future creative performance. In addition, Tierney and Farmer (2011) have found that changes in CSE will lead to corresponding changes in creative performance in a 6-month longitudinal study. Taken together, this sequential mediation path provides a clear description of the process by which SES affects creativity through hope and then CSE.

Some studies have explored the associations between SES and creativity. However, the mechanism between these two variables has not been fully elucidated and our study is the first study of how hope and CSE mediate this relationship. We conducted this study in ten Chinese universities and were able to generate a large sample. This large sample size increases our confidence in the external validity of the results.

However, this study has some limitations that suggest directions for future research. Firstly, RIBS is a self-report survey, and response bias is inevitable in this type of method. Future researchers should use other experimental methods to collect data on creativity, including the alternative use test, Remote Associates Test and Torrance Tests of Creative Thinking. Secondly, the participants were college students in China, which may limit our ability to generalize the results across other age groups and cultures. Lastly, the cross-sectional design does not allow causal inferences. Future experimental or longitudinal designs are needed to confirm our results.

The findings of this study have some theoretical and practical implications. Our results indicate that SES affects creativity through hope and CSE, both of which play a significant role

in creative ideation. These findings indicate that creativity might be developed through interventions targeted toward SES levels. Hope intervention may help individuals from low SES backgrounds improve their creativity directly or by increasing their CSE. CSE showed great influence on creativity, indicating that increasing confidence may enhance low SES individuals' creativity.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics Committee of East China Normal University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

YY contributed the initial idea generation, analyzed/interpreted the data and wrote this manuscript. XX revised this manuscript substantially. WL was responsible for the data collection. WP made contributions to supervision, initial idea, study design improvement, interpretation of the results, and some critical reviews of this manuscript.

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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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Advancing the Study of Positive Psychology: The Use of a Multifaceted Structure of Mindfulness for Development

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Positive psychology, as a distinctive paradigm, focuses on the remedy of pathologies and, by contrast, the promotion of positive experiences and conditions in life (e.g., encouraging a state of flourishing). Positive psychology, in its simplistic form, may provide evidence and insightful understanding into the proactivity of human agency (Seligman, 1999; Seligman and Csikszentmihályi, 2000). Drawing from this emphasis, we have developed the *theory of optimization*, which attempts to explain the achievement of optimal functioning in life (e.g., optimal cognitive functioning: academic performance). By the same token, in the course of our research development into the theory of optimization, we have also delved into a comparable theoretical orientation, namely: the *multifaceted nature of mindfulness*, consisting of three interrelated components – the psychological component of mindfulness, the philosophical component of mindfulness, and the spiritual component of mindfulness. This conceptualization of mindfulness is rather unique for its incorporation of both Western and Eastern knowledge, philosophical viewpoints, and epistemologies into one holistic framework. The main premise of this conceptual analysis article is to advance the study of positive psychology by specifically introducing our recently developed model of mindfulness, in this case, the multifaceted structure of mindfulness with its three distinct components. Importantly, we make attempts to highlight the significance of this multifaceted model by situating it within the theory of optimization for academic learning. Using philosophical psychology and personal-based teaching and research reasoning, we provide a valid rationale as to how aspects of our proposed model of mindfulness (e.g., reaching a state of enlightenment) could act to facilitate and optimize a person's state of functioning (e.g., cognitive functioning). Moreover, we posit that our rationale regarding mindfulness as a potential “optimizing agent” for the purpose of optimal functioning could, indeed, emphasize and reflect the salient nature of positive psychology. In other words, we contend that an explanatory account of mindfulness from the perspectives of Confucianism and Buddhism could, in this analysis, coincide with and support the meaningful understanding and appreciation for the study of

positive psychology in educational and non-educational contexts. We conclude the article by exploring the complex issue of methodology – that is, for example, how would a researcher measure, assess, and/or empirically validate the multifaceted nature of mindfulness?

Keywords: Buddhism, Confucianism, positive psychology, mindfulness, meditation, optimal best, flourishing, optimization

INTRODUCTION

The present article makes attempts to accentuate the important nature of positive psychology (Csikszentmihályi, 1990; Seligman, 1999; Seligman and Csikszentmihályi, 2000) by taking into account and incorporating the theoretical concept of mindfulness. In other words, our main premise is to introduce preliminary details of our recently developed theoretical model of mindfulness (Phan and Ngu, 2019; Phan et al., 2019d), which could hopefully instill appreciation and facilitate meaningful understanding into the paradigm of positive psychology. This theoretical-conceptual article emphasizes the use of philosophical psychology and personal reasoning to rationalize the *potential intricate association between mindfulness and positive psychology*. We contend that our proposed model of mindfulness is innovative and, indeed, espouses notable tenets of Buddhism (e.g., enlightenment) that may, in effect, advance understanding into the true nature of positive psychology.

In the next section of this article, we provide an overview of positive psychology (Csikszentmihályi, 1990; Seligman, 1999; Seligman and Csikszentmihályi, 2000), which is then followed by a brief theoretical account of the theory of optimization (Fraillon, 2004; Phan et al., 2017, 2019c) and its association with the concept of optimal best practice (Fraillon, 2004; Martin, 2006, 2011; Phan et al., 2016). This overview in the initial stage is beneficial, forming grounding for the subsequent sections of the article – namely, an examination of the theoretical concept of mindfulness. In the latter section of the article, we offer a conceptualization, which researchers may consider for their own inquiries. One notable line of inquiry, in this case, is related to the development of an appropriate methodological design that could measure, assess, and validate our proposed model of mindfulness.

THE IMPORTANCE OF POSITIVE PSYCHOLOGY: A BRIEF OVERVIEW

There has been extensive research development pertaining to the nature of positive psychology. Why study positive psychology? Positive psychology, emerging within the field of psychology as a paradigm for quality teaching and scientific research development (Csikszentmihályi, 1990; Seligman, 1999; Seligman and Csikszentmihályi, 2000), lies in its nature to address and prevent pathologies and maladaptive experiences. Moreover, positive psychology, spanning the course of three decades, is concerned with the encouragement and promotion of positive experiences and conditions in life (Pawelski, 2016). Indeed, according to Gable and Haidt (2005), the study of positive psychology considers different internal and external conditions

that could contribute to a person's and/or an organization's state of optimal functioning.

So, what is positive psychology? According to Sheldon et al. (2000), positive psychology:

“Positive Psychology is the scientific study of optimal human functioning. It aims to discover and promote the factors that allow individuals and communities to thrive. The positive psychology movement represents a new commitment on the part of research psychologists to focus attention upon the resources of psychological health, thereby going beyond prior emphases upon disease and disorder” (section “The Importance of Positive Psychology: A Brief Overview”).

This definition, as reflected in Pawelski's (2016) comprehensive review of this topic, connotes the inclusion of attributes such as personal growth, mastery, drive, character building, human strength, and family and civic virtue. From this emphasis, the study of positive psychology may entail the “building of the most positive qualities of an individual” (Seligman, 1999) and “on building of what makes life most worth living” (Seligman, 1999). Seligman and Csikszentmihályi's (2000) published work, likewise, emphasizes the science of positive psychology may exist on three levels – subjective, individually, and institutional: “the field of positive psychology at the subjective level is about valued subjective experiences: well-being, contentment, and satisfaction (in the past); hope and optimism (for the future); and flow and happiness (in the present). At the individual level, it is about positive individual traits: the capacity for love and vocation, courage, inter-personal skill, aesthetic sensibility, perseverance, forgiveness, originality, future mindedness, spirituality, high talent, and wisdom. At the group level, it is about the civic virtues and the institutions that move individuals toward better citizenship: responsibility, nurturance, altruism, civility, moderation, tolerance, and work ethic” (p. 5).

From the above, positive psychology is well-balanced in scope delving into the resolution of the spectrum of both negative and positive life experiences (Pawelski, 2016) – that is, flourishing at one end of the continuum (i.e., positive) and languishing at the other (i.e., negative) (Keyes, 2005). In terms of the proactivity of human agency (Phan et al., 2020a), incorporation of positive psychology may involve the fostering of optimal functioning. In this analysis, deep meaningful understanding of positive psychology acknowledges the entirety of human experiences with the hope that we could facilitate, motivate, and enhance optimal conditions for the purpose of self-fulfillment and flourishing. This tenet reflects importantly, from our viewpoint, the maximization of a state of condition or functioning – that is, the notion of optimal condition or functioning in a subject matter or contextual setting.

Recent research development using positive psychology as a main premise has explored an interesting topic, known as optimal functioning (Martin, 2011; Liem et al., 2012; Phan et al., 2016). Optimal functioning, or optimal best practice, is concerned with the *maximization* of a person's acquired knowledge, experience, and/or personal state of flourishing in a subject matter (e.g., feeling good about oneself) (Ngu et al., 2019). Over the past 5 years, we have made extensive theoretical, methodological, and empirical contributions to the study of optimal best practice, especially within the realm of academia (e.g., Ngu et al., 2019; Phan et al., 2019b, 2020b).

The Importance of Optimal Best Practice

Optimal best practice is an important topical theme for discussion as it reflects the nature of positive psychology. In brief, from the preceding section, we know that optimal best practice is concerned with the maximization of fulfillment and/or accomplishment – say, in mathematics learning in the topic of Algebra. At the same time, however, achievement of optimal best is indicative of positive psychology, especially in terms of personal experience of fulfillment and inner satisfaction. What is of interest from this understanding, as initially raised by Fraillon (2004), is the methodological account or explanation of how optimal best is calculated or derived. This examination, which we have explored in-depth, is insightful in helping to elucidate the positive nature of positive psychology.

The concept of optimal best practice is significant, especially in light of our focus on the use of mindfulness to appreciate the nature of positive psychology. Fraillon (2004) and Phan and his colleagues (e.g., Phan et al., 2016, 2017) have been prominent in their respective discussions regarding the operational nature of optimal best practice – that is, for example, how does one achieve a state of optimal best practice in a subject matter? According to the authors' explanations, achievement of optimal best practice requires a point of reference or, alternatively, optimal best practice is intricately linked to a reference point. Phan et al.'s (2019b) recent article is insightful for its detailed account, which we refer in this section. **Figure 1** is a summary of the *process of optimization* (Phan et al., 2017, 2019c), which shows two levels of best practice:

- i. A level of *current best practice*, denoted as L_1 , according to Fraillon (2004) and Phan et al. (2019c), is defined as a person's perceived level of functioning at the present time – for example, “what is it that I am capable of at present in Algebra?” (e.g., I am able to solve equations with one unknown, x , at present).
- ii. A level of *optimal best practice*, denoted as L_2 , in contrast, is defined as a person's perceived maximum level of functioning that could be fulfilled and/or accomplished (Fraillon, 2004; Phan et al., 2019c) – for example, “I perceive and believe that I am capable of accomplishing . . . in Algebra” (e.g., I am capable of solving equations with two unknowns, x and y . This accomplishment is my maximum capability).

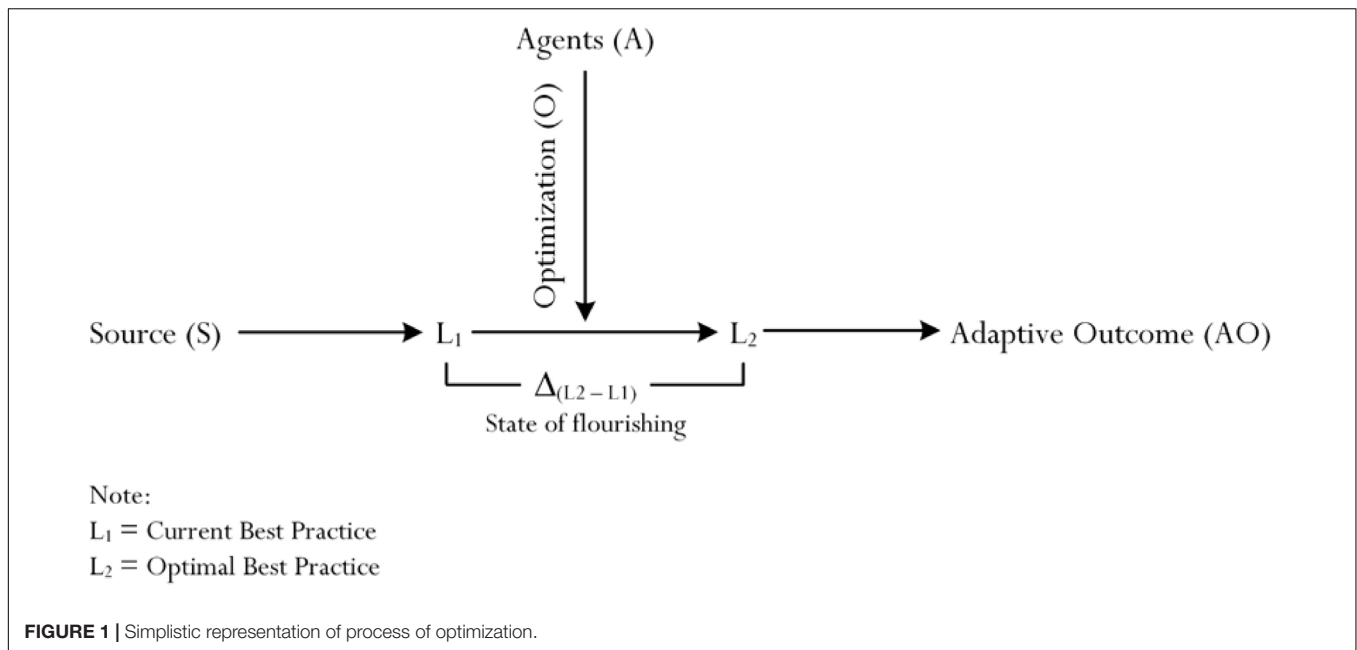
The relationship between L_1 and L_2 , in its simplistic term, according to Phan et al.'s (2019b) recent study, is shown in

Figure 1. The uniqueness of **Figure 1** lies in the concise representation of the enactment of optimization (Phan et al., 2017, 2019c), and a “state of flourishing” – in this case, defined as “a quantitative and qualitative difference between L_1 and L_2 [i.e., $\Delta(L_2-L_1)$].” The theory of optimization (Phan et al., 2019c, 2020b) indicates that the achievement of L_2 from L_1 would require the activation and enactment of different types of *educational* (e.g., an appropriate instructional design: Ngu et al., 2018), *psychological* (e.g., belief of personal efficacy: Bandura, 1997), and *psychosocial* (e.g., the impact of the home environment: McCartney et al., 2007) agencies. Phan et al.'s (2019c) detailed proposition, interestingly, stipulated the positive effects of educational, psychological, and/or psychosocial agencies on the initiation of experience of “energy” (denoted as “E”), which would then activate the buoyancy of different psychological attributes (e.g., personal resolve). Buoyant psychological experiences, in turn, would arouse and sustain the accomplishment of L_2 .

Optimal best practice, L_2 , may entail different types of functioning – for example, cognitive functioning in a school context may reflect exceptional academic performance in essay composition. Optimal best practice in emotional development, likewise, may consist of a person's state of happiness. Aside from the importance of optimal best practice, poignant from **Figure 1** also is the description that pertains to a person's state of flourishing – denoted as $\Delta(L_2-L_1)$. Flourishing in this case, similar to other comparable definitions (e.g., Diener et al., 2010; Huppert and So, 2013), is positive and reflects improvement, accomplishment, and self-fulfillment. From Phan et al.'s (2019c) theory of optimization, there are three main premises for acknowledgment:

- i. A focus on the facilitation of L_2 , via means of different types of optimizing agents (e.g., educational agent such as an appropriate instructional design: Ngu et al., 2016).
- ii. A focus on ensuring that a person experiences a state of flourishing, which would equate to a positive difference between L_1 and L_2 .
- iii. The underlying role of energy, which is central to the process of optimization, facilitating a person's improvement and progress from L_1 to L_2 .

From the preceding sections, one notable aspect of positive psychology (Csikszentmihályi, 1990; Seligman, 1999; Seligman and Csikszentmihályi, 2000) is concerned with the accomplishment and fulfillment of optimal conditions and life experiences (e.g., feel-good experience). Since the emergence of positive psychology, there have been different theoretical models developed to help foster the accomplishment and fulfillment of optimal best practice – emotionally, socially, cognitively, physically, and socially. By the same token, of course, constructive models reflecting the importance of positive psychology have also focused on preventive measures, which could resolve and weaken negative life experiences, pathologies, etc. From the literature, for example, there are some interesting models: Seligman's (2010) *PERMA* model (i.e., Positive Emotions, Engagement, Relationship, Meaning, and Accomplishment), Csikszentmihályi's (1990) *flow*



theory, Keyes's (2002) *continuum of psychological wellbeing*, Peterson and Seligman's (2004) *Character Strengths and Virtues Framework*, and Phan et al.'s (2017) *Framework of Achievement Bests*.

Indeed, from a practical point of view, not to mention theoretically, there is impetus for us to consider research development, policies, programs, pedagogical practices, etc. that may assist in the fostering of flourishing. Within the context of schooling, as an example, it is pertinent that educators consider different opportunities, pathways, means, etc. that may assist students in their learning (e.g., mastery experience in a subject matter) and non-learning (e.g., psychological well-being) experiences. In a recent study, for example, Phan et al. (2019a) found that social relationships with others (e.g., peers) and enriched academic experiences may serve to enhance positive emotions. In another similar study, Hasnain et al. (2014) reported that both hope and happiness positively influenced students' psychological well-being. Tugade and Fredrickson (2007), interestingly, offered a number of strategies that could be considered for usage (e.g., relaxation therapies and meditation practices).

INTRODUCING THE IMPORTANCE OF MINDFULNESS

Phan et al.'s (2020b) recent article is significant as it introduces the concept of *time* (Frank, 1939; Lewin, 1942; Wallace, 1956; Nuttin, 1964; Mehta et al., 1972) and its potential association with the achievement and fulfillment of L₂. In this analysis, Phan et al. (2020b) contend that in order for one to achieve a state of flourishing, Δ(L₂ - L₁), he/she would need to structure and have an appropriate future time point (e.g., 6 months). In other words, from the authors' rationale, achievement of L₂ from L₁

does not occur instantaneously but requires adequate time. By the same token, this rationalization also considers the plausibility that a future time orientation may, in itself, serve as a source of motivation, which would direct and compel a person to strive for optimal best. This rationalization is interesting, highlighting the complexity of the fulfillment of L₂.

Considering Phan et al.'s (2020b) rationalization of time, we consider another related concept, which could serve to facilitate the achievement of optimal best practice: *mindfulness*. What is so unique about mindfulness and why would we want to include this concept for in-depth examination, especially with reference to the study of positive psychology? There are three major reasons:

- i. Our individual and collective interests in mindfulness from an Eastern perspective, which in this case encompasses both Confucianist thinking and Buddhist philosophy. We contend that this article is appropriate, allowing us to introduce our proposition of a theoretical model of mindfulness (Phan and Ngu, 2019; Phan et al., 2019d) for readers to appreciate.
- ii. Mindfulness is personal and proactive, coinciding with and reflecting the true nature of positive psychology (Csikszentmihályi, 1990; Seligman, 1999; Seligman and Csikszentmihályi, 2000). For example, meaningful understanding of mindfulness may assist a person to feel "enlightened," resulting in the fulfillment of happiness.
- iii. We contend that it would be of interest to consider mindfulness, via means of meditation practice as an optimizing agent, as Phan et al. (2019d) recently discussed in their theoretical-conceptual chapter. In this analysis, as a proposition, we posit that our derived model of mindfulness could optimize a person's state of functioning.

In this section of the article, we want to explore the definition(s) and scope of mindfulness from a psychological point of view. The latter sections of the manuscript introduce our recently developed model of mindfulness (Phan and Ngu, 2019; Phan et al., 2019d), and how this theorization could indeed explain the specific reference to optimal best practice – in this case, the use of optimization, as an underlying process, to explain for the achievement of L_2 .

Definition and Scope of Mindfulness and Meditation

Scientific research into the concept of *mindfulness* is well documented in different journals (e.g., the journal of *Mindfulness*). One important line of research development, in this case, focuses on clarity into the *definition* and *nature* of mindfulness. Aside from definition, the “nature” of mindfulness connotes understanding of its scope and underlying structure – that is, what constitutes the “essence” of mindfulness? This question, we contend, reflects a similar theoretical approach to the study of other psychological concepts, such as *self-efficacy* (Bandura, 1977, 1997), *self-concept* (Shavelson et al., 1976; Marsh et al., 1988), and *engagement* (Schaufeli et al., 2002; Fredricks et al., 2004).

There are a number of comparable definitions of mindfulness. For example, Kabat-Zinn (2015) defines mindfulness as “moment-to-moment, non-judgmental awareness, cultivated by paying attention in a specific way, that is, in the present moment, and as non-reactively, as non-judgmentally, and as openheartedly as possible.” Desbordes et al. (2015), differently, makes reference to mindfulness as “the quality of mind that one recollects continuously without forgetfulness or distraction while maintaining attention on a particular [mental] object.” Brown and Ryan (2003), acknowledging Buddhist and contemplative traditions and other researchers’ theoretical contributions, define mindfulness as “a state of being attentive to and aware of what is taking place in the present.” This definition, as the authors noted, reflects both Nyanaponika Thera (1972) (i.e., “the clear and single-minded awareness of what actually happens to us and in us at the successive moments of perception,” p. 5) and Hanh’s (1976) definition of mindfulness (i.e., “keeping one’s consciousness alive to the present reality,” p. 11). From our own teaching, coinciding with Buddhist philosophies and the importance of Confucianism, we surmise mindfulness as being of the following: a person’s state of: (i) *awareness of the present moment*, (ii) *consciousness and focus of his/her contextual surrounding*, and (iii) *concentration of a designated object in mind* (e.g., *image of Buddha*).

What actually defines mindfulness, as detailed from the above, in turn reflects the importance of the concept’s nature – that is, its scope and underlying structure. From an empirical point of view, researchers have used a quantitative methodological approach (Hanson et al., 2005; Babbie, 2014), involving both experimental and non-experimental data to study the true nature of mindfulness. For example, non-experimentally, researchers have used factorial techniques to test and compare competing *a priori* and *a posteriori* model (Schumacker and Lomax, 2004;

Kline, 2011) – does a one-factor model, in this instance, represent the underlying structure of mindfulness? Or, comparatively, does a two-factor model provide a stronger representation of mindfulness? From the literature, we see that numerous questionnaires (e.g., The Toronto Mindfulness Scale; Lau et al., 2006) have been developed to measure and assess the construct of mindfulness. **Table 1** illustrates a brief summation of existing research that has used both open-ended and close-ended questionnaires to gauge into the nature and predictive effect of mindfulness. It is interesting to note that there is no definitive consensus as to what actually constitutes mindfulness. Some researchers, for example, have established a simple structure: a *one-factor* (e.g., Brown and Ryan, 2003; Chadwick et al., 2008) and a *two-factor* (e.g., Cardaciotto et al., 2008; Davis et al., 2009) model. In contrast, too, other researchers tested and established more complex models: a *four-factor* (e.g., Baer et al., 2004; Feldman et al., 2007), a *five-factor* (Baer et al., 2006), and a *six-factor* (Neff, 2003) model.

It is indeed interesting to note the differing viewpoints and interpretations of mindfulness. Our own proposition, likewise, also adds credence, providing another comprehensive interpretation of the nature of mindfulness. Despite the complexity of viewpoints and interpretations and the quest for us to add theoretical contributions, we can surmise that mindfulness is *purposive* and *meaningful*, reflecting a person’s temperament, personality and, more importantly, his/her state of mind. This theoretical positioning of mindfulness, as concurred by Western scholars (e.g., Chiesa et al., 2011; Keng et al., 2011; Treanor, 2011; Bowlin and Baer, 2012; Hjeltne et al., 2015), emphasizes two fundamental tenets:

- i. A person’s experience of a *present state*, reflecting clear focus and personal contentment, may serve to instill an internal state of calmness, ease, and clarity.
- ii. Experience of mindfulness, in its truest sense, may yield a number of *meaningful outcomes*, such as improvement in positive emotions (e.g., happiness) and personal functioning (e.g., performance in a subject matter), and weakening in negative emotions (e.g., anxiety).

In essence, the study of mindfulness has involved scholars from the United States, the United Kingdom, Europe, Australia, etc. (e.g., Baer et al., 2008; Sauer et al., 2011; Kabat-Zinn, 2015). Despite this collective interest, we purport that inconsistency is still evident in terms of a common definition and understanding of mindfulness. Why is this the case? Despite the effectiveness and robustness of factorial techniques (Schumacker and Lomax, 2004; Kline, 2011), it can be said that quantitative representations (e.g., a four-factor model) are somewhat limited and do not, in this case, provide comprehensive evidence of the nature of mindfulness. A factorial-derived mapping of mindfulness, from our point of view, is somewhat limited and too simplistic for interpretation and in-depth account of its structure. The crux of our argument then is that mindfulness encompasses much more than just a simple definition (e.g., say... a person’s psychological state of ease), which could simply espouse “a

TABLE 1 | Mindfulness scales and inventories.

Scales	Age	Rating	Components	sample items
The Five Facet Mindfulness Questionnaire (e.g., Baer et al., 2006)	Undergraduate Psychology students (<i>N</i> = 613)	1 = Never or very rarely true 5 = Very often or always true	<i>Observing</i>	1. I sense my body, whether eating, cooking, cleaning, or talking. 2. I notice how my emotions express themselves through my body.
			<i>Describing</i>	1. I am good at finding words to describe my feelings. 2. I can easily put my beliefs, opinions, and expectations into words.
			<i>Acting with awareness</i>	1. I break or spill things because of carelessness, not paying attention, or thinking of something else. 2. I find myself doing things without paying attention.
			<i>Non-judging of inner experience</i>	1. I criticize myself for having irrational or inappropriate emotions. 2. I think some of my emotions are bad or inappropriate and I should not feel them.
			<i>Non-reactivity to inner experience</i>	1. I perceive my feelings and emotions without having to react them. 2. I watch my feelings without getting lost in them.
The Mindful Attention and Awareness Scale (e.g., Brown and Ryan, 2003)	Undergraduate students (<i>N</i> = 313)	1 = Almost always 6 = Almost never	<i>One latent factor</i>	1. I could be experiencing some emotion and not be conscious of it until sometime later.
	General Community adults (<i>N</i> = 79)			2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
The Toronto Mindfulness Scale (e.g., Davis et al., 2009)	Undergraduate Psychology students (<i>N</i> = 90)	0 = Not at all 4 = Very much	<i>Curiosity</i>	1. I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations. 2. I am curious to see what my mind is up to from moment to moment.
	General Community (<i>N</i> = 369) and First-year Psychology students (<i>N</i> = 92)		<i>Decentering</i>	1. I experience myself as separate from my changing thoughts and feelings. 2. I am more concerned with being open to my experiences than controlling or changing them.
The Revised 12-item Cognitive and Affective Mindfulness Scale (e.g., Feldman et al., 2007)	University students (<i>N</i> = 548) College students (<i>N</i> = 212)	1 = Rarely/Not at all 2 = Sometimes 3 = Often 4 = Almost always	<i>Present Focus</i>	1. I am preoccupied by the future. 2. I am able to focus on the present moment.

(Continued)

TABLE 1 | Continued

Scales	Age	Rating	Components	sample items
The Southampton Mindfulness Questionnaire (e.g., Chadwick et al., 2008) The Philadelphia Mindfulness Scale (e.g., Cardaciotto et al., 2008) The 30-item Freiburg Mindfulness Inventory (e.g., Sauer et al., 2011) The Kentucky Inventory of Mindfulness Skills Scale (e.g., Baer et al., 2004)	Non-Clinical Community (N = 134) and Clinical (N = 122)	0 = Strongly disagree 6 = Strongly agree	Attention	1. It is easy for me to concentrate on what I am doing. 2. I am able to pay close attention to one thing for a long period of time.
			Awareness	1. I can usually describe how I feel at the moment in considerable detail. 2. I try to notice my thoughts without judging them.
			Acceptance	1. I can tolerate emotional pain. 2. I am able to accept the thoughts and feelings I have.
	Undergraduate Psychology students (N = 204) Undergraduate Psychology students (N = 559) Clinical patients (N = 52) Clinical patients (N = 30) Graduate students (N = 78) in Health Programs	0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Very often	One latent factor	1. I am able just to notice them without reacting. 2. I judge the thought/image as good or bad.
			Awareness	1. I am aware of what thoughts are passing through my mind. 2. When talking with other people, I am aware of their facial and body expressions.
			Acceptance	1. I try to distract myself when I feel unpleasant emotions. 2. There are aspects of myself I don't want to think about.
	British patients (N = 130)	1 = Almost never 4 = Almost always	Presence	1. I pay attention to what's behind my actions. 2. I am open to the experience of the present moment.
			Acceptance	1. I watch my feelings without getting lost in them. 2. I am able to appreciate myself.
	Undergraduate Psychology students (N = 205), Undergraduate Psychology students (N = 215), and Adults with borderline personality disorder (N = 26)	1 = Never or very rarely true 5 = Almost always or always true	Acting with awareness	1. When I do things, my mind wanders off and I'm easily distracted. 2. When I'm doing something, I'm only focused on what I'm doing, nothing else.
			Observing	1. I notice changes in my body, such as whether my breathing slows down or speeds up. 2. I pay attention to whether my muscles are tense or relaxed.
			Describing	1. I'm good at finding words to describe my feelings. 2. I can easily put my beliefs, opinions, and expectations into words.
			Non-judgmental Acceptance	1. I criticize myself for having irrational or inappropriate emotions. 2. I tell myself that I shouldn't be feeling the way I'm feeling.

(Continued)

TABLE 1 | Continued

Scales	Age	Rating	Components	sample items
The Mindfulness-Based Relapse Prevention Adherence and Competence Scale (e.g., Chawla et al., 2010)	Individuals who completed inpatient or intensive outpatient substance abuse programs (N = 93)	Therapist style/approach 1 = Low 5 = High Overall therapist performance 1 = Not satisfactory 5 = Excellent	<p><i>Adherence (adherence to individual components of MBRP and discussion of key concepts)</i></p> <p><i>Competence (ratings of therapist style/approach and performance)</i></p>	<p>Adherence: Discussion of key concepts</p> <ol style="list-style-type: none"> 1. Noticing/awareness of current experience. To what extent do therapists encourage noticing and being aware of present-moment experience? 2. Acceptance of current experience. To what extent do therapists encourage bringing curiosity and a non-judgmental attitude to whatever arises in the present moment, regardless of whether it is pleasant, unpleasant, or neutral? 3. Acceptance versus Aversion. To what extent do therapists introduce the differences between relating to one's experiences from a standpoint of acceptance as opposed to aversion? 4. Acceptance versus Action. To what extent do therapists discuss the importance of stepping out of auto-pilot (pausing, taking a breathing space, evaluating one's choices etc.) as a means of engaging in mindful action (responding vs. reacting, making choices that are in one's best interest), and/or to what extent do therapists describe the relationship between acceptance and skillful/mindful action? <p>Competence: Therapist style/approach</p> <ol style="list-style-type: none"> 1. <i>Inquiry</i>: Therapists' ability to elicit and respond to both verbal and non-verbal feedback. 2. <i>Attitude</i>: Therapists' ability to model and embody the spirit of mindfulness. 3. <i>Use of key questions</i>: The overall extent to which the therapists used key questions in eliciting discussion about exercises and home practice. 4. <i>Clarifying expectations</i>: The extent to which the therapist addresses and clarifies ideas and misconceptions about mindfulness meditation. <p>Competence: Overall therapist performance</p> <ol style="list-style-type: none"> 1. How would you rate the overall quality of the therapy in this session? 2. How would you rate the ability of the therapists to work as a team? 3. How would you rate the ability of the therapists to keep the session focused and on topic? 4. Please rate the overall quality of delivery of the meditation exercises.

(Continued)

TABLE 1 | Continued

Scales	Age	Rating	Components	sample items
The Self-Comparison Scale (e.g., Neff, 2003)	Undergraduate Educational Psychology students (N = 391)	1 = Almost never 5 = Almost always	Self-kindness	1. I try to be understanding and patient toward those aspects of my personality I don't like. 2. I'm kind to myself when I'm experiencing suffering.
	Undergraduate Educational Psychology students (N = 232)		Self-judgment	1. When I see aspects of myself that I don't like, I get down on myself. 2. When times are really difficult, I tend to be tough on myself.
	Buddhist participants (N = 43)		Common humanity	1. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people. 2. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.
			Isolation	1. When I fail at something that's important to me I tend to feel alone in my failure. 2. When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world.
			Mindfulness	1. When something upsets me I try to keep my emotions in balance. 2. When I'm feeling down I try to approach my feelings with curiosity and openness.
			Over-identification	1. When something upsets me I get carried away with my feelings. 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.
The Self-Other Four Immeasurables Scale (e.g., Kraus and Sears, 2009)	College students (N = 124)	1 = Very slightly or not at all 2 = A little 3 = Moderately 4 = Quite a bit 5 = Extremely	Positive qualities toward self	Friendly – toward myself Joyful – toward myself Accepting – toward myself Compassionate – toward myself
			Positive qualities toward others	Friendly – toward others Joyful – toward others Accepting – toward others Compassionate – toward others
			Negative qualities toward self	Hateful – toward myself Angry – toward myself Cruel – toward myself Mean – toward myself
			Negative qualities toward others	Hateful – toward others Angry – toward others Cruel – toward others Mean – toward others

persons' psychological state of ease," or "a person's experience of reflection and self-awareness."

Interestingly, in the Western literature (e.g., a Google search), another terminology also coincides with the concept of mindfulness – namely, in this case, the concept of *meditation*, also known as *meditation practice*. So, from this introduction, what is meditation or meditation practice? From a general point of view, there are many different types of meditation practice – for example: breath-awareness meditation, visualization meditation, and mantra-based meditation¹. From a more technical point of view, reflecting the importance of Buddhist teaching, Loden (1996) defines meditation as "thoroughly and deeply acquainting the mind with objects of virtue. Because virtuous minds are by nature happy and the source of future happiness, each time that you engage in meditation further happiness is brought into your life" (p. 23). In a similar vein, Olendzki (2009) considers meditation as being the "sustained consideration or thought upon a subject... As such, it is always an exercise of ordered conceptual contemplation, involving the systematic and disciplined use of language, symbol, and concept" (p. 37). Kabat-Zinn (2015) likewise defines meditation as being "the systematic and intentional cultivation of mindful presence, and through it, of wisdom, compassion, and other qualities of mind and heart conducive to breaking free from the fetters of our own persistent blindness and delusions" (p. 1482). From this brief account, we could say that meditation practice (e.g., "seated meditation practice") is intentional, enabling a person to seek positive experience of calmness, concentration, and emotional balance. In our own teaching of meditation practice at university, for example, we teach and engage students in a practice known as "walking meditation practice." Students would, in this case, recite the Buddhist sutras as they "walk" in a straight line or in a circle, paying close attention to their breathing.

We advocate and contend, indeed, that both mindfulness and meditation practice are two interrelated, but distinct concepts. As practitioners and researchers of mindfulness from an Eastern perspective, we argue for the following interpretation: that meditation practice (e.g., walking meditation) acts a practical mechanism, which would then facilitate and enable the personal experience of mindfulness (e.g., reaching a state of self-actualization). In other words, differing from scholarly previous conceptualizations and interpretations, we align our deliberation with those established in Buddhist texts (e.g., "*Meditations on the path to enlightenment*") (Loden, 1996). From this consideration, we argue that meditation is an intentional applied personal practice whereas, in contrast, mindfulness is the acquired knowledge and experience that a person subsequently attains. From this stipulation, we argue that it is somewhat erroneous to make statements such as, "I'm practicing mindfulness right now..." and "I am experiencing meditation at the moment..." Supporting our theorization is another interesting terminology, coined as *mindfulness meditation* (Kristeller, 2007; Tang et al., 2007; Bauer-Wu, 2010). What is mindfulness meditation?

According to Kristeller (2007), mindfulness meditation, also referred to as "Vipassana practice" and "insight meditation," is primarily concerned with the cultivation of a person's "ability to bring a non-judgmental sustained awareness to the object of attention rather than cultivating focused awareness of a single object, such as a word or mantra, as occurs in concentrative meditation. Mindfulness meditation may utilize any object of attention – whether an emotion, the breath, a physical feeling, an image, or an external object-such that there is more flexibility in the object of awareness than there is in concentrative meditation and such that the object may shift from moment to moment" (p. 393). We appreciate and concur with this viewpoint of mindfulness meditation as indeed, upon reflection, we teach and practise this personal approach. For us, in our teaching, mindfulness meditation may entail a focus on and the visualization of Buddha during our meditative practice.

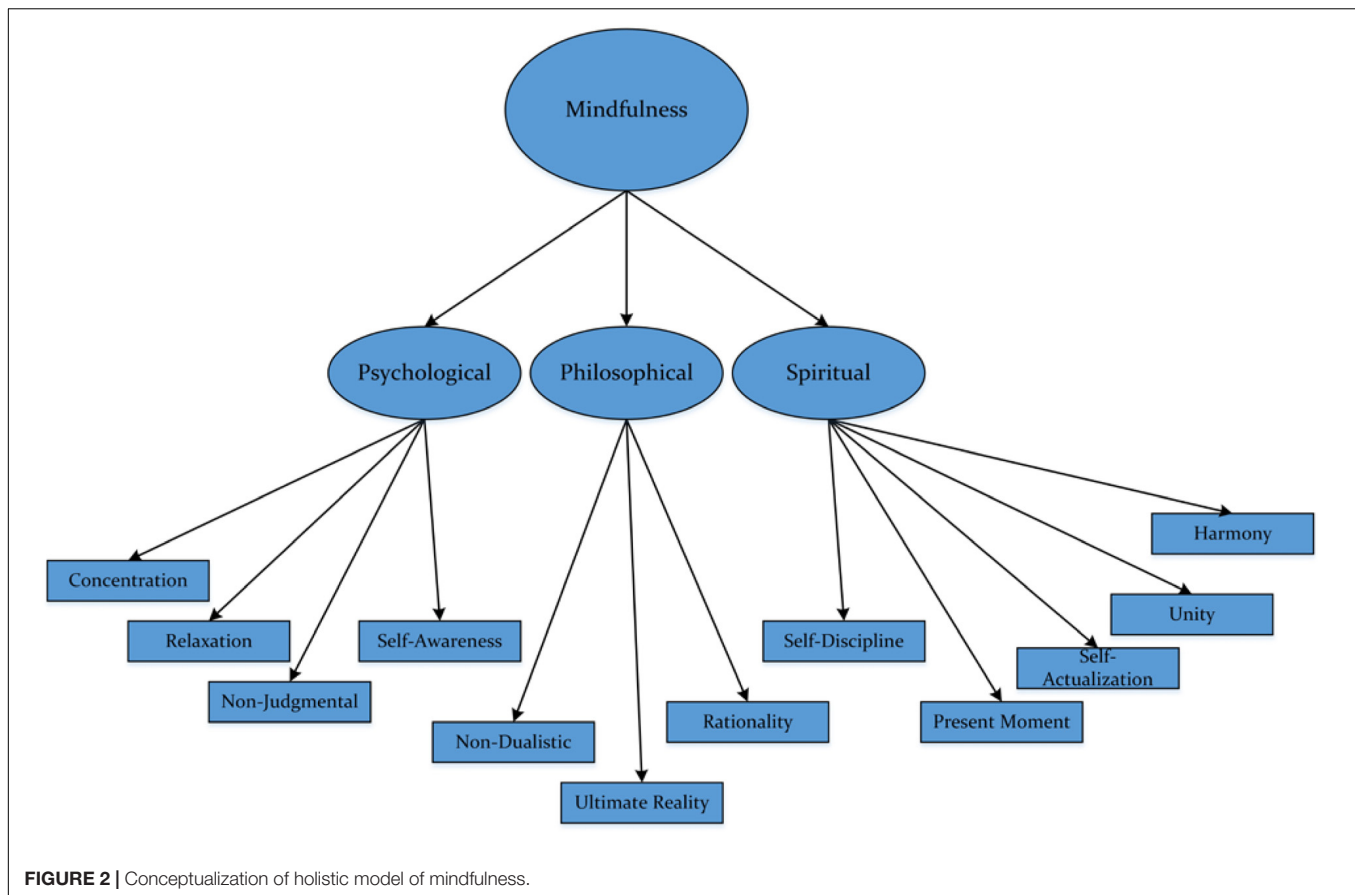
Mindfulness meditation then, from this consideration, is a style of meditation (Tang et al., 2007; Bauer-Wu, 2010), similar to that of concentration meditation, mantra meditation, and guided meditation. As a "mind control," or a "training" technique, according to Kristeller (2007), mindfulness meditation may assist in the facilitation of the achievement of "physical relaxation, emotional balance, behavioral regulation, and changes in self-judgment, self-awareness, and relationship to others" (p. 395). As we discuss later in the article, mindfulness meditation is quite appropriate and potent, coinciding with the teaching of Buddhism and Confucianism – in other words, as we attest, mindfulness meditation is an applied practice, which may result in the achievement in understanding and experience of mindfulness.

CONTEMPORARY UNDERSTANDING AND RESEARCH DEVELOPMENT: INTRODUCTION OF PROPOSITION

At present, from our synthesis and review of the literature (e.g., Baer et al., 2008; Sauer et al., 2011; Kabat-Zinn, 2015), mindfulness is analogous to that of a person's *meditational state*. From a practitioner's point of view, mindfulness is concerned with an internal state of "calmness," "ease," and/or "relaxation." By the same token, mindfulness is *not* concerned with a person's ability or inability to be "mindful" of a situation and/or an event – for example, statements such as "I am mindful that we are late for our next appointment" and "I need to be mindful that his grandfather recently passed away" may, in this sense, reflect a person's *cognizance* and/or *attentiveness* of a contextual situation. This consciousness does not, in our view, equate to meaningful understanding and/or experience of mindfulness. Mindfulness is more than just attentiveness and may delve into other complex facets. In this analysis, as we have argued, it is somewhat limited to perceive and interpret mindfulness as simply a psychological state of attentiveness, reflection, self-awareness, etc.

Research development in the area of mindfulness is evolving and ongoing. One notable line of inquiry is, of course, concerned

¹<https://chopra.com/articles/whats-the-difference-between-meditation-and-mindfulness>



with theoretical, methodological, and empirical contributions to the elucidation and understanding of the nature of mindfulness. Ultimately, what is mindfulness and how does one perceive this on a daily basis? Our collaborative research development over the past 5 years, cross-institutionally and cross-culturally, in positive psychology (e.g., optimization: Phan et al., 2019c, 2020c) has led to our keen collective interest to consider a proposition of a holistic model of mindfulness. At the time of preparation and write-up of our book, titled *“Teaching, Learning and Psychology,”* we briefly introduced this holistic model and contended that it offers a more inclusive definition of mindfulness. Our proposed model, as shown in **Figure 2**, is innovative and differs from existing representations that largely emphasize the importance of Western ideas and theoretical stance (e.g., Baer et al., 2008; Sauer et al., 2011; Kabat-Zinn, 2015).

The Importance for More Inclusiveness

Literatures delving into Confucianist teaching (Yao, 2000; Havens, 2013) and Buddhist philosophy (Yeshe and Rinpoche, 1976; Master Sheng Yen, 2010) have so much to offer, especially in terms of providing theoretical understanding into the nature of mindfulness. Many scholars, from Eastern contexts, would argue that existing research development into the nature of mindfulness from Western settings is somewhat limited. Psychological emphasis (e.g., state of relaxation), alone, is restricted and does not take into account the gamut of factors and/or facets that

could illuminate the true “essence” of mindfulness. Having said this, however, we do note that in recent years, some Western scholars (e.g., Carmody, 1984; Carmody et al., 2008; Mutter, 2014; Lazaridou and Pentaris, 2016) have incorporated and have placed emphasis on non-psychological entities – for example, the importance of spirituality within the realm of mindfulness. Our own research development and professional experiences (e.g., teaching mindfulness at university), for example, have led us to strongly advocate for the inclusion of attributes that espouse to the teaching of Confucianism (Yao, 2000; Havens, 2013) and Buddhism (Yeshe and Rinpoche, 1976; Master Sheng Yen, 2010). In this analysis, meaningful understanding of mindfulness does not simply entail, for example, the experience of and appreciation for a relaxed state of mind. It is much more than this viewpoint, we believe. By the same token, not appearing to sound restrictive (e.g., restricting to Buddhism alone), we speculate that other specific epistemologies, philosophical beliefs, and rationales (e.g., faith in Hinduism) may also help to elucidate and add clarity to the study of mindfulness. In this analysis, we purport for a more holistic outlook by which different cultural interpretations could be offered to describe and explain the “totality” of mindfulness.

As shown in **Figure 2**, our proposition indicates intricacy and that, more importantly, there is the “merging” of both Western and Eastern ideas. This consideration, indeed, rejects the view that mindfulness is simply a psychological entity. Similarly, in line with this reasoning, we recently devoted a chapter in

our forthcoming book, titled “*In search of sociocultural and psychological explanations of human agency: Western and Eastern insights for future development*,” which seeks to explore the complex issues of methodology. In other words, as we explore later in the article, the methodological issue of measurement and assessment is imperative, especially in terms of empirical validation of the proposed model of mindfulness.

Proposed Model of Mindfulness

A model of mindfulness that is more inclusive, as shown in **Figure 2**, may espouse both Western (e.g., Baer et al., 2004; Davis et al., 2009) and Eastern (Nyanaponika Thera, 1972) ideas and theoretically-derived tenets. In this analysis, via means of focus-group discussions with Taiwanese scholars who specialize in knowledge, experience, and teaching of Asian cultural studies (e.g., Chinese History), mindfulness, and meditation, we theorize and postulate three components: *psychological component*, *philosophical component*, and *spiritual component*. This conceptualization, in particular, purports that mindfulness is much more than just testament of a person’s observational state of cognition and/or behavior. Our main premise is that, unlike research studies in Western contexts, there are many “non-observable” attributes, which may define mindfulness. In this analysis, we contend that Likert-scale measures and/or open-ended surveys, alone, do not capture the essence of mindfulness.

So, what is our proposition? **Table 2**, referenced from Phan and Ngu’s (2019) recent publication, provides a summation of description of the three components and their respective attributes:

- *Psychological Component*: concentration, relaxation, non-judgment, and self-awareness.
- *Philosophical Component*: non-dualistic, ultimate reality, and rationality.
- *Spiritual Component*: self-discipline, present moment, self-actualization, unity, and harmony.

In this analysis, we argue that mindfulness is rooted in a tripartite system of psychological, philosophical, and spiritual measures. In other words, we contend that this proposed tripartite system of mindfulness has both “scientific” (e.g., psychological measure?) and “non-scientific” (e.g., philosophical and spiritual measures?) measures, and may require engagement and usage of alternative non-traditional methodological approaches. In brief, as detailed in **Table 2**, we have three components:

Philosophical Component

The philosophical component of mindfulness focuses on the *epistemology and exploration* of the contextual nature of mindfulness. Epistemology, in this case, is concerned with a persons’ quest to seek understanding into the true “meaning” of mindfulness. What does mindfulness actually mean and, more importantly, what does it constitute? This component of mindfulness, from our rationalization, delves into the reading of Buddhist scriptures and places emphasis on a person’s philosophical stance. In other words, we contend that individual experience of mindfulness, via means of meditation would direct

and facilitate a person to engage in philosophical “pondering.” This “philosophical pondering” considers a person’s reflection and willingness to explore comparative and contrasting scenarios, viewpoints, and propositions.

A philosophical viewpoint of mindfulness, from our summation (**Table 2**), emphasizes the importance of self-reflection, introspection, and contemplation. Experience of mindfulness, in this sense, delves into a person’s mindset and his/her relationship with nature and reality. For example, in his/her state of philosophical pondering, a person may contemplate about the universe and where he/she is at. Ultimately, the philosophical component of mindfulness espouses a perceived sense of openness, guiding a person toward appreciation for life and of life itself. In essence, the philosophical component of mindfulness has the potential to instill philosophical reasoning, enabling a person to question his/her own existence, contextual surroundings, and/or personal life experiences.

Aside from the mentioned testament, it is also a plausibility for a person to seek philosophical understanding about the nature of mindfulness. Philosophically, for example, what is mindfulness? What does it mean, theoretically, when a person is in a philosophical state of reasoning? Do we, as a specific being, differ from other beings and, more importantly, can we coexist? These few questions are examples, which may focus on the nature of the philosophical component of mindfulness. As physical beings, experiences of mindfulness enable us to question our own existence with nature and, by the same token, engaging in philosophical reasoning would permit us to acknowledge and recognize our own mortalities and rationalities.

Spiritual Component

The spiritual component of mindfulness focuses on the *importance of spirituality*. Spirituality, from an Eastern perspective, may encompass the true meaning of the afterlife and, of course, other life-related aspects that cannot be accounted for by the laws of physical sciences. The physical world, for example, defines a linear time point: past, present, and future (Phan et al., 2020b). We think about the past, live in the present moment, and consider our future outlooks. From this understanding, situated within a larger system of change, a person may seek to understand about his/her holistic being. What does this actually entail?

Experience of mindfulness, from our point of view, may enable a person to seek understanding into his/her presence in this universe. The physical body exists within the realm of a person’s lifetime – that is, from birth to death. However, spiritually, we also place emphasis on the “human spirit” or a “person’s soul.” From this understanding, we contend that experience of mindfulness would offer opportunities for individuals to reflect and to ponder about other “realms” of reality. Spiritually, a person could ponder and seek to understand the meaning of the afterlife – for example, what happens when a person moves on from this living world? Where does his/her soul reside? Where happens to his/her state of consciousness? These questions are examples that may reflect the complex nature of spirituality of mindfulness.

TABLE 2 | A Summary of psychological component, philosophical component, and spiritual component.

Mindfulness		
Themes	Indicators	Definition
Psychological	Concentration	This indicator emphasizes a person's mindset, which is resolute and focused. Mindfulness, in this sense, recognizes the importance of <i>focus</i> , which is direct, purposive, and directs toward a particular know. For example, concentration may involve a person's focus on a particular keyword (e.g., happiness), or a thing in the contextual environment (e.g., a flower) with ease. Concentration, in this case, does not entail deviation of a person's mindset and/or focus – that is, concentration does not permit a person's mind to “wonder off.”
	Relaxation	This indicator recognizes the importance of a person's <i>psychological and physiological attributes</i> , which are at ease. Mindfulness, in this case, enables and facilitates a person to “ease” his/her emotions, feelings, and physiological functioning. Relaxation, in this case, would free the mind from any provoking thoughts, emotions, and/or actions. A mindset that is “relaxed” would help a person to reach a state of enlightenment, which then may result in harmony, peace, and love. Non-relaxation, of course, indicates a confused mindset that, correspondingly, yields negative heightened psychological and physiological attributes.
	Non-judgmental	This indicator focuses on a person's judgment of others and what this judgment entails. Judgments can be both positive (e.g., Sheng seems to get on with his friends) and negative (e.g., Ya-Chu does not seem to have any friends). Mindfulness, in this case, enables and ensures that a person is non-judgmental in his/her daily functioning – that is, he/she does not make judgments about others, regardless of their differences, backgrounds, situations, and personal circumstances. A non-judgmental mindset reflects a state of contentment, and the achievement in experience of unity and harmony.
	Self-awareness	This indicator emphasizes the importance of a person's recognition and awareness of his/her own mindset, which in this case entails emotions, thoughts, actions, ease, and the contextual surrounding. Does one know, for example, that one is unhappy and experiencing a state of anxiety? And why is this the case? Mindfulness, in this case, enables a person to develop and to experience an internal state of cognizance, which may assist him/her to reach <i>enlightenment</i> . Lack of self-awareness, in contrast, reflects the inability to engage in and/or to experience mindfulness.
Philosophical	Non-dualistic	This indicator focuses on the importance of non-separation, and the fundamental point of essential oneness (i.e., wholeness, completeness, or unity). This emphasis on non-duality suggests that as individuals, we are all one at the deepest level of our existence. There is no such thing, in this analysis, of separation and/or diversity (e.g., this <i>versus</i> that, you <i>versus</i> me), – there is only one universal essence, and one reality by which we are all included. The physical body and mind become one – that is, mind and matters combine. The importance of oneness. When others experience, you feel pain as well. People + People Mind + Physical Mind + Mind
	Ultimate reality	This indicator contend that ultimate reality is the absolute nature of all things. As individuals, we use our observations, consciousness, and experience to define ordinary reality, which we hold as being truthful. Mindfulness, in part, focuses on the transcendence between the physical and the non-physical dimensions of our world. At the same time, engagement in mindfulness enables a person to recognize and to acknowledge the existence of an all-inclusive reality, by which all things are derived.
	Rationality	This indicator emphasizes the importance of reality, absolute in nature, which then determines a person's course of action. As individuals, we act by reasons, which are in accord with the facts of reality. Irrationality, in contrast, reflects the undermining of one's own mind and conviction to act in a rational manner. In choosing irrationality, a person then conveys the message that he/she lacks a rational mind. Mindfulness, in this sense, acknowledges our thought processes as sources that guide our convictions, values, goals, desires, and actions.
Spiritual	Self-discipline	This indicator focuses on a person's ability to accomplish things, to regulate and train personal conduct, and to regulate personal feelings, emotions, and desires. This emphasis of self-discipline, of course, recognizes the importance of mental strength, which may involve personal resolve and persistence, to self-regulate and control one's own behaviors, feelings, emotions, and desires. Mindfulness, in this sense, enables a person to develop and to experience an inner self, which then translates and/or reflects a state of discipline.
	Present moment	This indicator, interestingly, focuses on time, differentiating the past, the present, and the future. Buddhism, in this sense, does not recognize the past, nor does it recognize the future. Rather, the present moment is the only thing where there is no time. The present moment is always there, and it also serves as a meeting point between past and future. We can never access any other timeframe, other than the present time point. In this analysis, everything that ever happened and will ever happen can only happen in the present moment, and not at any other time points. The past and the future do not have distinctive realities – only the present moment can. Our memories of the past, and/or our consideration of the future are simply mental concepts. Meditation, in this sense, attempts to enable a person to become present oneself. When a person is in a state of “present moment,” he/she does not think of the past, nor does he/she consider of his/her future.

(Continued)

TABLE 2 | Continued

Mindfulness		
Themes	Indicators	Definition
	Self-actualization	This indicator, similar to that of the concept of nirvana, emphasizes a person's potential to become what he/she is capable of. In this sense, considering the perspective of Buddhism, self-actualization reflects a person's desire and inner strength to reach "enlightenment." Experiencing the "present moment," in particular, assists a person to achieve a Buddha-nature state of perfection or tranquility, which is known as <i>satori</i> . Enlightenment, ultimately, indicates and/or reflects a person's mind and personality merging with nature and reality. When this occurs, consequently as a result of engagement in mindfulness, one is able to experience a state of unity and harmony.
	Unity	This indicator places emphasis on the importance of bonding between individuals. The ideal positioning, through mindfulness, reflects an internal state of "many in body, one in mind" (i.e., we are all different, but share the same spirit). With a state of ease, mindfulness facilitates our thinking to consider unity of diversity, and to recognize that we all have to work collectively toward self-reformation, and to look out for each other for a better future. Ultimately, as humans, we are all followers of Buddha with the main desire to obtain <i>nirvana</i> (i.e., <i>enlightenment</i>).
	Harmony	This indicator emphasizes the importance of pleasant and non-contentious functioning between individuals, and/or between groups of people. Mindfulness, in this sense, reflects a desire to achieve <i>enlightenment</i> or <i>nirvana</i> , which then enables a person to experience harmony and peace. A state of harmony, via means of mindfulness, intricately associates with other qualities, such as <i>love, generosity, appreciation of others, sensitivity, forgiveness, kindness, respect, sympathy, and tolerance</i> .

Self-awareness, indeed, is a state by which a person would seek to understand and appreciate. Personal self-awareness, in this case, would enable a person to situate his/her mindset to the present moment with the focus being on a quest to strive for enlightenment. Time, as we previously described, is an important entity by which only the present time point counts. In this sense, appreciation of spirituality enables a person to contemplate the meaning of peace, harmony, connectedness, and unity. By the same token, of course, experience of mindfulness would purposively allow a person to delve into the meaning of *transcendence*. Transcendence, in this case, is related to a person's cognizance that there is a division between the living world and the non-living world.

Psychological Component

The psychological component of mindfulness focuses on the *importance of a person's psychological mindset*. This emphasis, of course, closely relates to a person's state of consciousness, delving into a few notable attributes – for example: (i) a person's state of concentration, (ii) a person's ability to remain non-judgmental, (iii) a need to be cognizant of the contextual surrounding and of himself/herself, and (iv) to recognize the importance of ease, calmness, and serenity.

In essence, the psychological component of mindfulness places emphasis on a person's psychological mindset to be able to self-regulate his/her thoughts and behaviors. Experience of mindfulness, in this case, would enable a person to possess and exhibit an appropriate temperament, such as the ability to remain calm and to be non-judgmental of nature itself. In other words, from the perspective of Buddhism, mindfulness does not place emphasis on encouragement for individuals to make judgments and/or to be judgmental of others – for example, "that is a pretty dress that you are wearing." Everything in nature is as it is and, importantly, there is no valence – that is, the positives versus the negatives.

Experience of mindfulness, psychologically, entails an unwaivered mindset by which a person is able to remain

on task in terms of his/her attention. Recently, in a study involving Taiwanese university students, we introduced and explored a psychological concept, which we termed as "personal resolve." Personal resolve differs from a state of resilience (Martin and Marsh, 2006) and/or self-determination (Deci and Ryan, 2008), and "considers interestingly the importance of a person's mental resolute and "unwavering focus" to stay on task without any uncertainty or reservation to achieve optimal best. In this analysis, . . . personal resolve focuses on a person's conviction that his/her choice, positioning, and action are indeed correct, despite what others may say" (Phan et al., 2020c). From this understanding, we contend that experience of personal resolve may indeed reflect the psychological nature of mindfulness, especially in terms of a person's state of concentration.

In Totality: A Multifaceted Structure of Mindfulness

In total, what can we take away from the preceding sections? Our main premise, in this case, is that mindfulness is complex and may espouse a multifaceted structure, consisting of three major components: psychological, spiritual, and philosophical. This rationalization, in part, rejects existing research inquiries and theorizations from Western contexts, which place strong emphasis on different psychological themes. Stemming from personal experiences and the teaching of Buddhism and Confucianism, we argue that mindfulness is more than just testament and reflection of psychological processes (e.g., a person's temperament). Rather, as a point of totality, we purport that perceived understanding of mindfulness encompasses the gamut of human experiences, consciously and subconsciously.

The distinction of our proposed model of mindfulness lies in its merging of Eastern and Western ideas, reflecting inclusiveness of philosophical, spiritual, and psychological attributes. At the same time, of course, we contend that our proposition places emphasis on the notion of "universality," which encompasses both scientific (e.g., state of concentration) and non-scientific

(e.g., state of transcendence) inquiries. This consideration emphasizes the use of personal reasoning and philosophical psychology to seek understanding into the intricate nature of mindfulness. By all account, the proposition detailed in **Figure 2**, as Phan and Ngu (2019) recently introduced, is conceptual and would require rationalization and continuing research development. Speculative, however, it is plausible for us to draw in differences between individuals. For example, novice practitioners of meditation may simply experience an internal state of relaxation and calmness and, eventually, come to recognize the importance of his/her focus of concentration (e.g., on a subject). Novice learners of mindfulness, from our point of view, would not necessarily have the skills and/or experiences to reflect on their inner selves, and/or to view everyone with a sense of fairness. In contrast from this, more experienced practitioners of meditation (e.g., Buddhist monks/nuns) would have advanced understanding and appreciation of mindfulness, differentiating themselves by their achievements of *enlightenment* and *satori*. Moreover, advanced individuals of mindfulness would recognize the intricate “bond” between different beings and nature. An internal state of *nirvana*, in this case, would allow individuals to develop and flourish in different types of personal attributes, such as love, generosity, forgiveness, kindness, and respect for all different beings. In other words, in-depth and personal experience of mindfulness from our point of view may instill a higher-order “philosophical mindset,” resulting in a person’s appreciation and acknowledgment that there is no distinction and/or differentiation between different beings in nature (e.g., human beings, birds, dogs, etc.). In essence, from this testament, the significance of our proposed multifaceted model of mindfulness lies in understanding that a person’s experience of mindfulness may entail different types of philosophical, spiritual, and religious sentiments for contemplation – for example: what happens when a person passes on from this living world? what makes a person different from another person but, more importantly, should this

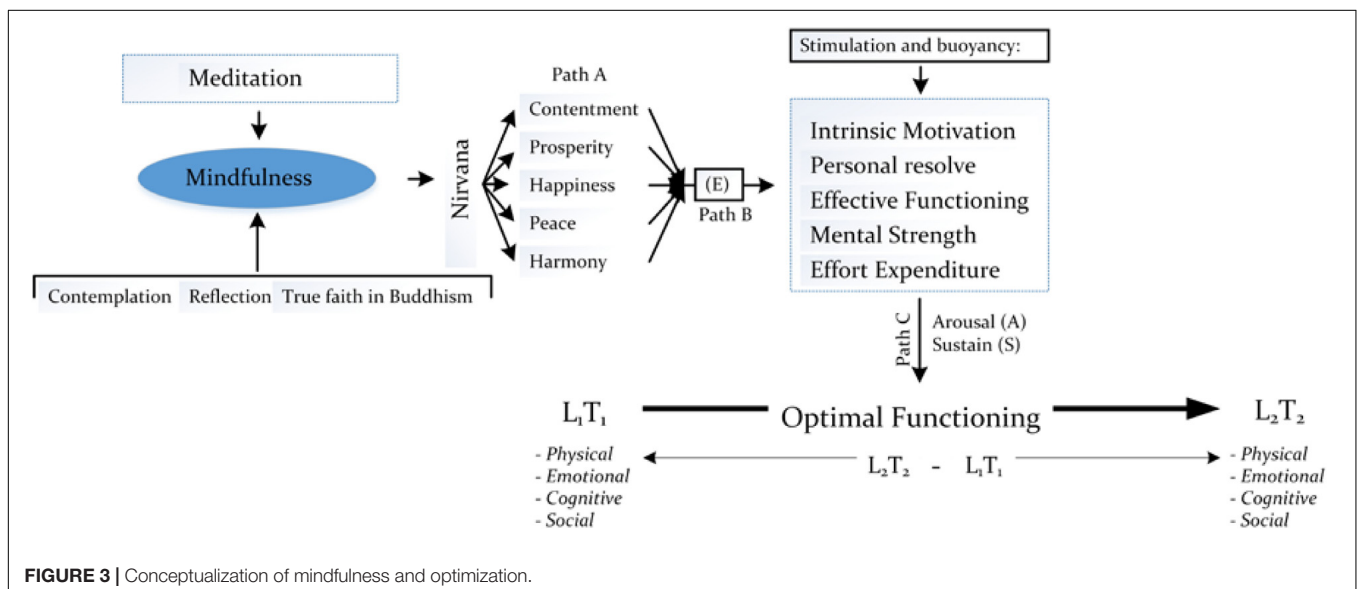
“difference” affect his/her attitude, respect, viewpoint, etc. for that person?

TESTAMENT OF MINDFULNESS AS PART OF POSITIVE PSYCHOLOGY

By all means, development into the holistic representation of mindfulness, taking into account philosophical component, psychological component, and spiritual component is evolving (**Figure 2**). What we have presented so far in this article is introductory, and entails the following:

- Advocation for a complex, multifaceted structure of mindfulness, which reflects a combination of both Western and Eastern ideas. This emphasis is significant, advocating for the sharing of knowledge and the acceptance of cross-cultural comparison in viewpoints and epistemologies.
- Consideration of consciousness and the subconsciousness and, by the same token, acknowledgment of both scientific and non-scientific attributes, which could account for the complex nature of mindfulness.
- Acknowledgment that practice of meditation gives rise to a state of mindfulness, differentiating novice from experienced practitioners. Meaningful understanding of mindfulness, in this case, may consist of testament of evidence of philosophical experience, psychological experience, and/or spiritual experience.

It is sound and logical to consider mindfulness as an entity of positive psychology (Csikszentmihályi, 1990; Seligman, 1999; Seligman and Csikszentmihályi, 2000). How do we rationalize this theoretical positioning – *that mindfulness could be part of the repertoire of positive psychology?* To answer this question, let us refer back to the concept of optimal best (Martin, 2011; Liem et al., 2012; Phan et al., 2016) and, in particular, the



active process of optimization (Fraillon, 2004; Phan et al., 2019c, 2020b). In a recent book chapter, Phan et al. (2019d) discussed this association in detail – that mindfulness could act as an optimizing agent, which would in turn facilitate the accomplishment of optimal best. We refer to Phan et al.'s (2019d) rationalization for discussion in this section. To assist with this postulation (i.e., the relationship between mindfulness and optimization), we have developed a conceptual model, as shown in **Figure 3**.

The proposition detailed in **Figure 3** is innovative, illustrating the potentiality for perceived experience of mindfulness to act as an antecedent in the process of optimization. As an example, with reference to **Figure 3**, a person engages in Buddhist meditation, which would result in his/her understanding and experience of mindfulness – in this case, this understanding and experience of mindfulness is indicated by the person's reflection, contemplation, and testament of true faith in the philosophy of Buddhism. We propose that this development in understanding and experience of mindfulness, in turn, would act to instill a suite of *Buddhist-related attributes* for acknowledgment and recognition – for example: personal contentment or satisfaction, the prosperity of health functioning, and a perceived sense of happiness, peace, and harmony. These Buddhist-related attributes, as positive and proactive concepts, from our conceptualization, may act as sources of information to initiate an appropriate level of energy, *E*, for further enactment (Phan et al., 2019c, 2020b). In accordance with recent development of the process of optimization, we postulate that a high level of energy would result in the activation and buoyancy of different psychological attributes (e.g., effort expenditure), resulting in arousal and the sustaining of a state of functioning (e.g., happiness).

The above example is insightful as it helps to elucidate the potential relationship between our proposed model of mindfulness and the paradigm of positive psychology (Csikszentmihályi, 1990; Seligman, 1999; Seligman and Csikszentmihályi, 2000), which in this case is related to the process of optimization (Fraillon, 2004; Phan et al., 2019c, 2020b) and, subsequently, the achievement of optimal best. This depiction is summarized in **Figure 4** where we have the following: (i) indicative of the paradigm of positive psychology is the achievement of optimal best (e.g., positive emotions), *L₂*, and the process of optimization, and (ii) resulting from the process of optimization, which mindfulness may act as an optimizing agent, is the achievement of optimal best, *L₂*. Our proposition, as

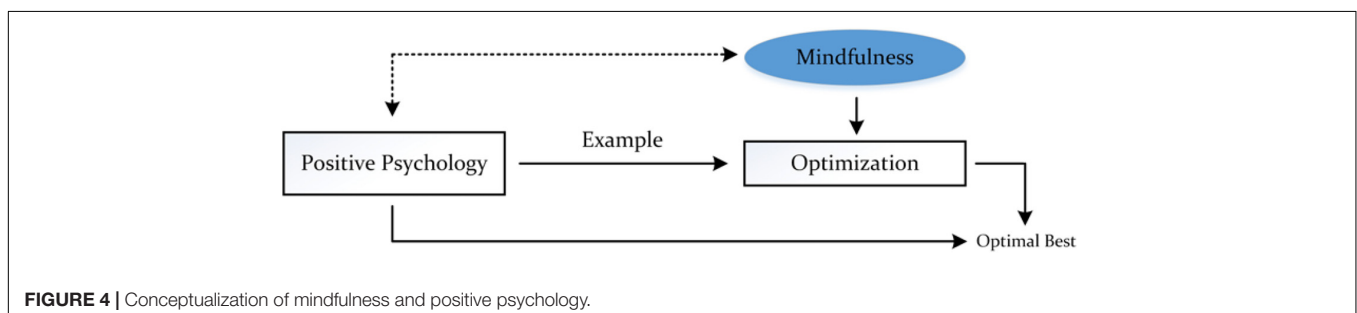
shown, posits the indirect influence of mindfulness on optimal best, via the process of optimization. In other words, rather than a direct association (i.e., mindfulness® optimal best), we argue that mindfulness is prevalent via means of its optimizing role.

Note: We have drawn a dotted line to depict the direct association between positive psychology and mindfulness. However, despite this recording, we propose that the relationship between the two concepts is evident via the process of optimization (i.e., non-dotted lines).

IMPLICATIONS FOR CONSIDERATION: THEORETICAL AND METHODOLOGICAL CONTRIBUTIONS

Scientific inquiries, such as research undertakings that focus on students' academic performance outcomes are direct and may involve the use of conventional methodological approaches (e.g., a two-group experimental design). Complexities arise, however, when we have inquiries that do not conform to and/or situate within the physical world. In this analysis, measuring and assessing a psychological, factorial structure of mindfulness is relatively straightforward, which may involve Likert-scale responses that are analyzed within the framework of CFA techniques (e.g., Baer et al., 2004, 2008; Cardaciotto et al., 2008). Having said this, though, validating our proposed multifaceted model of mindfulness is more difficult, to the point where it may be perceived as being improbable. Traditional methodological means, in this analysis, may not be adequate. For example, how would we validate the spiritual component of mindfulness? Understanding the true meaning of nirvana (Phan and Ngu, 2019; Phan et al., 2019d), in this analysis, is somewhat difficult to achieve, given the fact that it would be infeasible to quantify and measure.

In our recent research development, we devoted a chapter in which we explored in detail the issue of what is termed as "methodological appropriateness" (Phan et al., 2019a). Phan et al. (2019c), in their conceptual article, introduced this term, which is defined as the development of an *appropriate* methodological design that would enable the accurate measurement and assessment of a process or an outcome (e.g., optimization). The authors' rationale, in this case, is that inappropriate methodological designs would produce inaccurate results and/or misconstrued interpretations. On this basis, our chapter also explored the importance of appropriate methodological designs



for usage to measure and assess non-scientific inquiries. In the present context, for example, emphasis of methodological appropriateness could involve the use of *focus-group discussions and sharing of experience, in situ observations, and reflective writing* to seek relevant insights into the multifaceted nature of mindfulness.

We perceive that certain aspects of our proposed model of mindfulness are “esoteric” and “mythological,” which would make it somewhat difficult to ascertain some form of scientific evidence. For example, experience of satori in which a person is able to reach a Buddha-nature state of tranquility would, in this sense, be difficult to validate. A perceived sense of satori, according to experienced practitioners of meditation, is “internalized” and not yield observational information for documentation. In a similar vein, testament of nirvana, that is a state of enlightenment, is somewhat difficult to document and to ensure accuracy for the purpose of comparison and consistency. Our mentioning of “non-scientific” attributes (e.g., the attribute of “ultimate reality”: **Figure 2**), in this case, emphasizes the importance of non-physical, non-contextual, and non-cognizant experiences.

We contend that at any moment in time, a person’s state of consciousness and engagement with the physical world serve to explain his/her experience of mindfulness. Personal experience, arising from maturity and ongoing practice of meditation, may provide grounding for individuals to develop “insights” into their sub-consciousness, enabling them to acquire esoteric and mythological experiences. Rather than focusing on conventional methodologies (e.g., a two-group experimental design), we propose the use of Eastern, non-traditional epistemologies, which could offer evidence and in-depth understanding of different personal esoteric experiences. Some Taiwanese colleagues that we know of, for example, engage in non-traditional epistemologies such as: (i) reflecting on their acquired wisdom about the world and life, in general, (ii) documenting their deep, meaningful insights into the living world, and (iii) to consider thoughts, behaviors, and actions that are “higher-order.” These methodological positionings, of course, are relatively unfounded and may lack credibility, scientifically. However, despite this contentious methodological approach, some Taiwanese scholars and experienced practitioners of meditation have attested to the fact that their esoteric, non-conventional experiences of mindfulness have helped them in their daily lives. In a similar vein, we recommend for the inclusion of contributions, theoretical, conceptual, empirical, and/or methodological, from other sociocultural settings. It would be of interest, in this analysis, for us to consider and incorporate other philosophical faiths – for example: how does true faith in Hinduism account for understanding and personal experience of mindfulness? how does an Indigenous group’s particular cultural esoteric practice

assist in the development of understanding and experience of mindfulness?

CONCLUSION

Positive psychology, as extensive writings have shown, is an interesting paradigm for reading. At the same time, of course, educators and researchers have used positive psychology to structure and design various programs for implementation, which would ultimately result in the determent of pathologies as well as the promotion of positive conditions and positive life experiences. Our own research development over the past 5 years, likewise, has made extensive theoretical, methodological, and empirical contributions to the study of positive psychology. One notable aspect of our research, which we share in this article is the theorization and development of a proposed multifaceted model of mindfulness that takes into consideration both Western and Eastern ideas.

We contend that mindfulness is a complex concept that scopes different themes and attributes, scientifically and non-scientifically. Our theoretical contention, as explored in this article, is that mindfulness (i.e., our proposed multifaceted model) could coincide with and support the study of positive psychology. In particular, adhering to the theory of optimization, we postulate that mindfulness could act as an “optimizing agent,” which then would assist in the facilitation of a person’s achievement of optimal best (Phan et al., 2017, 2019d; Phan et al., 2020b). This consideration is interesting, reflecting our use of philosophical psychology, personal reasoning, and extensive experiences in teaching and research development of optimization and mindfulness. Aside from the postulation that mindfulness is closely associated with positive psychology, we also offer methodological issues that are of significance for continuing research.

AUTHOR CONTRIBUTIONS

HP and BN were responsible for the conceptualization, literature search, and write-up of this manuscript. SC, LW, S-YS, R-YL, J-HS, and H-WW contributed equally in terms of conceptualization, discussion, literature search, and philosophical reasoning with specific reference to Buddhism and Buddhist mindfulness.

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Higher Education, Happiness, and Residents' Health

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The study proposes a new mechanism by which higher education affects the health of residents, showing that higher education can first improve the happiness of residents and then improve their health. In this research, we employ the data collected in Chinese General Social Survey in 2013 and adopt the semiparametric estimation methodology of ordered probit model. Our main findings include the following. First, compared with the residents without higher education, residents with high education enjoy better health conditions, and residents' happiness also significantly affects their health conditions. Second, higher education may have a long-term impact on residents' health by affecting their happiness. Third, the results of grouping test demonstrate that, with the increase in age, the influence of residents' happiness on health is more pronounced, but the mechanism of higher education to improve health status by improving residents' happiness becomes unobvious. Furthermore, we adopt the Shapley value decomposition methodology to decompose the effects of various factors on residents' health. We find that with the increase in age, happiness contributes more and more to residents' health conditions.

Keywords: higher education, happiness, health, semiparameter estimation, shapley value decomposition

INTRODUCTION

As a capital of human resources, education is not only an important indicator of social and economic status but also has a direct impact on one's occupation, income, and wealth. Therefore, among the various social factors that affect health and cause health inequality, it is sometimes regarded as the root cause of health disparity. Numerous studies have revealed a robust positive correlation between education and health. The existing literature shows that education mainly affects residents' health through the following three means. First, the more educated an individual is, the higher his or her income level will be (Moen, 1999). Because the living standard of the higher-income group is also higher, it is often accompanied by better health (Bai et al., 2020). Second, people with higher education level are more likely to make better use of health care and medical information, adapt to complex medical treatment, and thus benefit more from the improvement of medical technology (Glied and Lleras-Muney, 2003). Third, better education will help people better understand the potential harms caused by bad life behaviors on health, encourage people to develop healthy living habits such as minimize or quit smoking, and develop good eating and exercise habits (Kemptner et al., 2011).

Since the twenty-first century, with improving quality of health care and level of people's education, the health status of residents in developing countries has been significantly improved. However, compared with developed countries, there is still a certain gap. As the most populous developing country, with the introduction of Healthy China Strategy, the issue of Chinese national health has garnered extensive attention. According to Chinese Family Health Big Data Report 2018, in recent years, Chinese people's awareness of healthy life and family health management has been enhanced, and the health concept of active prevention has been embraced by people. However, more and more young people have health problems, and the rapid growth of the elderly unhealthy people has become national health issues. Many scholars discuss how to improve the health level of Chinese people from the perspective of education. Zhao and Hou (2005), Zhao (2006), Li and Feng (2006), and Cheng et al. (2015) all showed that the improvement of education level can increase income and improve residents' living behaviors, thus significantly and positively impacting the health of Chinese citizens. Considering selective bias and heterogeneity, Wang and He (2015) estimated the impact of high school education, and higher education on health using Propensity Score Matching. Their results obtained by local linear matching confirmed that higher education can produce better health level. Zheng and Zeng (2018) used tracking data to study the health return of education and found that the health return of education gradually increased in recent years. Li and Liu (2019) tested the causal relationship between Chinese education and national health and health behaviors based on the two-stage least squares method (2SLS). They found that the improvement of education level significantly improved the men's health condition. However, some scholars question the positive health effects of higher education in China. Zhao and Hu (2016) believed that, as a developing country, China's higher education fell behind developed countries in terms of curriculum, sports facilities, and health concept, and residents with higher education tended to engage in more stressful work, which made people have irregular rest and work schedule and suffer from extensive use of electronic radiation products. Thus, higher education would have a significant negative impact on health.

To some extent, these studies revealed the health effects of higher education in China. However, they typically ignore another potential way of higher education affecting the health of residents, which maybe a very important reason for the inconsistency of existing research results. In fact, higher education can also affect the health of residents by affecting their well-being. A number of studies based on Chinese data have found that education can improve residents' well-being. First, education improves the subjective well-being of residents by improving their income level (Luo, 2006). Second, people receiving higher education are better at communication and can deal with disputes and contradictions flexibly (Gilar-Corbi et al., 2018; Zhao et al., 2019). This not only makes for expanding and maintaining social relations with others but also enables individuals to obtain a stable emotional support and strengthen their perception of happiness (Huang, 2013). Finally, education can improve self-identity, so can promote happiness (Zhou,

2015). If it is real that education affects residents' well-being, education is likely to further affect residents' health because there is a lot of evidence that happiness has a positive impact on residents' health based on China and other countries. Graham et al. (2004) took the survey data of Russian residents as a sample to investigate the impact of happiness on residents' health. They found that those residents with higher happiness had stronger optimism attitude and enjoyed better health in the future. Straume and Vitters (2015), Sabatini (2014), and Siu et al. (2015) confirmed that the residents with higher happiness were healthier. They argued that people's optimism could regulate their physical functions. Based on Chinese data, Zhu and Yang (2017) found that individuals with high happiness may easily form good habits for health, such as eating a balanced diet and exercising regularly; thus, happiness had a positive impact on health.

This study believes that education can improve residents' happiness and thus improve their health level. Based on the data of Chinese General Social Survey in 2013, this study empirically investigates the impact of higher education on health condition of residents by using the semiparametric estimation methodology of ordered probit model. It shows that higher education can improve health condition by affecting residents' happiness. Furthermore, in order to investigate the impact of higher education on the health of residents in different age, we will conduct grouping test.

DATA DESCRIPTION

Our research data is from 2013 Chinese General Social Survey (CGSS), a large-scale nationwide survey conducted by the Department of Sociology, Renmin University of China. Because the paper mainly focuses on the impact of higher education on residents' health, we need delete the samples with missing critical information. As a result, 10,037 observations were obtained.

Residents' health status, labeled as health, is the core dependent variable in this paper, which is a multidimensional concept including physiological health and psychological health. The existing literature often measures it by subjective self-evaluation, which is also adopted in this research. In the CGSS questionnaire, a main question employed in our research is: "what do you think your physical health is?" The answer to the question employs the 5-point Likert scale in which values of 1 and 5 represent "very unhealthy" and "very healthy," respectively. **Figure 1** shows, in the survey, 2.78% of the residents consider themselves very unhealthy, and 13.33% consider themselves comparatively unhealthy; 38.68% of the residents think they are in good health, and 26.13% think they are very healthy. This implies that most respondents' self-perception of physical condition is healthy.

Because age is an important factor that influences health condition, **Figure 2** further reports the differences in health condition among residents of different age groups. We divide our survey subjects into three groups according to their age: age ≤ 40 , $40 < \text{age} \leq 60$, and age > 60 . In our samples, The proportions of the three groups are 33.12, 41.42, and 25.47%, respectively. As shown in **Figure 2**, with the increase in age, the health condition

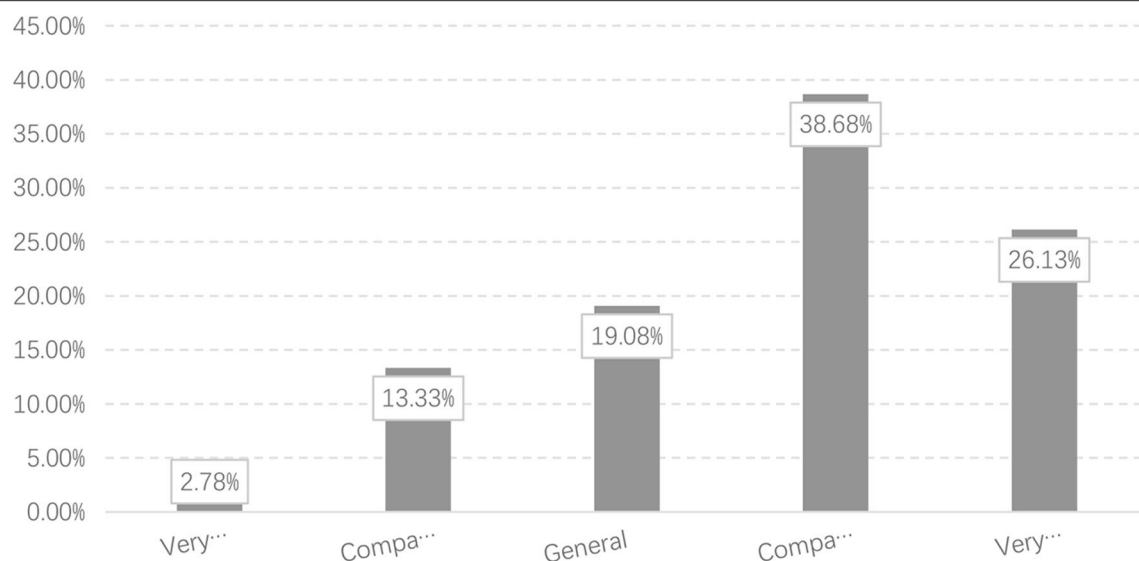


FIGURE 1 | Health conditions of survey respondents.

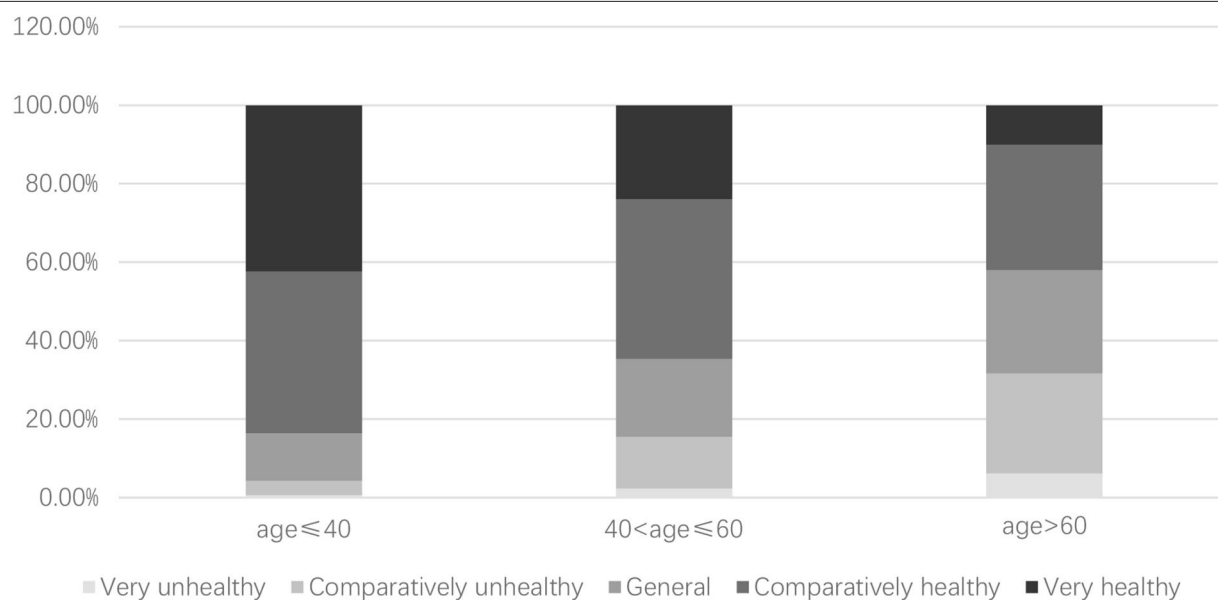


FIGURE 2 | Health conditions among residents of different age groups.

of residents tends to deteriorate. About 80% of residents under the age of 40 think they are in good health, while only about 50% of residents over the age of 60 think they are in good health.

The study focuses on the impact of higher education on residents' health status, so it is necessary to check whether a resident received higher education. We use the core explanatory variable *education* in this study. We obtain the educational attainment of the respondents based on the answer to the question, "your highest education level at present" in the CGSS questionnaire. According to the respondents' answers,

when a respondent chooses "junior college (adult higher education)," "undergraduate college (regular higher education)," "undergraduate degree (adult higher education)," and "graduate and above," s/he is considered to have received higher education. We assign it with a value of 1. In contrast, when a respondent chooses "no education," "private school," "primary school," "junior high school," "vocational high school," "ordinary high school," "technical secondary school," or "technical school," s/he is considered to have not received higher education. We assign it with a value of 0. Among our respondents, 1,595 respondents

are receiving or have received higher education, accounting for 15.89%. The remaining 8,742 respondents are non-higher education receivers, accounting for 84.11%.

In this study, we argue that higher education can improve residents' health by improving their sense of happiness. Next, we need to know the happiness assessment of different residents. We measure the variable happiness from the survey question: "in general, how do you feel about your own life?" The answer to the question is also designed to utilize 5-point Likert scale in which values 1 and 5 represent very unhappy and very happy, respectively. Of the respondents, 59.18% were happy and 13.79% were very happy.

In order to accurately judge the impact of higher education on residents' health status, we designed an econometric model for empirical testing. In addition to higher education, income level, sex, age, marriage status, job industry, and other factors may also affect individuals' perception of happiness. Hence, we also need to control these variables based on the CGSS questionnaire. Based on the answers to the question, "what was your total income last year (2012)?" we obtain the values of the variable *income*. The value of the variable *sex* is 1 for male and 0 for female. The variable *age* is assigned as the respondent's age in 2013. As for the variable *marriage*, residents with "cohabitation" and "married" status are denoted as 1, while the others are denoted as 0. Based on the answers to the question, "what is your work experience and status?" we obtain the values of the variable *work*. For respondents in the non-agricultural industry, we assign the value of 1. Otherwise, we assign the value of 0. As shown in **Table 1**, we report main variables' descriptive statistics, such as mean, standard deviation, minimum, and maximum.

ESTIMATION METHOD AND RESULTS

Semiparameter Estimation Method of Ordered Probit Model

According to the questionnaire of CGSS 2013, we can adopt the maximum likelihood method of the ordered probit model because health condition is an ordered dependent variable. However, due to the fact that health conditions are subjective indicators, it is often difficult for an individual to judge them accurately. If those latent variables are grouped

precisely according to the integers from 1 to 5, there is reliability deviation. Therefore, the explained variables are redivided as:

$$s^* = \begin{cases} 1 & s < 3 \\ 2 & s = 3 \\ 3 & s > 3 \end{cases} \quad (1)$$

By transforming the above equation, s can be redivided into three non-overlapping intervals, s^* . The new variable s' is further normalized as follows:

$$s^* = \begin{cases} 1 & s' < \lambda_1 \\ 2 & \lambda_1 \leq s' \leq \lambda_2 \\ 3 & s' \geq \lambda_2 \end{cases} \quad (2)$$

For Equation (2), the probability of s^* taking a particular value can be calculated as follows:

$$pr(s^* = j) = \begin{cases} F(\lambda_1 - x_i'\beta) & j = 1 \\ F(\lambda_2 - x_i'\beta) - F(\lambda_1 - x_i'\beta) & j = 2 \\ 1 - F(\lambda_2 - x_i'\beta) & j = 3 \end{cases} \quad (3)$$

In Equation (3), $F(\bullet)$ is subject to normal distribution, λ_1 and λ_2 are the new interval partition value, x represents explanatory variables including higher education, and β represents the corresponding estimated coefficient. Next, s^* is taken as the explained variable to establish the ordered probit model. Then, the logarithmic likelihood function of this model is:

$$\ln L(\beta, \lambda_1, \lambda_2, \lambda_3) = \sum_{i=1}^n \sum_{j=1}^3 1\{s^* = j\} \ln [F(\lambda_{j+1} - x_i'\beta) - F(\lambda_j - x_i'\beta)] \quad (4)$$

In Equation (4), $1\{\bullet\}$ denotes the indicative function: it equals 1 when the condition in parentheses is satisfied; otherwise, it is 0. The coefficients β and the parameters λ_1 and λ_2 of the ordered response model can be estimated by maximizing the log-likelihood function. The commonly used ordered probit model assumes that the residuals follow a normal distribution, which is, however, often difficult to check. Stewart (2004) proposed that the semiparametric method could be used for correction. Assuming that the distribution function of ε is unknown, the ε density function can be simulated by the Hermit sequence

$f_k(\varepsilon) = 1/\alpha^* (\sum_{\rho=0}^k \gamma_\rho \varepsilon^{\rho^2})^{-2} \prod(\varepsilon)$. Furthermore, we can obtain the values of other parameters. It can be verified that when $k \geq 2$, the estimated coefficient is the same as that of the ordered probit model (Stewart, 2004). Therefore, $k = 3$ is the starting point of semiparameter estimation. In addition, given that the nested nature of semiparameter estimation, the likelihood ratio test (LR test) can be used to determine the necessity of semiparameter estimation.

TABLE 1 | Descriptive statistics of the main variables.

Variable	Mean	SD	Min	Max
Health	3.7205	1.0759	1	5
Education	0.1589	0.3656	0	1
Happiness	3.7363	0.9378	1	5
Age	48.9565	16.0763	17	97
Income	2.3873	3.6952	0	100
Sex	0.5108	0.4999	0	1
Marriage	0.8065	0.3950	0	1
Work	0.6981	0.4591	0	1

TABLE 2 | A test of high education's influence on residents' health.

	(1)	(2)	(3)	(4)
Education	0.2724 (6.76)***	0.1106 (2.56)**	0.3224 (4.58)***	0.1144 (2.73)***
Age	−0.0387 (−7.89)***	−0.0496 (−9.44)***	−0.0474 (−4.15)***	−0.0394 (−3.76)***
Happiness		0.2782 (6.38)***		0.2697 (3.84)***
Income		0.0313 (6.17)***		0.0237 (3.12)***
Sex		0.0822 (3.16)***		0.0750 (2.74)***
Marriage		0.1720 (4.87)***		0.1608 (3.56)***
Work		0.2568 (8.77)***		0.2536 (4.63)***
Log likelihood	−8256.7562	−8133.5294	−8255.1981	−8130.6683
P-value (LR)			0.0605	0.0167
Standard deviation			1.1201	1.0637
Skewness			−0.1016	0.6425
Kurtosis			2.6976	3.7317

*, **, and *** are significant at the 10, 5, and 1% levels, respectively. T-statistics is reported in brackets. The table reports LR test of ordinary OP model only, and P-value results from LR test.

Analysis of Estimated Results

To test the impact of higher education on residents' health, we established an econometric model, and the estimated results are shown in **Table 2**. The models (1) and (2) in **Table 2** are the estimated results of the traditional ordered probit model. In model (1), we only controlled the *age* variable apart from introducing the core explained variable *education*. Based on model (1), model (2) introduces variables such as *happiness*, *income*, *sex*, *marriage*, and *work*. The estimated coefficients of higher education variables in models (1) and (2) are significantly positive, indicating that residents with higher education have better health conditions. Since the general ordered probit model may have reliability deviation, models (3) and (4) are the estimation results of the semiparameter estimation method of the ordered probit model. LR test rejects the null hypothesis of ordinary parametric model, indicating that the semiparametric model is better. Such model needs to select the appropriate value of the parameter *k* in the residual distribution function. To this end, we increase *k* continuously from 3. Because the model corresponding to low-order *k* is nested in the model corresponding to high order *k*, LR test can be used to determine the appropriate *k* value. The nested LR test of both models shows that there is no significant difference in the estimated results of the model between *k* of 4 and 5, but there is significant difference in the estimated results of the model between *k* of 3 and 4, so the final value of *k* should be 4. Models (3) and (4) are the estimation results when *k* is 4. The estimated coefficient of *education* variable in the models (3) and (4) is still significantly positive, indicating that residents with higher education do have better health condition compared with those without higher education, which is basically consistent with our expectation. In **Table 2**, the estimated coefficient of *happiness* variable is also significantly positive, indicating that residents' *happiness* will also affect their subjective health assessment. The estimated coefficient of *age* variable is negative and significant at the level of 1%, indicating that the health condition of residents will

deteriorate with age. The estimated coefficients of *income*, *sex*, *marriage*, and *work* are also significantly positive, which is also in line with our expectations.

Next, the paper needs to test whether higher education can improve health condition by affecting residents' happiness. Following Mackinnon et al. (1995) and Preacher and Hayes (2008), we compare the coefficient of variable *education* in the model including variable *happiness* with that in the model excluding variable *happiness*, and it is widely assumed that *education* can exert effect on *health* by *happiness* when the coefficient in the model excluding variable *happiness* is bigger than that in the model including variable *happiness*. The models (5) and (6) in **Table 3** are the estimation results by using the general ordered probit model, and the results show that the coefficient of variable *education* become bigger when we drop variable *happiness*. Models (7) and (8) report the results by using semiparameter estimation method of ordered probit model. LR test shows that using the semiparametric estimation method is better. Nested LR test indicates that the model residual sequence *k* is 4. We still find that the coefficient of variable *education* becomes bigger when we drop variable *happiness*. Consequently, we can make sure *education* can exert effect on *health* by *happiness*.

GROUPING TEST AND CONTRIBUTION DECOMPOSITION

Grouping Test

As age is an important factor affecting the health of residents, the health status characteristics of residents in different ages are quite different. Therefore, we will divide our survey subjects into three groups according to their age: $\text{age} \leq 40$, $40 < \text{age} \leq 60$, and $\text{age} > 60$. The proportions of respondents who are receiving or have received higher education are 31.89, 9.29, and 5.75% respectively. **Table 4** reports the results obtained by using the semiparametric

TABLE 3 | The mechanism test based on the new method.

	(5)	(6)	(7)	(8)
Education	0.1106 (2.56)**	0.1414 (3.32)***	0.1144 (2.73)***	0.1422 (2.17)**
Happiness	0.2782 (6.38)***		0.2697 (3.84)***	
Age	−0.0496 (−9.44)***	−0.0256 (−29.94)	−0.0394 (−3.76)***	−0.0258 (−3.49)***
Income	0.0313 (6.17)***	0.0300 (5.96)***	0.0237 (3.12)***	0.0272 (4.36)***
Sex	0.0822 (3.16)***	0.0832 (3.20)***	0.0750 (2.74)***	0.0878 (2.39)**
Marriage	0.1720 (4.87)***	0.1038 (3.19)***	0.1608 (3.56)***	0.1254 (2.56)**
Work	0.2568 (8.77)***	0.2350 (8.07)***	0.2536 (4.63)***	0.2524 (3.12)***
Log likelihood	−8133.5294	−8138.1288	−8130.6683	−8127.4898
P value (LR)			0.0167	0.0000
Standard deviation			1.0637	1.5878
Skewness			0.6425	0.6411
Kurtosis			3.7317	2.3779

*, **, and *** are significant at the 10, 5, and 1% levels, respectively. T-statistics is reported in brackets. The table reports LR test of ordinary OP model only, and P-value results from LR test.

estimation method of ordered probit model. LR test shows that using the semiparametric estimation method is better. Nested LR test indicates that the model residual sequence k is 4. Models (9) and (10) in **Table 4** is the impact effect's estimation of higher education. The estimated coefficient of the *education* variable was significantly positive in the group $\text{age} \leq 40$, suggesting that residents with higher education had better subjective health assessment for this group. The estimated coefficient of *education* variable was positive but not significant in the group $40 < \text{age} \leq 60$ but negative in the group $\text{age} > 60$. Furthermore, if we observe estimates coefficient of *happiness* variable, we will find that the estimated coefficient changing trend with age appear contrary to *education* variable. The estimated coefficient of this variable was significantly positive in the group $\text{age} \leq 40$. With the increase in age, the estimated coefficient of this variable not only tends to become significant but also become large. This result indicates that, with the growth of age, the people who received higher education may suffer from irregular rest schedule (Zhao and Hu, 2016). Hence, the influence of higher education on residents' health status will be increasingly weakened, while the influence of psychological factors such as happiness perception on residents' self-rated health status will be more pronounced.

As shown in **Table 5**, we further compare the coefficient of variable *education* in models (12)–(14) with that in models (9)–(11) excluding variable *happiness*. **Table 5** shows that, in the group $\text{age} \leq 40$, coefficient of variable *education* become bigger when we drop variable *happiness*. However, in the group $40 < \text{age} \leq 60$ or $\text{age} > 60$, coefficient of variable *education* change little when we drop variable *happiness*. It means that, with the growth of age, mechanism of higher education to health status by improving residents' happiness become less salient. This is similar to the results in **Table 4**. With the growth of age, the people who received higher education may suffer from irregular rest schedule (Zhao and Hu, 2016). As a result, this reduces people's positive feeling.

In order to make sure grouping test results are robust, we retest the estimation by dropping variable *age*. On this condition,

TABLE 4 | Grouping test results I.

	(9) Age ≤ 40	(10) 40 < age ≤ 60	(11) Age > 60
Education	0.1608 (1.84)*	0.0190 (0.26)	−0.0138 (−0.53)
Happiness	0.2265 (1.75)*	0.2680 (5.37)***	0.3086 (3.21)***
Age	−0.0901 (−1.46)	−0.0163 (−0.25)	−0.1451 (−2.43)**
Income	0.0066 (1.06)	0.0557 (6.58)***	0.0854 (4.60)***
Sex	0.0966 (1.78)*	0.0962 (2.43)**	0.0739 (1.56)
Marriage	0.1949 (2.57)**	0.3022 (4.55)***	0.0680 (1.26)
Work	0.2748 (3.91)***	0.1878 (4.27)***	0.1864 (3.38)***
Log likelihood	−1721.3885	−3622.9714	−2700.8365
P value (LR)	0.0051	0.0000	0.0000
Standard deviation	1.9525	1.8988	1.5421
Skewness	−0.3272	0.4643	0.4422
Kurtosis	1.7571	2.1186	3.1578

*, **, and *** are significant at the 10, 5, and 1% levels, respectively. T-statistics is reported in brackets. The table reports LR test of ordinary OP model only, and P-value results from LR test.

the results in models (15)–(20) in **Table 6** show that, with the growth of age, the change in coefficients of variable *education* before and after dropping happiness is small. This means that the mechanism of higher education to health status by improving residents' happiness becomes less salient in elderly group.

Contribution Decomposition

The coefficient estimation results show that higher education has a complex impact on residents' health status. Furthermore, we will evaluate the importance of *education* variables by decomposing contribution rate. Since the multiple explanatory variables considered in this study include *education*, *happiness*, and *age*, there may be multicollinearity among these variables. This may lead to unreliable results using traditional decomposition methods based on regression coefficients (Fields,

2003). The newly developed Shapley value decomposition method can effectively overcome this problem, as it can measure the marginal contribution and contribution rate of explanatory variables (Israeli, 2007; Huettner and Sunder, 2012). The basic idea is that, when measuring the contribution of an explanatory variable, we first calculate the R^2 in the model that contains the explanatory variable and then remove the variable to observe the change in R^2 . The larger the change in R^2 is, the higher contribution rate of the variable is. Because there may be many different combinations of explanatory variables, Israeli (2007) and Huettner and Sunder (2012) suggest taking the average value of various combinations to obtain the marginal contribution or contribution rate.

For this study, the following is the main idea of Sharpley value decomposition. In the econometric model in this study, there are seven variables affecting health condition, which are denoted as x . Hence, x has 7! possible combinations, denoted

as set Θ . Let us assume $\theta \in \Theta$ is one from the set. When measuring contribution rate of *edu* variable, we assume that θ_{edu} is the position of *education* variable in the set θ , $P(\theta, \theta_{edu})$ is the set of variable set who is placed in front of θ_{edu} , denoted as $P(\theta, \theta_{edu}) = \{x \in X | \theta_x < \theta_{edu}\}$. Then, marginal contribution of *education* variable can be obtained by the following equation:

$$mc_{edu} = R^2 [P(\theta, \theta_{edu}) \cup edu] - R^2 [P(\theta, \theta_{edu})] \quad (5)$$

In Equation (5), $R^2(\bullet)$ represents R^2 of the regression equation, and mc_{edu} represents the marginal contribution of *education* variable. Furthermore, the contribution rate of *education* variable can be defined as follows:

$$s_{edu} = mc_{edu} / R^2 [P(\theta, \theta_{edu}) \cup edu] \quad (6)$$

In the equation above, S_{edu} is the contribution rate of *education* variable. Then, we need to calculate S_{edu} under various combinations so as to obtain the average contribution rate.

$$S_{edu} = \sum_{\theta \in \Theta} s_{edu} / 7! \quad (7)$$

Using the Sharpley value decomposition method, we obtained the contribution rate of *education* variable and other variables affecting residents' health status. The results are shown in Table 7. In the overall sample, *age* variable is the most important factor affecting physical condition, and contribution rate is 60.12%. The second is residents' happiness, with a contribution rate of 14.00%, indicating that residents' subjective happiness is also an important factor affecting their health condition. The contribution rate of higher education (*education*) is 5.56%, ranking the fifth in the seven variables, indicating that the impact of higher education is relatively small. Table 7 shows that main influencing factors vary with the growth of age.

TABLE 5 | Grouping test results II.

	(12) Age ≤ 40	(13) 40 < age ≤ 60	(14) Age > 60
Education	0.2558 (2.28)**	0.0183 (0.24)	−0.1610 (−0.83)
Age	−0.0387 (−4.96)***	−0.0218 (−3.34)***	−0.0249 (−4.90)***
Income	0.0327 (3.35)***	0.0785 (5.65)***	0.2132 (3.03)***
Sex	−0.1255 (−1.63)	0.0892 (1.97)**	0.0870 (1.00)
Marriage	0.1083 (1.07)	0.2880 (3.50)***	0.0744 (0.79)
Work	0.3094 (3.35)***	0.2242 (2.90)***	0.2786 (2.84)***
Log likelihood	−1788.0027	−3617.5107	−2690.1974
P-value (LR)	0.0002	0.0001	0.0000
Standard deviation	1.9428	2.0010	1.8666
Skewness	−1.5080	0.0964	−0.3501
Kurtosis	4.6272	1.8673	2.3516

*, **, and *** are significant at the 10, 5, and 1% levels, respectively. T-statistics is reported in brackets. The table reports LR test of ordinary OP model only, and P-value results from LR test.

TABLE 6 | Grouping test results III.

	(15) Age ≤ 40	(16) 40 < age ≤ 60	(17) Age > 60	(18) Age ≤ 40	(19) 40 < age ≤ 60	(20) Age > 60
Education	0.2107 (1.85)*	0.0517 (0.72)	−0.1453 (−0.81)	0.2481 (2.42)**	0.0578 (0.78)	−0.0179 (−0.07)
Happiness	0.3023 (2.69)***	0.3529 (6.90)***	0.4572 (5.50)***			
Income	0.0024 (2.24)**	0.0632 (4.76)***	0.1238 (3.82)***	0.0255 (2.29)**	0.0796 (6.99)***	0.2718 (7.53)***
Sex	0.1311 (1.77)*	0.0921 (2.34)**	0.2071 (2.64)***	−0.1578 (−1.75)*	0.0724 (1.79)*	0.0252 (0.31)
Marriage	−0.1934 (−1.42)	0.1752 (2.71)***	0.1481 (1.47)	−0.2293 (−2.40)**	0.2873 (4.55)***	0.1466 (1.74)*
Work	0.2821 (1.67)***	0.1792 (3.65)***	0.2937 (2.89)***	0.3698 (2.48)**	0.2418 (4.33)***	0.2451 (2.38)**
Log likelihood	−1925.4324	−3524.9133	−2563.1475	−1805.8096	−3634.4103	−2693.4222
P-value (LR)	0.0001	0.0000	0.0000	0.0001	0.0000	0.0000
Standard deviation	1.1736	1.8933	2.0413	1.5089	2.0989	2.3351
Skewness	−0.3732	0.4331	0.5807	−1.4094	−0.0558	−0.3307
Kurtosis	3.0074	1.9891	2.5003	4.3405	1.6487	1.8647

*, **, and *** are significant at the 10, 5, and 1% levels, respectively. T-statistics is reported in brackets. The table reports LR test of ordinary OP model only, and P-value results from LR test.

TABLE 7 | Decomposition of contribution rate (%).

	Whole sample	Age ≤ 40	40 < age ≤ 60	Age > 60
Education	5.56	10.92	4.42	1.69
Age	60.12	29.03	17.92	8.59
Happiness	14.00	38.49	39.62	45.12
Income	5.70	4.32	12.91	21.24
Sex	1.03	1.85	4.47	3.92
Marriage	0.99	3.29	5.43	2.51
Work	12.61	12.10	15.23	16.93

The contribution rate of *education* and *happiness* variables are, respectively, 10.92 and 38.49% in the group age ≤ 40 , and 4.42 and 39.62% in the group 40 < age ≤ 60 . For residents who are older than 60, the contribution rate of *education* variable was 1.69%, and the contribution rate of *happiness* variable was 45.12%. Similar to the estimated results using the semiparametric estimation method of ordered probit model, the Shapley value decomposition results show that with the growth of age, the impact of higher education on residents' health tends to be weakened, and the impact of residents' subjective happiness and other psychological factors on physical health becomes more and more important.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Based on the sample data obtained from Chinese General Social Survey (CGSS) in 2013, our study empirically investigates the impact of higher education on health condition of residents. For empirical testing, we adopt the semiparametric estimation methodology of ordered probit model. Our empirical results show that residents with higher education are indeed in better health conditions than those without higher education. Furthermore, residents' happiness significantly affects their health conditions. Moreover, because higher education will affect residents' happiness perception, it will have a long-term impact on residents' health status. We conduct grouping tests, and the results show that with the increase in age, the influence

of residents' happiness on subjective health assessment is more salient. However, the mechanism by which higher education improves health status by improving residents' happiness become less salient. Finally, our results of Shapley value decomposition also demonstrate that happiness is increasingly more important to residents' health with the increase in age.

In short, our empirical results reveal that higher education has a significant and positive causal effect on health conditions. Our results lead to the following policy insights. First, improving education level is an important way for developing countries to improve their citizens' health conditions. Therefore, in developing countries, it is necessary to continue to develop higher education, especially to provide fair education opportunities for vulnerable groups. Second, with the growth of age, the mechanism of higher education to health status by improving residents' happiness become less significant. This means that it is useful to help younger people learn more about health management in order to minimize their future unhealthy lifestyles. Third, our results confirm that happiness is a critical factor that influences health in elderly group. Since happiness is a subjective feeling to a large extent, it is not only necessary for a developing country to provide various economic support policies for elderly citizens but also to develop a national psychological counseling service system.

DATA AVAILABILITY STATEMENT

Publicly available datasets were analyzed in this study. This data can be found here: <http://cgss.ruc.edu.cn/>.

AUTHOR CONTRIBUTIONS

HT conceived the main idea of the theoretical mechanism and manuscript drafting. JL did the literature review and related empirical analysis. MZ provided main idea of the revised manuscript. All authors contributed to the article and approved the submitted version.

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The Hummingbird Project: A Positive Psychology Intervention for Secondary School Students

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Mental health in schools has attracted a lot of attention in recent years. Positive Psychology Interventions (PPIs) in secondary schools have been shown to improve mental health outcomes for students. Previous PPIs have tended to be delivered by trained Psychology specialists or have tended to focus on a single aspect of Positive Psychology such as Mindfulness. The current study involved 2 phases. Phase 1 was a pilot PPI, delivered by current university students in Psychology, which educated secondary school students ($N = 90$) in a variety of Positive Psychology concepts. Phase 2 involved delivering the PPI to secondary school students ($N = 1,054$). This PPI, the Hummingbird Project, led to improvements in student well-being, as measured by the World Health Organization Well-Being Index (WHO-5). The intervention also led to improvements in student resilience, as measured by the Bolton Uni-Stride Scale (BUSS), and hope, as measured by the Children's Hope Scale (CHS). Results are discussed in the context of their implications for the future of psychological intervention in secondary school settings.

Keywords: school, happiness, well-being, Positive Psychology, child, adolescent, universal, preventative

INTRODUCTION

Children spend significantly more time in school compared to any other formal institution during their lives (Rutter et al., 1979), though school hours have changed very little in the last 40 years (Symonds and Hagell, 2011). Consequently, schools play a major role in children's development, including relationships, cognitive development, social skills, academic attainment, emotional, and behavioral control (Fazel et al., 2014). As such schools have increasingly been the prime target of interventions designed to improve young peoples' mental health (Wyn et al., 2000). It was argued by Champion et al. (2012) that mental health and mental disorder are distinct. Absence of one does not imply the presence of the other. However, prevention of mental disorder is closely associated and can be considered as a product of promoting mental health and resilience. It is considered that health, social and economic benefits are products of positive mental health (Lyubomirsky et al., 2005; Keyes, 2007). The following factors are associated with positive mental health; improved educational attainment, greater productivity, reduced mortality, increased social interaction and

engagement, reduced risk of suicide and mental illness, reduced likelihood of risk-taking behavior, and increased levels of resilience to adversity (Campion et al., 2012).

According to World Health Organization statistics (WHO, 2008), in the United Kingdom, mental disorder accounts for 22.8% of the total health burden, cancer for 15.9% and cardiovascular disease 16.2%. These findings can be seen as alarming and could impact on the UK's future social and economic stability. It has been shown that 50% of lifetime mental illness starts by age 14 and 75% by the mid-20s (Kessler et al., 2007). As such, early interventions for the prevention of mental disorder during childhood and adolescence could prove helpful. In the UK more than one in 10 children and young people are reported to have a mental health disorder at any one time (Green et al., 2005). Mental health costs the UK economy £70–100 billion each year, or 4.5% of its Gross Domestic Product (GDP) (Goldie et al., 2016). A longitudinal study analyzed the data of 17,634 children from England, Scotland and Wales, and found associations between childhood psychological problems and the ability of affected children to work and earn as adults (Goodman et al., 2011).

The British Office for National Statistics has shown that the North West of England contains five of the 10 most deprived local authorities in England (Gill, 2015). The proportion of the population in England who are in the most deprived group varies from a low of 7.3% in the South East to a high of 32.8% in the North West (Newton et al., 2015). Deprivation has been linked to a variety of negative outcomes in both physical and mental health. It is reported that the UK is facing a significant level of mental health inequality despite major government policy initiatives (Grey et al., 2013). In parallel, there has been a reduction in National Health Service (NHS) expenditure on specialist mental health care since 2008 (Docherty and Thornicroft, 2015). Some local authorities have experienced reductions in spending of up to 32%. The report claims that this spending reduction has contributed to a 48% decrease in the number of people with mental illnesses receiving appropriate care. This reduction is also present in Child and Adolescent Mental Health Services (CAMHS). A survey of members of the Faculty of Child and Adolescent Psychiatrists into experiences of admitting young people to inpatient units (Hindley, 2014) showed 77% of respondents had experienced difficulties when accessing admissions to inpatient beds. Some 79.1% reported experiencing safeguarding concerns or incidents whilst waiting for a bed and 76% reported that a lack of beds had led to young people with unacceptably high-risk profiles being managed in the community. Finally, 61.9% reported that they had experience of young people being held in inappropriate settings. The mental health outcomes of children across the country will suffer due to issues such as these.

Recent research highlights an unprecedented increase in childhood and adolescent depression among Western countries. At any point of time, approximately 2% of children aged 11–15 and 11% of youth aged 16–24 are suffering from a major depressive disorder in the UK (Green et al., 2005). Boniwell and Ryan (2012) argue that wealthier countries appear to invest relatively little in protection for the safety

of young people. In 2007, a UNICEF report presented an overview of child well-being in rich countries, where the UK was in the bottom third of the list of 21 countries. The UK did in fact come last under the dimension of subjective well-being, where children ranked their opinion of their health, interest in schools, and subjective view of their personal well-being. This alone shows the need to intervene in Britain's schools.

Over the last 20 years, Positive Psychology (PP) has developed a science of well-being (Seligman, 2002) and a growing body of empirical evidence supports Positive Psychology Interventions (PPIs). The first manualized treatment interventions are now being produced (Slade et al., 2017; Rashid and Seligman, 2018). There are core pillars behind the PP-based well-being approaches such as the science of character strengths, health, achievement, and a range of other positive outcomes (Niemiec, 2013). Well-being interventions can have a preventive effect on depression, anxiety, and other mental health disorders.

A systematic review and a meta-analysis conducted by Werner-Seidler et al. (2017) included 81 studies conducted in schools where students had undergone some sort of depression and anxiety prevention program. It identified three UK based studies whereas there were 27 studies from America and 20 studies from Australia. The UK needs to expand its provision. The need for a scientific basis for these interventions is considered critical. The assessment of the intervention should be carefully designed to yield accurate results. Classroom-based intervention studies are mainly either universal or targeted. There is evidence from previously effective studies to demonstrate that a combination of universal and targeted interventions may have a positive impact. The BRIDGE program links mental health and education in urban schools. Conclusions from a randomized controlled study (Fazel et al., 2014), showed the program was effective at the classroom and individual level and resulted in positive outcomes. The program was developed and designed in New York and targeted at elementary level schools (Cappella et al., 2012). There is a need for an empirically tested intervention in the UK school context. An obstacle to the implementation of evidence-based interventions in school settings is “poor engagement” of all necessary parties such as school staff, counselors, and support staff. There are also other challenges such as individual factors (e.g., stigma, risk factors, parental issues), community-related factors, and system-related factors such as access to funding, waiting times, and availability of training (Fazel et al., 2014).

Building happiness into the school curriculum can be a successful approach to intervening in student mental health (Boniwell et al., 2016). This can be achieved by having PPIs that run as a year-round addition to the timetable (Shoshani and Steinmetz, 2014). Approaches such as these require support on a number of levels to embed PP into teacher training, school leadership training, and into the system-wide educational culture (Waters, 2011). The costs involved could be prohibitive. Shorter-term PPIs that are not embedded in the school curriculum have shown mixed results (Suldo et al., 2014). There is an insufficient evidence base to support the widespread adoption of PPIs in schools (Dawood, 2013). However, there remains

cause for optimism as some PPIs have been shown to effectively increase students' motivation to study and enhance their academic performance (Muro et al., 2018). A review of Brief PPIs has shown that they can be successfully implemented and demonstrate a diverse range of benefits to students in terms of their learning and their well-being (Shankland and Rosset, 2017). However, these brief PPIs typically focus on a single aspect of PP such as gratitude (Froh et al., 2009), character strengths (Quinlan et al., 2015), or mindfulness (Sapthiang et al., 2019). One intervention that has been shown to be effective in improving mental health outcomes, which operates by improving social and emotional skills, is KidsMatter (Littlefield et al., 2017). KidsMatter has also been shown to be favorable to pupils. Insufficient consideration of children's views can result in a disparity between what young people say about their lives and their needs and what problems are targeted by an intervention (Kidger et al., 2009). This might then result in pupils having negative views of existing support. If children do not view an intervention as being confidential, available to all, or sympathetic to their needs, this issue can be exacerbated. Stigma was one of the main concerns highlighted by the children who took part in this study. These children were wary of being seen or treated differently than their peers. Kidger et al. (2009) showed that this fear has the potential to create a significant barrier, preventing children from accessing a particular source of support. Findings of this type highlight the importance of ensuring that pupils are informed and have readily available information about what interventions and services are provided. It is recommended that pupils' opinions of services are surveyed so that provision can be altered to better meet their needs.

Whole-school reviews of values, policies, and practices suggest that schools use separate initiatives alongside mainstream teaching to address mental well-being (Spratt et al., 2006). The report suggests that schools should employ specialist mental health workers to build a school climate that benefits all pupils. Embedding a holistic approach to mental health into standard teaching practice has been shown to improve outcomes for a range of age groups (White and Waters, 2015). Using this holistic approach and focusing less on mental health specialization could potentially help educators to build relationships with the children they teach such that they can identify and intervene in their well-being since, in this circumstance, it is the people who teach the children who intervene in their mental health. The qualities children and adolescents consider most important in mental health professionals (Farnfield and Kaszap, 1998) are general helpful qualities, counseling skills, an ethical stance, and providing helpful outcomes. What matters most to children is not the profession of the adult but that the adult possesses these qualities. However, unless it comes with a recommendation from a colleague whose opinion they respect, Head Teachers find it difficult to know whether a service being offered is of sufficient quality (NAHT/Place2Be, 2017).

Child and adolescent academic and mental health functioning can be promoted and improved by both mental health identification programs and prevention programs when delivered in schools (Levitt et al., 2007). Who will deliver these programs?

In real terms, the Department for Education budget was cut by 7.4% between 2010 and 2016 (Crawford and Keynes, 2015). This lack of money for schools leads to staff feeling unable to deal with pupils' mental health adequately. Studies have found that many teachers report their jobs as being very or extremely stressful (Nagel and Brown, 2003). While teachers in Norway report high job satisfaction, they also report suffering from severe stress and even exhaustion (Skaalvik and Skaalvik, 2015). Initial teacher training in mental health is varied at best. In many cases, it is non-existent (Byrne et al., 2015). Teachers require appropriate knowledge, skills, and attitudes if they are to recognize mental health problems (Whitley et al., 2013). Teachers also need to be aware of what steps need to be taken to integrate the affected pupils in activities in the classroom and to obtain for them the care they require. When children display both internalizing and externalizing of their problems, teachers are able to identify possible mental illness (Vieira et al., 2014). However, the same study demonstrated that this was not the case when children only showed internalizing behaviors. There is room for cautious optimism, as at least half of teachers involved in the study could identify problem cases and make the appropriate referral, with the correct training. Indeed, 60% of teachers who failed to identify typical adolescent behaviors at the beginning of the study were able to be trained in this skill. Training educators in order to improve their knowledge of, and attitudes to, mental illness has been highlighted as an important next step (Kutcher et al., 2013). Improving educator knowledge and attitudes is also highlighted as an important next step so that schools can provide effective mental health promotion and prevention. It may be more prudent to find low-cost interventions that can be delivered with minimal training.

Before intervening in the situation described above, it was decided that it would be helpful to scope the opinions of Head Teachers and Special Educational Needs Coordinators (SENCOs) regarding the main causes of mental ill-health amongst school-aged children in the North West of England. Scoping looked at the current situation in children's mental health services, as well as mental health interventions in the region's schools. This might clarify areas where intervention into children's mental health was most needed and inform the direction of both future research and interventions.

Results from the scoping study showed educators considered deprivation as the main cause of mental ill-health in children and adolescents in the North West of England. This confirms a relationship between deprivation and a range of health outcomes. Family issues, including domestic violence and divorce, were more likely to be experienced by deprived children. These problems were seen as being exacerbated by deprivation, though they were not seen as being exclusive to deprived children. This is consistent with previous research demonstrating the relationship between deprivation, family dissolution, and academic performance (Downey, 1994; Pong and Ju, 2000). Scoping also showed that educators believed there was a skills gap when it came to dealing with mental health problems in children in the North West of England. Educators saw this skills gap as being exacerbated by a lack of money, staff, and training for school staff to provide for child and adolescent mental health.

This shows that a unique resource burden is associated with attempting to embed mental health interventions in schools (Fazel et al., 2014). Educators in the North West of England felt underfunding meant children were being failed both at school and in specialist mental health services. These educators see specialist mental health services as failing to meet the needs of the pupils at their schools. They believed that waiting times were too long for such services to be of use to children. This is consistent with existing research (Frith, 2016).

Theoretical Framework

Based on the issues discussed above, a new psycho-educational PPI, the Hummingbird Project, was created and piloted in two schools in Greater Manchester. The hope here was that an intervention could be created that would overcome the issues raised whilst incorporating the factors highlighted as being important when intervening in child and adolescent mental health in a school setting. The study used a theoretical approach grounded in PP. It was anticipated that teaching children and adolescents concepts from PP and allowing them to practice activities based on these concepts at home would lead to an improvement in well-being. The approach taken was empirically based. However, given the funding and time pressures in the educational setting discussed above, it was deemed impractical to perform a full randomized controlled trial. Therefore, a pragmatic approach using within-subject comparisons was necessary.

Aim and Research Question

The aim of the current study was to deliver a short, evidence-based PPI in High Schools that could be replicated by school staff with minimal training. This would be achieved by recruiting schools in the North West of England to participate in the intervention and delivering the intervention, with the assistance of MSc and BSc Psychology students from two local universities. The PPI would then be evaluated using standardized measures, administered to participants in the first and last sessions. In this way it was hoped to answer the research question: Can a short, multi-component PPI be successfully delivered in Secondary Schools in the North West of England to improve well-being in pupils?

MATERIALS AND METHODS

The PPI involved 8 weekly 1 h sessions, taking place in the two schools during normal timetabled hours, delivered by MSc Psychology students. Session 1 involved an introduction to the program for students and teachers. Sessions 2–7 covered a range of concepts from Positive Psychology. These sessions covered happiness and well-being, grit and resilience, growth mindsets and character strengths, mindfulness, mental health problems and stigma, and hope and gratitude, respectively. The final session involved an overview and recap of the topics covered as well as advice for students on how to use the concepts discussed during the PPI in their everyday lives.

Participants

The pilot PPI involved an opportunity sample of 90 students from two schools. Participants were recruited by emailing the Head Teachers and SENCOs of several schools in the region. Inclusion criteria were studying at a secondary school and a willingness to take part in the study. Participant ages ranged from 11 to 16 and 66% were female. Each student received a workbook in which they could record all of the work they did in sessions and at home, as well as any thoughts and feelings they had about the experience. They also received questionnaires as outcome measures.

Instruments

Questionnaires included four standardized quantitative measures. These were:

- (1) The World Health Organization-Five Well-Being Index (WHO-5) (Staeher, 1998), a five-item well-being scale on which items are measured on a six-point Likert scale (0 = at no time; 5 = all of the time). WHO-5 Cronbach's Alpha = 0.84 and an example item is "I have felt cheerful and in good spirits." The WHO-5 has been validated as a measure of well-being for adolescents (De Wit et al., 2007) using confirmatory factor analysis ($r = 0.60$, $p < 0.01$).
- (2) Grit was measured using the Grit Scale (GRIT) (Duckworth et al., 2007), a 12-item scale on which items are measured on a five-point Likert scale (1 = not like me at all; 5 = very much like me). GRIT Cronbach's Alpha = 0.77 and an example item is "Setbacks don't discourage me." Duckworth et al. (2007) demonstrated the validity of the GRIT scale using confirmatory factor analysis (chi-square (19, $n = 1,554$) = 188.52, $p < 0.01$). They also demonstrated 1 year test-retest stability for children and adolescents ($r = 0.68$, $p < 0.01$).
- (3) The Bolton Uni-Stride Scale (BUSS) (Kannangara et al., 2020) was used to measure academic tenacity. The BUSS is a 12-item scale on which items are measured on a five-point Likert scale (1 = not like me at all; 5 = very much like me). Cronbach's Alpha = 0.64 and a sample item is "I consider myself as persistent and hard-working." Using a sample of 340 undergraduate students, Kannangara et al. (2020) demonstrated that the BUSS has good internal consistency (Cronbach's alpha = 0.74) and 3-week test-retest reliability (Cronbach's alpha = 0.70 for the Tenacity subscale and 0.77 for the Self-composure subscale).
- (4) The Children's Hope Scale (CHS) (Snyder et al., 1997), a measure of hope that uses six items on a six-point Likert scale (1 = none of the time; 6 = all of the time). CHS Cronbach's Alpha = 0.91 and an example item is "I can think of many ways to get the things in life that are most important to me." Snyder et al. (1997) demonstrated that the CHS has high internal consistency (Cronbach's alpha = 0.72–0.86) and high temporal stability [$r(359) = 0.17$, $p < 0.01$].

Data Collection Procedures

Outcome measures were administered to participants at the start of session 1 and the end of session 8 of the PPI. Participants were asked to be as honest as possible and informed of their right to withdraw from the study. They were informed that school grades would not be affected by participation in the study or by their answers to the questions. Upon completion of pre- and post-intervention questionnaires, questionnaires were coded as stated above, with negatively coded items being reverse scored. Only the GRIT and BUSS scales contained negatively coded items. An example of a negatively coded item from the GRIT scale is item 2, “New ideas and projects sometimes distract me from previous ones.” An example of a negatively coded item from the BUSS is item 4, “Sometimes I know that my actions are wrong, but I cannot stop myself.”

Data Analysis Procedures

Data was analyzed using SPSS (version 25). Using this statistical program, descriptive statistics were generated and reliability analyses were conducted for all scales. Kolmogorov-Smirnov tests showed that data were normally distributed for all four scales; WHO-5 $D(88) = 0.08$, $p = 0.20$, GRIT $D(31) = 0.13$, $p = 0.20$, BUSS $D(53) = 0.09$, $p = 0.20$, CHS $D(87) = 0.09$, $p = 0.16$. Therefore, paired samples t -tests were conducted to compare scores on the four scales before and after participation in the PPI and to analyze the impact of the PPI.

RESULTS

Paired sample t -tests were performed. **Table 1** shows descriptive statistics for these tests. The only measure on which a statistically significant change was found was the WHO-5, showing that participants' levels of well-being had improved over the 8 weeks of the Hummingbird Project. Cohen's d shows a small to medium effect size on this measure. Changes in the other measures used were shown not to be statistically significant. However, there were small positive improvements on all of the measures used.

DISCUSSION

Although the only statistically significant change was found on the WHO-5, there were small positive improvements on all the measures used. Therefore, it was felt that there was some basis for rolling out the Hummingbird Project to a larger

cohort of secondary school children. However, before this took place, the PPI was revised to improve its efficacy. The session on mental illness and stigma was removed as these subjects were not consistent with a PPI. This session was replaced with a short discussion with participants regarding stigma, taking place in session 1. It was felt that this would allow students to raise any questions or concerns they might have regarding mental illness. The decision was taken to shorten the length of the PPI as many half-terms in the standard academic calendar are shorter than 8 weeks. Therefore, the intervention might be interrupted by a break of a week or more. Having the sessions take place on consecutive weeks would keep the ideas fresh in students' minds and allow them to consider them together. It was also decided that the GRIT scale should be removed from the evaluation questionnaires. The GRIT scale was removed for three reasons. Firstly, the scores on this scale showed very little change. Secondly, the GRIT scale and the BUSS scale measure similar constructs. Thirdly, it was felt that reducing the length of the questionnaires would compensate for the time lost in reducing the length of the PPI in order to better teach students about the concepts in question.

The main study involved altering the PPI with consideration of feedback from parents, teachers, students, and researchers, as well as results from the scales used, to improve its efficacy. The intervention was then rolled out to a larger number of schools in the local area and assessed using similar scales along with open-ended questioning of students and teachers.

MATERIALS AND METHODS

The revised Hummingbird Project was shortened to involve 6 weekly 1-h sessions, taking place during normal timetabled hours, delivered by a single researcher, with support from undergraduate and MSc Psychology students. Session 1 involved an introduction to the PPI for students and teachers and a discussion of stigma around mental illness. Sessions 2–5 covered concepts from Positive Psychology. These sessions took place with students, with the sessions covering happiness, resilience and character strengths, hope, growth mindsets and gratitude, and mindfulness, respectively. The final session included an overview of the topics covered and advice for students on how to build on the concepts for the future, as in the pilot.

Participants

Participants in the main study were an opportunity sample of 1,054 students at 14 schools in the North West of England. Participants were recruited by emailing the Head Teachers and SENCOs of several schools in the region. Inclusion criteria were studying at a secondary school and willingness to take part in the study. Students were selected by their respective schools, without researcher input, using a range of criteria. These included; form group, Personal, Social and Health Education (PSHE) group, timetabled lesson group, or perceived need for intervention. Participant ages ranged from 11 to 18 and 57% were female. Each

TABLE 1 | Descriptive statistics for pilot study.

Scale	n	Start mean	SD	End mean	SD	t	p	Cohen's d
WHO-5	64	10.55	5.71	11.86	6.16	-2.71	0.01	0.34
Grit	29	37.07	6.98	37.14	7.18	-0.07	0.95	0.01
BUSS	32	33.50	6.38	34.50	7.25	-1.42	0.17	0.25
CHS	63	20.06	7.76	21.13	8.08	-1.71	0.09	0.22

student received a workbook in which they could record all of the work they did in sessions and at home, as well as any thoughts and feelings they had about the experience. They were also given questionnaires as outcome measures.

Instruments

Questionnaires contained three standardized quantitative measures. These were the same battery of scales used in the pilot project, minus the GRIT scale.

Data Collection Procedures

Outcome measures were administered to participants at the start of session 1 and the end of session 6 of the PPI. As in the pilot study, participants were asked to be as honest as possible and informed of their right to withdraw from the study. They were informed that school grades would not be affected by participation in the study or by their answers to the questions. Upon completion of pre- and post-intervention questionnaires, questionnaires were coded as stated above, with negatively coded items being reverse coded. Only the BUSS contained negatively coded items.

Data Analysis Procedures

Data were analyzed using SPSS (version 25). Descriptive statistics were generated and reliability analyses were conducted for all scales. As parametric tests have been demonstrated to be valid for large sample sizes due to the central limit theorem (Lumley et al., 2002), paired-samples *t*-tests were conducted to compare scores on the three scales before and after participation in the PPI and to analyze the impact of the PPI. A one-way MANOVA was also performed in order to investigate whether student selection type had an impact on the PPI's impact on outcome measures.

RESULTS

Paired sample *t*-tests were performed. **Table 2** shows descriptive statistics from these tests. Results from the Hummingbird Project main study show that the PPI resulted in a positive change in all of the outcome measures in pre- and post-intervention testing, showing the average child has seen an improvement in their well-being (WHO-5), an improvement in their level of resilience (BUSS), and an increased level of hope for the future (CHS).

It was then decided that it might be useful to investigate whether student selection type had an impact on the PPI's impact on outcome measures. A one-way MANOVA was performed. **Table 3** shows descriptive statistics for this MANOVA. A significant multivariate main effect was found for well-being (WHO-5), $F(1, 652) = 6.748, p = 0.010$. The same MANOVA

revealed a significant multivariate main effect for resilience (BUSS), $F(1, 579) = 8.73, p < 0.01$. There was also a significant multivariate main effect for hope (CHS), $F(1, 643) = 38.50, p < 0.01$. These results show that the well-being, resilience, and hope, of students selected based on perceived need were all improved significantly more by the Hummingbird Project than those of the students who took part in the project in groups that they would ordinarily be in during a normal school day.

DISCUSSION

Results shown in the main study of the Hummingbird Project are promising, with positive improvements on all outcome measures. Results show small effect sizes across all of these factors, with the largest effect size being 0.24. Over time, the effects found here might increase. Once participants have had time to reflect on the knowledge they have gained during the course of the PPI and practice the skills and techniques that they have learned in the 6 weeks of sessions, they may become more skilled in attending to their own mental health. Follow-up testing would be needed to test this. Budget and time constraints meant this was not possible during year 1 of the main study of the Hummingbird Project. Later phases of the project may provide time and money, and some of the schools involved in the PPI have expressed openness to including follow-up testing. A meta-analysis of meta-analyses conducted by Tanner-Smith et al. (2018) found universal prevention programs of this type, delivered to school-aged children, have effect sizes within the range of 0.07–0.16. Therefore, the results found in the current study show that the Hummingbird Project has a comparatively large effect on the mental health of participants. Given that school-based preventative interventions in the UK have been shown to have a cost-benefit ratio of at least 1:10 and potentially more than 1:80 (Arango et al., 2018), the Hummingbird Project might potentially have a large effect on the mental health of school-aged children, at a very encouraging cost-benefit ratio. The project was also delivered by a single member of staff without specialist doctoral training, with the support of current MSc and BSc level students, demonstrating such interventions do not require large amounts of previous training. As noted earlier Farnfield and Kaszap (1998), stated the factors that young people look for in those who intervene in their mental health are their personal qualities not the profession of the trainer. Also, considering the findings regarding the high levels of teacher stress (Skaalvik and Skaalvik, 2015) and the lack of teacher training in mental health (Byrne et al., 2015) previously mentioned, having an intervention that is easily delivered by staff with minimal training has the potential to have a positive effect on staff well-being (or at least mitigate the negative effect that other, more labor-intensive interventions might cause) as well as improve student mental health.

A number of issues arose during the delivery of the Hummingbird Project. One such issue was that low budgets led to shortages in time, space, and resources in schools across the country. These shortages can have a negative impact on the ability to effectively deliver a PPI in those schools. Hence a tolerance

TABLE 2 | Descriptive statistics for main study.

Scale	n	Start mean	SD	End mean	SD	t	p	Cohen's d
WHO-5	657	12.47	5.43	12.94	5.95	−2.46	0.01	0.1
BUSS	584	36.63	7.03	37.23	6.44	−2.84	0.01	0.12
CHS	647	20.32	6.76	21.64	6.89	−6.11	< 0.01	0.24

TABLE 3 | Descriptive statistics for main study by student selection type.

	Scale	n	Start mean	SD	End mean	SD	t	p	Cohen's d
Non-selected	WHO-5	338	13.42	5.15	13.68	5.73	−0.99	0.32	0.11
	BUSS	312	38.11	6.70	38.61	6.47	−1.80	0.07	0.20
	CHS	344	21.78	6.30	22.85	6.45	−3.85	<0.01	0.42
Selected	WHO-5	301	11.42	5.54	12.16	6.08	−2.60	0.01	0.30
	BUSS	269	35.04	7.10	35.81	6.08	−2.31	0.02	0.28
	CHS	301	18.70	6.88	20.33	7.09	−4.80	<0.01	0.55

has been built into this project, allowing individual sessions to be shorter or longer than originally intended. In this way, should an unexpected problem arise, a particular activity can be altered, or an alternative activity might be introduced. One problem that was encountered when delivering the PPI in schools in the half-term before Christmas was that schools had seasonal events, exams, and double-booked rooms, leading to disruptions and missed sessions. An unforeseen issue was that students are used to questions being asked in the school setting having well-defined, right and wrong answers. Students were reluctant to answer questions about their own experiences and opinions, not only due to concerns about revealing personal information to peers and staff but also because they were concerned they might give the “wrong” answer. To overcome this reluctance, at all opportune moments, the anonymity and privacy afforded by the PPI were highlighted, as well as the subjective nature of happiness, and the fact that the PPI sessions are a safe place to discuss thoughts and feelings. Another issue that arose whilst delivering the PPI was that schools were inclined to assign students to the project according to perceived need for some kind of intervention into their mental health. This may be due to the reductions in school and CAMHS’ budgets discussed previously. These budget reductions have led to insufficient mental health interventions. Therefore, schools might be more likely to assign students with perceived mental health problems to an intervention such as the Hummingbird Project as these children are not receiving the care they require. However, this is problematic in the case of the Hummingbird Project. The project has been designed to be a universal intervention for all students. It is not intended to target children with severe mental health problems and therefore it may not be appropriate for these children. Previous research shows that when students are targeted for intervention based on perceived need, they tend to respond poorly to the intervention (Salerno, 2016) as they feel that they are being stigmatized and therefore are more likely to act out or even fail to complete the intervention. Close to half (509) of all the students who took part in the current study were selected by their schools based on a perceived need for mental health intervention. However, the results above show that these students actually showed larger increases in the scores on all measures than the students who were in groups they would usually be in during a normal school day. These results are encouraging as it shows that the project can potentially be used to improve the mental health of school-aged children with existing mental health problems. These results also show that teachers know their students well and are well-placed to identify students who require intervention into their mental

health, since the pre-intervention scores of the selected students were significantly lower on all measures than those of the students who were in their usual groups. This was also true at post-test. Selected students showed larger improvements in their scores than non-selected students. The improvements in scores of the selected students were all statistically significant, whereas those of the non-selected students only showed significant improvements in their levels of hope (CHS). However, the results found here might be the result of a ceiling effect that limits the ability of the PPI to improve the mental health of those students who are already flourishing.

The Hummingbird Project compares quite favorably to the limited number of PPIs that have been delivered in school settings. A much smaller study of a multi-component PPI in schools showed similarly positive outcomes (Freire et al., 2018). The team conducting that study encountered similar difficulties to those experienced in the current study regarding randomization. However, the current PPI was delivered to a far higher number of participants and was delivered by current university students, showing it is readily reproducible. A previous study involved the delivery of a PPI as a year-round addition to the timetable (Shoshani and Steinmetz, 2014). The Hummingbird Project is much shorter, taking at most 6 weeks to complete, and therefore does not require the integration of PP into teacher training, school leadership training, or into the wider educational culture. The current PPI has also been delivered with relatively low staff numbers and without the need for intensive staff training, therefore comes at a far lower cost. One PPI involved parents in PPI sessions, thus introducing more difficulties regarding recruitment (Roth et al., 2017). This PPI only targeted small groups of students whereas the Hummingbird Project could be delivered to entire year groups. Delivering to year groups also helps overcome difficulties around psychological interventions regarding stigma. PPIs targeting at-risk students have been shown to be effective (McCarty et al., 2011; Muro et al., 2018). The current study shows that selected students benefit the most from a universal PPI. Delivering universal PPIs to whole year groups helps reduce stigma by not singling out at-risk students, whilst also improving the well-being of students who are not at-risk. The current PPI also compares favorably to those which focus on a single aspect of PP (Froh et al., 2009; Quinlan et al., 2015; Sapthiang et al., 2019). The Hummingbird Project gives students an opportunity to sample a range of PP concepts and activities, enabling them to choose the activities that they feel suit them best. This improves person-activity fit, encourages better engagement, and has the potential to improve

outcomes (Schueller and Parks, 2014). Person-activity fit might also explain previous results regarding mixed outcomes for vanguard PPIs such as the Penn Resiliency Program (Bastounis et al., 2016) which focus on a single aspect of PP, potentially reducing broad appeal.

One of the limitations of the Hummingbird Project is that it was coordinated and delivered by a single member of staff, supported in sessions by volunteers. For the PPI to have a sustainable future, it will need to be scaled up so that it can be delivered by multiple trainers on multiple sites. Yet fidelity to original course materials and procedures is a significant predicting factor in outcomes of universal school-based PPIs (Mackenzie and Williams, 2018). If the Hummingbird Project is adapted to become a train-the-trainer model it will be vital to take steps to ensure that the trainers who end up delivering to children and adolescents are monitored regularly and supported in their endeavors. Issues regarding fidelity might be overcome by offering an online version of the Hummingbird Project. Using online materials would ensure that children and adolescents accessing the PPI are working from the same resources. An online version of the PPI might also better appeal to children and adolescents, as “digital natives.” Using an online version of a PPI comes with its own difficulties (Neumann, 2016). It may be necessary to ensure that a human aspect to the PPI is maintained so that children and adolescents can be offered guidance from a skilled member of staff who can answer any questions or concerns they might have. Having such a staff member will help children and adolescents use the resources correctly, reassure them, and make sure their needs are being met. A second limitation of the Hummingbird Project is that the PPI is designed to be delivered to high school students. It has been shown that the prevalence of mental health problems in primary school students is at 7.7% for all students and as high as 10.2% for boys (Green et al., 2005). It would therefore be advisable to attempt to work with students before they reach high school. However, it will be necessary to rewrite the PPI so that the contents are more readily understood by a primary school-aged cohort. Another potential change to the Hummingbird Project is to adjust the order of sessions such that the mindfulness session takes place earlier on in the process. Having learned about and practiced mindfulness in an earlier session, the students will be better able to focus when learning some of the other, less familiar concepts (Hyland, 2011). Changing the order of sessions might present an opportunity to better link the concepts so that students find them more readily understandable by making the content of each session lead on to the next and giving the project more of a coherent narrative. Another change is to communicate in stronger terms to schools involved that it is intended as a universal intervention for all students. This has the potential to increase the number of students who can participate. It could also reduce the negative effect of students feeling that they are being singled out for participation in the project and therefore increasing perceived stigmatization (Chandra and Minkovitz, 2006). Future research should also attempt to establish whether or not the PPI improves negative outcomes for participants by including measures of depression and anxiety. Mental health problems are the leading contributors to the health burden

in children and adolescents (Stockings et al., 2016). Showing a decrease in levels of depression and anxiety as a result of participation in the Hummingbird Project would represent a significant step in the intervention in child and adolescent mental health, as the evidence for the efficacy of other PPIs is mixed (Bolier et al., 2013).

Implications

The current study demonstrates that school-based PPIs do not necessarily require large amounts of staff training in order to be efficacious and therefore could have positive effects on teachers as well as students. However, the next step in this journey involves providing evidence for the efficacy of this PPI in reducing mental ill-health in this cohort. Another important step in improving the mental health of the region's children and adolescents is to establish the sustainability of PPIs delivered in such a way, without compromising the aspects that have a positive impact. This might necessitate an approach that involves pairing a train-the-trainer model with online resources for teachers, students, parents, and carers. The findings of Green et al. (2005) discussed above, also make it clear that intervention into child mental health must begin at an earlier age. Therefore, it will be necessary to adapt the approach taken in the current study to a primary school-aged population.

CONCLUSION

The current study, and the Hummingbird Project itself, represent a significant step forward in the intervention into the mental health of secondary school-aged students in the North West of England. The project has led to improvements in the flourishing of over 1,000 secondary school-aged children in the region. The current study shows that the Hummingbird Project occupies a happy medium in the dichotomy between mental health professional-delivered, prescriptive interventions and the kind of interactive, self-management encouraging interventions that are preferred by older adolescents (Brown et al., 2019). As stated by one of the students that took part in the PPI, “The Hummingbird Project is amazing! Very supportive and helpful. Highly recommended.” This study provides evidence that even a short 6-week Multi-component PPI, delivered by staff without extensive training, can lead to significant improvements in well-being, hope and resilience in high school students.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

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

informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

IP was the main author and lead researcher. CK supervised and assisted in the conception of the research in phases 1–3, and contributed to the writing-up of these phases. JC supervised and guided the research in phase 4 and edited the final manuscript. MT provided assistance in phase 4 of the research, conducted

statistical analysis of results, and contributed to interpretation of the final conclusions. All authors contributed to the article and approved the submitted version.

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Mental Health in Academia: The Role of Workplace Relationships

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INTRODUCTION

Discussions about mental health in academia have painted a concerning picture. A recent online survey with 2,279 participants from 26 countries and 234 institutions reported that graduate students are more than six times as likely to experience depression and anxiety as compared to the general population (Evans et al., 2018). Similarly, a study evaluating mental health problems among 3,659 Ph.D. students from Belgium indicates that the prevalence of psychiatric disorders is higher among academics than the general highly educated population (Levecque et al., 2017). Additionally, when directly screened for depressive symptoms, 47% of Ph.D. students and 37% of Master's students surveyed at the University of California met the required diagnosis score for depressive disorder (Assembly, 2014).

However, some studies on job satisfaction in the research community somewhat contradict the concerns regarding academic well-being. A survey among pharmacy school faculties in the U.S. with 811 participants showed that 86.3% of respondents stated a desire to stay in academia (Lindfelt et al., 2018). Moreover, 63.7% of the faculty members reported being very or extremely satisfied with their current academic position (Lindfelt et al., 2015). Amid Ph.D. students, an engagement survey from the University of Helsinki indicated that only 33% of the respondents had considered dropping out, which is lower than the reported 43% withdrawal intention for the whole university (Sakurai et al., 2012). Lastly, a recent worldwide survey from *Nature* on the career aims and struggles of around 5,700 Ph.D. students showed that, although more than one-quarter of the respondents were concerned about mental health, about 80% were satisfied or very satisfied with their decision to do a Ph.D. (Woolston, 2017).

In this article, I argue how the relationships between colleagues and supervisors in academic environments can be a central factor for understanding these seemingly conflicting data. Then, based on personal experience and published literature, I discuss how the unique work situations of biomedical research influence interpersonal relations and how it bidirectionally links to job satisfaction.

MAIN TEXT

Spending years in academia has allowed me to connect with a broad range of biomedical researchers. After various conferences, lectures, and meetings, it was impossible not to admire the researchers confidently speaking about their groundbreaking findings. As an early student, falling in love with such a welcoming and beautiful science was unavoidable. However, it was by talking to other graduate students that a less glamorous side could be witnessed: advisors that cared about quantity rather than quality and placed undue pressure on their students to increase numbers; professors that wanted to nurture their egos at other people's expense; absent tutors that did not remember what they had discussed with their students the day before (or sometimes, did not even recall their projects). As a Ph.D. student, I realized that having proper guidance was hard, and I was lucky. In fact, although overall satisfied with their academic path, recent reports show that fewer

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than 40% of Ph.D. students are happy with their tutoring. Moreover, 23% said they would change advisors if possible, and another 18% said that they do not have useful conversations about careers with them (Woolston, 2017). The picture remains equally unsettling after becoming an early-career postdoc. The constant pressure for fund gathering and high productivity, plus the responsibilities of being a faculty member, create a notoriously overwhelming situation (Lashuel, 2020). Yes, without guidance or social support, academia can feel like a lonely place.

However, in this seemingly inhospitable environment, it is possible to come across many honest and healthy relationships. The popular saying, despite worn out, sounds correct: goodness thrives when times are tough. Across a range of different laboratories and research groups and through their unique dynamics, it is usual to find friendships growing through the shared burden of long hours of work. Importantly, evidence shows that these close workplace relationships can improve well-being, as variables like colleague belongingness and positive relationships with co-workers are significant predictors of self-reported health (Persson et al., 2018). A positive atmosphere, as such, would be especially significant in biomedical research, where everyday chores may involve sacrifices like laborious day-long experiments, overnight shifts, busy weekends, and periods of intense stress due to deadlines (Landrigan et al., 2006; Thomsen et al., 2006). It is not surprising that support and understanding, which is necessary for any relationship, can be easily found among those with whom these challenges are shared.

Accordingly, case reports indicate that support from colleagues and superiors is essential for dealing with mental health struggles in academia (Loissel, 2019). Graduate students who had low scores in questionnaires for anxiety or depressive disorder were more likely to have a positive evaluation of their relationship with their principal investigators or supervisors (Evans et al., 2018). By providing early psychosocial help, the mentoring support found in the lab environment contributes to the students' well-being (Tenenbaum et al., 2001) and can make a difference in the fight against mental disorders, even before a formal diagnosis. Indeed, laboratory colleagues and group members are, in many cases, the few people close enough to someone showing initial signs of distress, and may be able to notice subtle symptoms, like apathy or restlessness (Loissel, 2019).

Additionally, it is not uncommon to find researchers who have or had romantic partners within academia, who often are collaborators or members of the same laboratory. Many institutions have policies to avoid such relationships in supervisory situations, which is strongly supported by faculty members (Bellas and Gossett, 2001). Nevertheless, unlike many other work environments (Kolesnikova and Analoui, 2012), where hierarchy-dependent positions are respected, romantic relationships are widely accepted within academia. In fact, a survey among graduate students provides evidence that participating in a romantic relationship with a member of the

same organization was positively associated with self-appraised job performance and intrinsic work motivation (Pierce, 1998). From personal experience, having a partner within a similar research field has helped to improve numerous manuscripts and presentations due to the overlook of a caring pair of fresh eyes. Most importantly, when feeling overwhelmed and in need of mental support, I could count on the help of someone that would understand the problem. Of course, each case is unique, but over the years, the act of sharing concerns and rewards of research endeavors brought me closer to the people I cared the most.

Considering these observations altogether, I believe that better recognition should be given to those who provide much-needed support throughout the arduous academic path. Independent of the type of relationship, from bench colleagues to advisors, those that are kind to us must be esteemed. If we encourage a positive environment, a culture of friendship and respect may grow, making research groups, and institutions a better place to work. When feeling valued, people enjoy the work and, ultimately, produce better science.

CONCLUSIONS

It is essential to distinguish that, although acknowledging that academic research is an intrinsically hard path, we cannot allow abusive workplaces. There is a line between challenging environments and displeasing ones — and where to draw the line is an individual's own decision. Mental health is definitely a concerning issue in academia, and we should pay closer attention to each other's struggles.

Nevertheless, we should not forget to cherish the good people around us. By appreciating the ones that make day-to-day research lighter, it is possible to nurture constructive and encouraging workplaces. After all, academic thinking works much better when we are thoughtful.

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‘When They Struggle, I Cannot Sleep Well Either’: Perceptions and Interactions Surrounding University Student and Teacher Well-Being

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A wealth of evidence has indicated that both students and teachers experience high levels of stress, burnout, and ultimately compromised well-being in the university context. Although numerous studies have investigated well-being among university students, and other studies have addressed well-being among university teachers, these lines of research are often conducted in isolation from one another. This is surprising, as the importance of considering reciprocal links between students and teachers has been suggested in several empirical studies. Additionally, when researching well-being in academia, the conceptualizations tend to differ from study-to-study. The present research therefore investigated how students and teachers conceptualize well-being at the university based on their personal experiences, as well as how student and teacher well-being interact. To examine this, six university students (50% female), and ten teachers (50% female) from Germany and the Netherlands participated in semi-structured interviews. Qualitative analysis using a multistage coding process revealed detailed insights concerning students’ and teachers’ perceptions of well-being that coincided with positive psychology, resilience, multifaceted, and basic psychological need fulfillment approaches. Moreover, an interaction between students’ and teachers’ well-being became apparent, including several factors such as the student-teacher relationship that in turn, contributed to both population’s well-being. The present findings lend evidence toward a more coherent conceptualization of well-being and are discussed in terms of suggestions for initiatives that simultaneously support both populations, for example, through the student-teacher relationship.

Keywords: higher education, well-being, student-teacher interaction, positive psychology, SDT, resilience, university

INTRODUCTION

“I used to think that I had a lot of impact on students and student well-being and I could really stress myself about students who were [stressed out]. Like- yeah REALLY. So, I was the one laying, late at night, thinking about how should we do this, and how can we make it to the deadline. And, and um (p), so tried very, various things, and I now end up thinking my, I think my role is rather limited. More limited than I originally thought.” (university teacher)

For university students and teachers alike, academic environments can be stimulating, informative, and socially enriching; however, they can also be competitive and stressful. Therefore,

the pursuit of success in academia constitutes a challenging process, making students and teachers susceptible to compromised well-being (Henning et al., 2018). In line with this, it is known that university students experience high levels of academic distress and mental health problems. These include psychological and emotional distress (Larcombe et al., 2015; Deasy et al., 2016; Baik et al., 2017), burnout (de Broer, 2017), and elevated prevalence of depression, anxiety, and stress disorders (Wong et al., 2006; Bayram and Bilgel, 2008; Backhaus et al., 2020). At the same time, it is becoming increasingly apparent that university teachers face similar experiences, as indicated by, for example, high levels of burnout (Lackritz, 2004), work stress (Gillespie et al., 2001), and low work-life balance (Kinman and Jones, 2008).

Despite university students and teachers both facing compromised well-being, this matter has, to the best of our knowledge, not yet been examined simultaneously within both populations. This is surprising, as numerous studies support the existence of reciprocal relations between aspects of student and teacher well-being in the school context (e.g., Frenzel et al., 2018; Harding et al., 2018), as well as the importance of examining student-teacher relationships in the university context (see Hagenauer and Volet, 2014b). Consequently, more comprehensive research is needed to shed light on opportunities to mutually foster student and teacher well-being in academia.

The current study stems from the positive psychology perspective (i.e., considering well-being in the light of living a well and fulfilled life), which is especially important as research thus far tends to focus on the negative side of well-being in academia. For instance, previous studies have primarily investigated factors causing academic distress (e.g., Gillespie et al., 2001; Benbassat, 2014; Deasy et al., 2016). Additionally, consequences of distress in terms of psychological ill-being are often reported, such as burnout (e.g., Lackritz, 2004), and depression or anxiety (e.g., Stallman, 2010; Larcombe et al., 2016; Backhaus et al., 2020). In contrast, positive aspects of student and teacher well-being such as engagement, positive affect, or life satisfaction seem to be less frequently researched, although exceptions exist (e.g., Schaufeli et al., 2002; Tay and Diener, 2011; Stanton et al., 2016; Stupnisky et al., 2019). Placing an emphasis on the positive side could therefore lend important information to support and enhance student and teacher well-being instead of solely curing ill-being.

Taken together, the current study addresses two primary research goals. First, we investigate how both students and teachers perceive well-being in academia; second, we explore how their well-being might interact. To examine these aspects, we conducted semi-structured interviews with students and teachers regarding their views on and experiences with well-being at the university.

Theory Surrounding the Conceptualization and Interaction of Well-Being

Well-being constitutes a concept widely used in its various forms and interpretations. These range from an interplay of life satisfaction, absence of negative, and presence of positive

emotions (Beiser, 1974), or mastery experiences and personal growth (Tay and Diener, 2011), to a state of optimal experience and functioning (Ryan and Deci, 2001). Still, no generally accepted definition of well-being exists in the literature, which is also reflected in empirical studies. For scientific research, this lack in definition clarity poses a problem, as various theories have been developed throughout the literature and results are consequently difficult to interpret and compare. From a practical perspective, it is also problematic to specify interventions and measures aimed at enhancing well-being without a coherent understanding of the concept. Moreover, in the case of well-being in academia, it seems even more challenging to conclude one final definition (Fraillon, 2004; Centre for Education Statistics and Evaluation, 2015). Therefore, in the present study, we are interested in gaining a comprehensive understanding of how students and teachers themselves define and perceive well-being at the university. Furthermore, gathering information about how they perceive their well-being to interact could provide an even clearer picture of well-being in academia.

Within this process of defining well-being, we use three well-established theoretical perspectives surrounding the conceptualization of well-being to guide our research. First, we consider well-being from a positive psychology perspective. Second, we incorporate the concept of resilience into our research, which is strongly intertwined with well-being (Mguni et al., 2012). Lastly, we consider well-being as a multifaceted construct including certain basic needs which need to be satisfied to ensure well-being. Moreover, when investigating the interactions between teachers' and students' well-being, the systemic approach serves as a theoretical basis.

To elaborate, the first aspect aligns with the World Health Organization's (WHO) view on health, which depicts 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity' (World Health Organization [WHO], 2020). This definition supports the positive psychology approach. Based on the salutogenesis concept (Antonovsky, 1987), positive psychology contrasts prior health and psychological world views (Seligman and Csikszentmihalyi, 2000; Azar, 2011). Well-being has previously been viewed as fighting diseases to bring patients to a level of not being ill, and thus, mainly psychological problems such as anxiety disorders, depression, or psychosis were researched. To this day, investigating human illness instead of human health continues, also throughout educational psychology research when examining student and teacher well-being. At the same time, it has become evident that the positive psychology movement, which aims to define well-being as flourishing, positive affect, and engagement, is also important to research (Gable and Haidt, 2005).

Secondly, well-being appears to go hand in hand with the concept of resilience in that it acts as an indicator of well-being (Centers for Disease Control and Prevention [CDC], 2018). However, comparable to well-being, resilience is not clearly defined (Britt et al., 2016). In a broad sense, it relates to an individual's ability to face negative experiences and activate personal resources to bounce back to the original psychological state prior to the stressor having emerged. This process can,

in turn, lead to positive adaptation and psychological growth (Masten, 2001; Tugade and Fredrickson, 2004). Conclusively, building personal resources can be considered a central process when striving for enhanced resilience and well-being (Gable and Haidt, 2005).

Thirdly, well-being depicts a multifaceted construct (Forgeard et al., 2011), including aspects such as physical, social, psychological, and emotional well-being as well as life satisfaction and work engagement (Centers for Disease Control and Prevention [CDC], 2018; World Health Organization [WHO], 2020). Reflecting this multifaceted view, Self-Determination Theory (SDT; Deci and Ryan, 1985; Ryan and Deci, 2000) posits that well-being consists of the satisfaction of three basic psychological needs (BPN): autonomy (the need to experience behavior as self-directed), competence (the need to experience behavior as effectively enacted), and relatedness (the need to interact, be connected to, and care for others). Recent research has addressed the relationship between these needs and enhanced well-being in the academic context, indicating a connection. For instance, having participatory control and flexibility within studies contributes to university students' satisfaction with their learning environment as well as their feeling of optimal challenge (Stanton et al., 2016). This finding could relate to the satisfaction of the need for autonomy. Moreover, perceived competence has been found to mediate the relationship between university environmental factors (e.g., administrative and research support) and aspects of university teacher well-being (Larson et al., 2017; Stupnisky et al., 2017). Regarding relatedness, the relevance of student-teacher relationships as beneficial factors in both students and teachers has also been identified within the literature (Hagenauer and Volet, 2014b). Taken together, these findings emphasize that the fulfillment of BPN is strongly intertwined with well-being in academia and is worth investigating further.

Lastly, to investigate expected interaction effects between students' and teachers' well-being, the systemic approach, based on social constructivism (Burr, 2003), is a fitting epistemological approach. According to social constructivism, social reality is constructed through individual perceptions and interactions with one's surroundings. Consequently, individuals act and exist within their systems, such as their families or their workplace. However, if a system member displays any emotional, behavioral, or psychological problems, the individual is seen as a symptom carrier of a malfunctioning system or relationship (Minuchin et al., 1978; von Schlippe and Schweitzer, 2015). Translated into the academic context, this implies that a high number of students or teachers, respectively, experiencing psychological distress may not indicate an individual problem of either party. Instead, the issue concerns the relationships between both or even within the academic system as a whole. Thus, it appears insufficient to concentrate well-being interventions solely on students or teachers, but instead, a focus should be placed on the dynamic interplay between both groups.

Student Well-Being

As previously mentioned, university students frequently demonstrate impaired mental well-being. For students, psychological

problems are more elevated compared to the general population in the same age group (Stallman, 2010; Benbassat, 2014; Larcombe et al., 2016). Furthermore, the psychological strain that university students perceive increases after entering university and never returns to the pre-registered level (Cooke et al., 2006; Bewick et al., 2010). These insights seem critical, given that psychological illnesses first emerge before the age of 25 (Veness, 2016). Moreover, on a subclinical level, academic distress can be problematic in that high levels of stress appear to be associated with lower academic achievement (Stallman, 2010), an unhealthy lifestyle (McEwen, 2008), and cognitive as well as behavioral problems in the educational context (Baik et al., 2017). Therefore, the study years depict a potentially sensitive period in an individual's life (Compas et al., 1986).

From an academic perspective, students' mental health seems to be of crucial relevance, in a negative, but also especially in a positive manner. Psychological distress impairs academic performance (Stallman, 2010; Deasy et al., 2016), whereas university engagement increases it (Schaufeli et al., 2002). Likewise, positive moods and emotions such as happiness seem to enhance several learning outcomes (Panger et al., 2014; Stanton et al., 2016). Examples thereof include creativity (Baas et al., 2008; Davis, 2009), productivity (de Neve et al., 2013; Oswald et al., 2015) and various cognitive variables important for academic achievement (Fredrickson and Branigan, 2005; Panger et al., 2014). Despite these findings, however, students' perceptions of well-being and its positive outcomes remain largely uninvestigated (Stanton et al., 2016). Thus, focusing on the positive side of student well-being constitutes a promising research avenue.

Teacher Well-Being

University teachers hold numerous responsibilities in their role, including teaching students, conducting and publishing research, as well as completing administrative tasks. When combined with additional characteristics of the profession such as working significant overtime hours (Fontinha et al., 2019) and having fixed-term employment contracts (Higher Education Statistics Agency, 2018), it is not surprising that university teachers are considered at-risk for compromised well-being (Kinman and Johnson, 2019). This has also been recognized by, among others, the German Research Foundation, the Dutch Research Council, the Royal Netherlands Academy of Arts and Science, and the Association of Universities in the Netherlands (Rijksoverheid, 2019; Nederlands Wetenschappelijk Onderzoek [NWO], 2020). These organizations acknowledge the high pressure on university teachers in the academic system and seek to support them.

Similar to student well-being, a large body of literature also examines university teacher well-being and aspects that contribute to it (see special issues of Kinman and Johnson, 2019; Mendzheritskaya and Hansen, 2019; Daumiller et al., 2020). Although some studies within this field have found that university teachers report moderate to high levels of job satisfaction (e.g., Kinman and Jones, 2008; Shin and Jung, 2013), most also reflect high levels of burnout and stress (Winefield et al., 2008; Watts and Robertson, 2011; Padilla and Thompson, 2016;

Guthrie et al., 2017). Furthermore, university teachers experience additional stressors such as role conflicts and role ambiguity (Richards and Levesque-Bristol, 2016), along with difficulties maintaining work-life balance (Kinman and Jones, 2008; Flaxman et al., 2012; Hogan et al., 2016).

Notably, few studies have explicitly investigated university instructor well-being in a positive light. To acknowledge this research gap and support mechanisms to enhance teachers' well-being, we aim to explore the concept of well-being from a positive, encompassing, and personal perspective. Some literature on university teachers already suggests the importance of the positive perspective and emphasizes protective and flourishing characteristics. Examples include positive work attitudes (Mudrak et al., 2018), positive emotions for teaching and research (e.g., Stupnisky et al., 2019; Rinas et al., 2020), and positive student-teacher interactions (Hagenauer and Volet, 2014b).

Interaction Between Student and Teacher Well-Being

Understanding the linkages between student and teacher well-being is important in gaining a comprehensive picture of their functioning in academia. Prior research, primarily in the school context, has supported this point. Regarding emotional well-being, student-teacher relationships have been positively associated with school teacher enjoyment and negatively associated with their anxiety (Hagenauer et al., 2015). Moreover, school teacher and student enjoyment seem to be positively connected (Frenzel et al., 2009), also in a reciprocal manner (Frenzel et al., 2018). Lastly, a link has also been found between school teachers' instructional characteristics and students' emotional well-being (Frenzel et al., 2009; Lazarides and Buchholz, 2019). In terms of psychological well-being, higher school teacher well-being has been associated with higher student well-being and lower student psychological difficulties. Reciprocally, lower teacher depressive symptoms have also been associated with higher student well-being (Harding et al., 2018).

Aside from the school context, the importance of the student-teacher interaction may also extend to the university context. Due to systemic differences between schools and universities (e.g., less contact between teachers and students, stronger motivations and autonomy), these findings from the school context cannot be readily transferred to the university context, but require specific investigation (see Daumiller et al., 2016). However, the first few studies that have considered student-teacher interactions in the university context suggest this to be a promising avenue. For example, Hagenauer and Volet (2014a,b), examined the importance of student-teacher interactions as well as university teachers' emotions, respectively. Regarding the former study, they conducted a systematic review highlighting the importance of the student-teacher relationship in the university context and suggested beneficial effects for students and teachers, also in terms of aspects of well-being. Next, in a longitudinal interview study, they found that student engagement influenced university teachers' emotions and impacted how they performed in their teaching. Taken together, these findings

indicate that the student-teacher interaction warrants further research attention in academia.

Research Questions

Considering the lack of consistency within the definitions of student and teacher well-being described in the literature, our first research aim was to investigate this conceptualization from a qualitative and positive perspective. To this end, we considered it essential to reflect both students' and teachers' thoughts about well-being in order to gain theoretical and practical insights contributing to a clearer definition of the construct within academia. Consequently, the first research aim was formulated by the following questions:

- RQ1. a. How do students and teachers conceptualize well-being at the university?
b. How do students and teachers perceive well-being at the university?

The second research aim addressed the knowledge gap surrounding the interaction between student and teacher well-being. Based on literature describing how student-teacher interactions impact certain emotional and psychological aspects of well-being in the academic context, we expected reciprocal relations. In other words, we expected students to mention that teachers were interconnected with their well-being, and vice-versa. It seems relevant to understand the underlying mechanisms of this interaction to gain clearer insights about how to enhance both student and teacher well-being in academia. Thus, our second research focus entailed the following questions:

- RQ2. a. What are the direct associations between student and teacher well-being?
b. How do factors contributing to student and teacher well-being relate?

MATERIALS AND METHODS

To investigate the research questions above, we conducted semi-structured interviews regarding the conceptualization, perception, and interaction of student and teacher well-being. During the process of conducting these interviews, the study was pre-registered through Open Science Framework¹.

Participants

To allow for a broad perspective on the topic and the inclusion of a range of well-being experiences, both the student and the teacher samples were heterogeneous in terms of age, gender, faculty, study or teaching experience, as well as the country in which the participants were from. Specifically, sixteen participants (six students between the ages of 22–29 and ten teachers between the ages of 26–57) from three public universities, one in the Netherlands and two in Germany ($n_{\text{Dutch}} = 11$, $n_{\text{German1}} = 3$, $n_{\text{German2}} = 2$), took part in the present interview study. The participants worked and studied at

¹The pre-registration can be found at <https://osf.io/2bu7v>

various faculties, including Education, Economics and Business, Behavioral and Social Sciences, Spatial Sciences, Arts, and the University Medical Center. Moreover, students had between 1 and 4 years of study experience, while teachers had between 1 and 32 years of teaching experience. The student sample additionally contained 50% international students, while the teacher sample contained 42% international teachers.

Interviews and Procedure

As previously mentioned, to gather an in-depth understanding of university students' and teachers' well-being experiences, we conducted semi-structured interviews. Permission to conduct the study was granted by an ethics committee and all participants provided informed consent prior to participating. We first issued a short demographics questionnaire, and then proceeded with the comprehensive, semi-structured interviews. These interviews ranged from 55 to 100 min, were recorded, and then transcribed verbatim. In this process, any personally identifiable information was pseudonymized.

The interviews were conducted by two interviewers in a conversational style, and each interviewer used an interview guide to structure the interviews. The interview guide contained all questions and prompts to be asked, which slightly differed for students and teachers (see additional material²). In general, the interview guide consisted of three parts. First, the questions focused on how student well-being is perceived and defined by the participants. Following this, the questions concentrated on teacher well-being, while the last questions concerned the interaction between teachers' and students' well-being in academia. A summary of the transcription was sent back to the participants so that they could report if any aspects were misunderstood and further decide to entirely or partly withdraw from the study.

Data Analysis

To answer the first research question, three phases of coding were implemented. First, the transcribed interviews were initially coded by two expert coders using the values coding approach (Miles et al., 2014). This method states that text fragments are coded depending on whether participants expressed a value, an attitude, or a belief. Based on these initial codes³, the two coders proceeded to analyze the data according to thematic analysis as discussed by Braun and Clarke (2006). In line with this method, thematic patterns emerging from the data are identified based on an initial coding phase and then analyzed (see also Ryan and Bernard, 2000). Therefore, the two coders first looked for commonalities across several interviews to identify common codes, which resulted in a preliminary codebook as a guide for

coding the remaining interviews. Through this, the codebook was enlarged with new emerging codes until saturation [i.e., the point at which no new information or themes were observed in the data; see Guest et al. (2006)]. Here, it must be noted that it was possible to apply several codes to one passage. For example, a passage coded as 'belonging' could simultaneously be coded as 'social well-being,' as indicated in the following quote from a university student: "But also, I feel like social is a big thing, like, feeling like you connect with your classmates and instructors." In the third phase of coding, the final set of codes served for the coding of the same data set again to check whether any initial codes had been missed or needed adjustment. This third phase acknowledges the iterative process within thematic analysis, which requires a constant back and forth processing of the data (Braun and Clarke, 2006). The two final coding phases were conducted using the program ATLAS.ti Scientific Software Development GmbH (designed for qualitative research and data analysis) and performed by the two coders independently to ensure inter-rater reliability. Following this, clusters and themes based on the codes were identified through discussion by the two coders as well as a panel consisting of three additional experts in the field. These themes could emerge both inductively from the data as well as deductively from theory (Hayes, 1997, 2000). The coders additionally worked independently from the aforementioned theoretical framework to ensure both perspectives (Braun and Clarke, 2006).

The second research question was analyzed using a slightly different procedure, yet remained rooted in thematic analysis (Braun and Clarke, 2006) and thus, aimed to find common themes emerging from the data. First, using the same approach and software as in the first research question, the two coders coded the interviews, marking any passages that referred to the student-teacher interaction. It was possible to code a passage as 'student-teacher interaction' even if it had already been given a code throughout analyzing the first research question. After this, the passages coded as the 'student-teacher interaction' were exported and independently analyzed by the coders with the goal of identifying clusters based on the co-occurring codes, along with searching for new overarching themes. Finally, the coders' independent findings and the resulting clusters were discussed amongst themselves as well as with the panel of experts, again, to ensure inter-rater reliability. As with the first research question, these clusters and themes could emerge both through inductive or deductive processes.

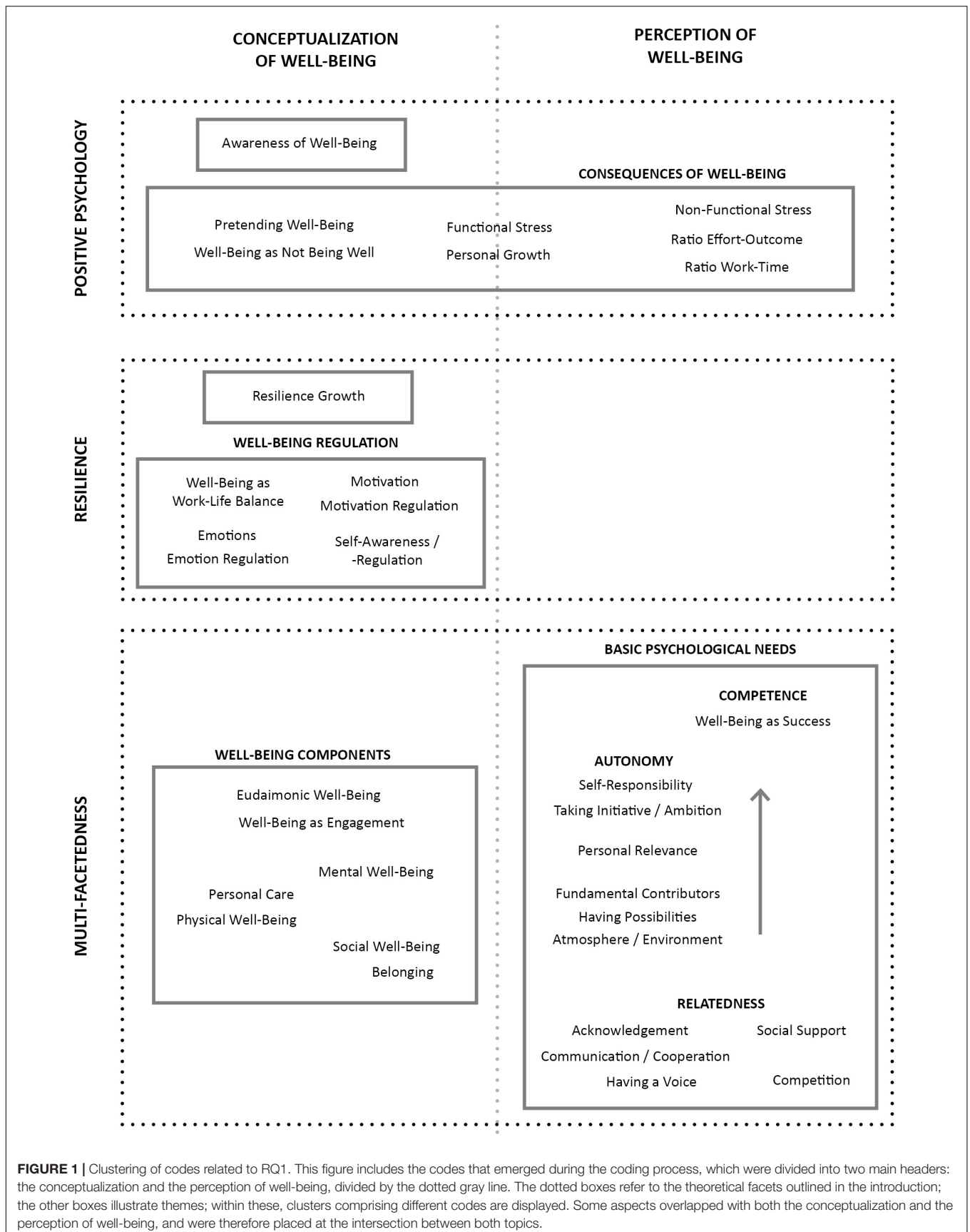
RESULTS

RQ1a. Conceptualization of Well-Being

An overview of our findings can be found in **Figure 1** below. First, two clusters could be seen in the light of positive psychology, namely the awareness of well-being and the consequences of the presence or absence of well-being, respectively. Secondly, resilience growth was described, especially related to well-being regulation. Lastly, some codes emerged that defined well-being in its basic components; emphasizing the multifaceted nature of the concept. We additionally found three clusters

²The additional material is available at <https://doi.org/10.34894/Q6DFLB> and contains consent forms, the participant information letter, the interview guides, as well as the final codebook which emerged throughout the analysis. The data itself is not included due to the high sensitivity of the topic.

³For clarification, the term 'code' refers to a label that a particular passage in the interview transcription was given, the term 'cluster' refers to a grouping of similar codes, and the term 'theme' refers to an overarching topic encompassing similar clusters, in line with the definitions of Braun and Clarke (2006) as well as Ryan and Bernard (2000).



concerning the BPN for competence, autonomy, and relatedness, which related rather to the perception of well-being than to its conceptualization.

Positive Psychology Approach of Well-Being

Awareness of well-being

The ‘awareness of well-being’ code, illustrating a cluster in itself, referred to the presence or absence of an understanding that well-being exists in the academic context and was mentioned by both students and teachers. Regarding the presence of awareness, some students highlighted well-being as a “hot topic” and as “being on the rise so much globally.” Concerning the absence of awareness, in contrast, most students commented on not being aware of either the topic nor offers focused on improving well-being at the university. For instance, when asked about effective coping, one student stated that “it’s not something I think about daily.” Teachers remarked both extremes as well, with some stating that well-being was a topic that they were interested in and aware of, and some, in contrast, mentioning not having thought about the topic before the interview.

Consequences of well-being: functional stress and personal growth

The ‘consequences of well-being’ theme focused on the outcomes of the absence or presence of well-being, respectively. Three clusters could be allocated to this theme: ‘pretending well-being,’ ‘functional,’ and ‘non-functional stress.’ In the following section, we solely report on functional stress, relating to the positive outcomes of academic stress and the scope of our study goals. However, the remaining two codes are defined within the codebook and can be found in the additional material.

Functional stress referred to how stress can be perceived in a positive light, as flow, and as an opportunity to develop new competences and self-confidence. For example, teachers stated that being stressed helped them to remain focused and to develop themselves within the academic context. In terms of students, one teacher argued that “part of studying in general is facing problems and that’s a skill you learn during the studies.” Likewise, students themselves mentioned that the experience of stress was an opportunity for them to grow. This “good level of stress” (university student) was intertwined with experiencing study success despite being stressed. Consequently, experiencing stress as “challenging” can be considered functional, and may additionally foster creativity and innovation, as well as personal growth. The ‘personal growth’ code related to learning processes resulting from the experience of functional stress, and included obtaining competences and maturing, but also knowing how to act professionally despite being stressed. It seemed satisfying for teachers to witness this process and see their students successfully developing into skilled academics and adults who can use their personal potential to face future academic stressors.

The Resilience Approach of Well-Being

Resilience growth

Next to growing personally, functional stress can also result in people growing in terms of becoming more resilient toward stress. This so-called ‘resilience growth’ relates to internal growth

not only despite but also due to having experienced negative situations. Teachers were aware of such processes, and admitted that students “have to learn it by doing! That’s also experience. You’ll have to cross it and bounce back and be very tired and very, like, exhausted.” Students mentioned that this growth mechanism led to heightened coping competences due to negative and stressful experiences as well. One student, for instance, phrased her resilience growth in the following way:

[...] one thing that made me cope better with my well-being was having like, like a few really [obscenity], awful things happen, and [...] then getting mentally stronger from that. [...] I’ve felt better and happier and stronger because I’ve learned to cope with them and deal with them, and I think that’s quite important as well in well-being. (university student)

Well-being regulation

In line with the aforementioned coping strategies being regulatory in nature, participants frequently referred to regulating their well-being by means of work-life balance, self-regulation, motivation regulation, and emotion regulation. ‘Well-being as work-life balance’—keeping balance as well as detaching from work or studies with other engagements outside of academia—was emphasized by teachers and students equally as being crucial for their well-being. Although both groups highlighted the importance of activities outside of academia, for students, this also encompassed investing in development toward their future working-selves. Regarding the latter point, teachers admitted that “for university instructors, it’s easier to take a step back because you have other stuff, but for university students your job is to study, so it’s kind of hard.” In contrast, on the teacher side, although teachers acknowledged the difficulty of keeping boundaries between work and private life, this seemed to be more feasible and important to pay attention to: “So, I have learned to say to my students or my colleagues: ‘Sorry I have not been able to do this.’ Knowing that I had time at the weekend or in the evening to do it” (university teacher).

Secondly, ‘self-awareness’ and ‘self-regulation’ appeared to be essential for regulating well-being. For instance, the interviewees reported learning the “things that’ll make you happy” (university student) as well as “what is causing the stress” (university teacher) and using this knowledge for coping. Moreover, a central insight for students was recognizing that their university outcomes and intelligence were independent from one another. Being aware of this discrepancy substantially contributed toward their feeling of well-being: “I really saw that it was, um, my way of learning and not my intelligence, that was—that was a bit of reassurance for me.” These reflective processes were mentioned frequently, including reflecting on the extent of involvement with students as a teacher or reflecting on personal development as a student. Generally, self-reflection appeared to lead to knowledge of one’s strengths, weaknesses, fears, and needs. This process of becoming aware of oneself seemed to be age-related and a skill learnable throughout adulthood.

Next, ‘motivation’ and ‘motivation regulation’ were mentioned as important aspects of well-being regulation; yet, they primarily referred to the students’ experiences. Here, they mentioned motivation to relate to their well-being when

they could see themselves potentially succeeding in their studies. Therefore, students acknowledged the teacher's role in stimulating and sparking motivation for specific subjects. Furthermore, being internally motivated due to developmental processes led to students being more persistent: "I kind of, I didn't want to fail [...] I want to pass and don't want to quit." However, students also reported experiencing demotivation, although less frequently. These statements referred to situations of feeling overwhelmed with self-responsibility, having too high of expectations, or feeling bored as a result of the teaching style. Finally, in terms of motivation regulation, students and teachers reported various motivational and cognitive strategies, including prioritizing and organizing, self-affirming talk, as well as creating small successes within the learning process.

Lastly, a cluster surrounding 'emotions' and 'emotion regulation' emerged. Positive emotions covered emotional states such as appreciation, happiness, enjoyment, or excitement, all of which were mentioned equally often by students and teachers. In contrast, negative emotions ranged from feelings of unimportance, misery, and frustration, to anxiety and fear. These negative feelings were generally less frequently mentioned. Yet, primarily students reported them and mainly referred to experiences of failing, because "it never feels good to fail in anything, right?" (university student). Further on, emotion regulation referred to strategies used to regulate their negative emotional states. Examples of these strategies were similar for students and teachers and included exercising, paying attention to one's lifestyle habits, as well as asking for help and social support. Moreover, most interviewees mentioned rationalizing one's feelings as an important strategy, as illustrated in the following quote:

I think about that nothing of this is really (p) life-threatening, for example, because these are also really small things, but they seem so big at the moment, and you think, you can't cope with anything anymore, but if you calm down and think rationally, then you realize that it's not life-threatening and then you-that you can (p) still do it. (university student)

The Multifaceted Nature of Well-Being

Well-being components

The multifaceted nature of well-being was illustrated by the 'components of well-being' theme, covering clusters of physical, mental, social, and eudaimonic well-being. Concerning 'physical well-being,' a considerable number of interviewees reported 'personal care' to constitute a central aspect. This care included how they looked after their bodies, such as being attentive toward sleep, nutrition, and exercise. To illustrate a contrasting example, one teacher commented on students during the exam period as "running around the library as ghosts. They didn't sleep, [...] and when they have a total overload with work, you see that physically."

Next, 'mental well-being' appeared to be equally important for students and teachers. This component, however, was mainly mentioned in a negative manner when reporting corresponding experiences. For instance, students reported a lack of mental well-being as a reason to either reach out for professional help or to consider quitting their studies. Furthermore, teachers reported

experiences with students who faced mental illnesses as well, such as students becoming thinner in class or student assistants struggling with burnout.

The third component, 'eudaimonic well-being and engagement,' referred to perceiving studying as fulfillment or being particularly engaged in study topics. Both appeared to be intertwined, as nearly every third statement coded as eudaimonic well-being co-occurred with well-being as engagement. Concerning engagement, the participants mainly described actively participating in and outside of class, wanting to contribute, as well as actively asking for feedback or further input. Moreover, engagement also seemed to be a central aspect of teachers' well-being, as expressed by a teacher who described how connecting to the students helped him to engage more with his teaching role. Similarly, eudaimonic well-being illustrated studying or teaching, respectively, as self-realization and meaningfulness, which, in turn, related to personal growth along with intrinsic motivation. For example, one student stressed that it is "nice to, to get good grades and to pass exams and get some, um, feeling of fulfillment, or achievement." For teachers, eudaimonic well-being also seemed to be important for their well-being and something they value in their jobs:

[...] I like to invent my own things and create my own job and I do like to-to read and be intellectual. That's just what I like. There's nothing else I can. (laughing) That is what I have. And I do fit-my brain fits in, with how things work here, because I constantly have ideas and I-so. I never get bored. (university teacher)

Finally, it seemed crucial for students to feel a sense of 'belonging' to their academic institution and the people within it, which contributed to their sense of 'social well-being.' The latter was described by a student as "how your social life affects you." This social life included social relationships with friends and family, but also close working connections with fellow students or colleagues. Furthermore, the participants discussed social well-being in terms of taking care of each other, enjoying a socially positive atmosphere, and sharing their concerns. This social connection constituted an aspect that both students and teachers consistently emphasized throughout the interviews. Beyond that, the sense of belonging was just as important, namely, feeling recognized as part of the community and feeling "in the right place" at university (university student). Again, this aspect applied equally to students and teachers, as both groups should ideally "feel being part of the same community" (university teacher). For instance, one teacher stated:

If you are feeling lonely and you-and a lot of students actually move to the city and try-try to start living here apart from their family. So, a lot of students feel disconnected, huh? Um, and have to find a new home or have to define a new home. (university teacher)

RQ1b. Perception of Well-Being

Basic Psychological Needs

Although the clusters of the three BPN, 'competence,' 'autonomy,' and 'relatedness' were not part of the theoretical conceptualization of well-being, we included them nonetheless as contributing factors. Within the interviews, they were specifically

mentioned within as well as outside of the student-teacher interaction (see **Table 1**). In the following sections, we will shortly outline those mentioned outside of the interaction; those mentioned within are reported in the section focusing on the student-teacher interaction (for more details see additional material).

Competence

The need for competence referred to the belief of being able to achieve something and being of value to one's academic community, which was mainly experienced by students. It appeared that these competence beliefs were highly related to positive feedback from others—both inside and outside of academia. Therefore, experiences of 'success,' another code within the competence cluster, strengthened one's feeling of competence and resulted in a range of positive experiences, such as feelings of pride and motivation. Furthermore, the participants did not only equate success with their well-being, but also vice versa. This is why changes in students' study outcomes seemed to depict an indicator of their well-being, as one teacher remarked when comparing students who are well to those who are not: "If someone used to be very good and then suddenly there's a change and he's delivering bad stuff, then you know something's wrong."

Experiencing a lack of competence primarily referred to not knowing how to deal with unfamiliar tasks. Incidences of failing further reinforced these feelings of incompetence. Again, most statements applied to students experiencing and teachers acknowledging these insecurities. Yet, also teachers reported stress due to not knowing how to teach: "[...] when I started at the university as a teacher I was struggling a lot because I didn't have any teaching experience [...] and I didn't know how to do that." This perceived incompetence could result in stress, passiveness, and imbalance.

Autonomy

A foundation for autonomy in academia comprised creating a certain 'atmosphere' and 'environment,' 'having possibilities,' and satisfying 'fundamental contributors to quality of life.' The latter comprised, among others, having adequate housing, financial security, as well as an appropriate office space. As an example, the following quote illustrated the general insecurity tied to being a university teacher: "Academia is a hard life. You get only temporary contracts, you have to earn your own money constantly, you have to constantly show yourself and be innovative-(sighs) crazy culture." (university teacher).

'Personal relevance' seemed to link the basis and the peak of academic autonomy, reflecting the feeling that what one was doing was personally meaningful and mattered. For example, having the impression that studies, or work in the case of teachers, contributed to one's future could evoke the feeling of personal relevance. Accordingly, one student stated: "And I found it here to be more exciting, to be more (p) um, applicable [...] I can do something with it, you know?" Not seeing the purpose of something, in contrast, led to lower motivation and persistence. However, this link applied primarily to the university students compared to teachers.

Finally, 'taking initiative' referred to participants' being ambitious, proactive, and autonomous, hence, taking certain matters into their own hands. Regarding this, teachers aimed to encourage students to take initiative, as illustrated with the following quote:

[The students] should be the ones driving it forward and I should be the one who's trying to push them to get there. Um, so that requires me sometimes, to, purposely full, take a step back—to let them take the, the, yeah, the steer. (university teacher)

As seen in the previous quote, teachers suggested that by giving students control over what they are doing, students could develop a sense of 'self-responsibility.' This, in turn, was defined by being responsible for both one's well-being as well as one's studies or work, complementing freedom and autonomy in academia. For instance, one teacher highlighted autonomy in a classroom, telling his students: "Well that's your responsibility I give you autonomy, but then it's your responsibility as well. What do you think? And come forward with your conclusions."

Relatedness

When asked about who was responsible for student well-being, one teacher stated: "I'm responsible for my life. But I can use support from others of course." This quote relates to the final BPN of relatedness, which was strongly associated with the aspect of 'social support.' Social support members included a range of social relationships, such as colleagues, friends, and family, or even one's pet. The ways in which these support members provided social support to others were broad as well, including encouraging them to share, listening to their problems, as well as giving advice, motivation, and confidence.

As illustrated in **Table 1**, social support was described through three different aspects. 'Acknowledgment' concerned situations in which the counterpart acknowledged one's time and effort, and also respected them as a person, teacher, or student. Moreover, teachers also needed this recognition from their superiors: "You want to feel like your work is valued and that you're treated with respect" (university teacher). Besides that, 'communication and collaboration,' referred to how people in academia communicated with each other. Lastly, 'having a voice' addressed being able to voice one's opinions. Here, however, both students and teachers expressed restrictions in having a voice. To elaborate, students occasionally felt powerless in academic decisions and needed to use their professor's help to achieve their goal at the university. Teachers, however, criticized that their opinions were not considered in a serious way in faculty matters.

'Lack of social support' was experienced when one's efforts weren't recognized, for example by neglecting the fact that working in academia encompasses more than attending or giving classes. Yet, also within the academic context, social support was vital and if lacking, led to adverse consequences. This issue was acknowledged by the participants as well: "If you don't have this basic feeling of being supported and that you have a positive feeling about how things are going; how can we expect you to learn? How can we expect you to teach? Perform research?" (university teacher). Beyond that, a lack in social support was also apparent through various behavioral outcomes, one of which

TABLE 1 | Codes allocated to the basic psychological needs in RQ1 and RQ2.

	Basic psychological need for		
	Competence	Autonomy	Relatedness
Outside student-teacher interaction (RQ.1)	Well-being as success	Self-responsibility Taking initiative/ambition Personal relevance Fundamental contributors Atmosphere/environment Having possibilities	Social support Acknowledgment Communication/cooperation Having a voice Competition
Within student-teacher interaction (RQ.2)	Having control/transparency Structure Feedback	Choice/freedom Flexibility Attention to individual Individual well-being	Course size Support Student-teacher interaction

appeared to be ‘competition.’ Specifically, whereas students were struggling with social comparison, teachers competed for funding and promotion opportunities.

RQ2a. What Are the Direct Associations Between Student and Teacher Well-Being?

To gain a more integrative picture of well-being in academia, we additionally wanted to understand how student and teacher well-being directly interact. Our interviews indicated that student and teacher well-being were not only “tied together very intimately” (university teacher), but also that this interaction was meaningful and prevalent. This interplay was described in terms of a positive direction, a negative direction, and a reciprocal feedback loop, as will be explained in the following sections⁴. A visual overview of the aspects tied to this research question can be found in **Figure 2**.

Positive Direction

One frequently mentioned overlap consisted of teachers feeling that their well-being was reflected by their lesson planning and teaching practices, and thereby impacted their students’ well-being. For lesson planning, when teachers felt well, this enabled them to prepare “a well-prepared lecture or class, and that’s going to be more satisfying for the students.” Moreover, they also described feeling “more energetic and present” as well as “more interested” when teaching their lessons, which they believed positively impacted their students’ well-being.

Another way in which teachers felt that their well-being positively impacted their students’ well-being appeared to be through direct interpersonal relations. Teachers stated that when they felt well, they experienced stronger and deeper relational ties with their students. One teacher, for instance, explained that she could not be a happy teacher if she taught her students as though she “doesn’t care about them.” This positive interaction was also described in terms of providing support and a warm environment to students such as “listening” or “being there,” which they felt responsible for.

Other times, the positive direction of the interaction was elaborated on in a more general sense. That is, some teachers

explained that when they felt well, they were “in a better place” and that there would then be “a high correlation to the students’ well-being.” This perception was strongly reflected in the following quote:

[...] if we as instructors feel supported, taken care of, that everything we’re doing is manageable, that puts us in a position to do our jobs better. And if we can do our jobs better, then that means that we are supporting students in the way that they need and helping them to feel like everything is manageable. So, it’s kind of in that way a ripple effect. (university teacher)

Negative Direction

In contrast to the positive side of the interaction, when teachers felt unwell, this seemed to negatively impact their students’ well-being. Examples included feeling overwhelmed, stressed, or having “a bad day,” which seemed to be associated with the interviewees perceiving their lectures to be of lower quality, as well as feeling less connected to students, and having negative emotional experiences within the classroom. In this light, one teacher explained that “if the instructor is stressed or not well prepared or overworked, the students are not going to learn as effectively, which is part of their well-being.”

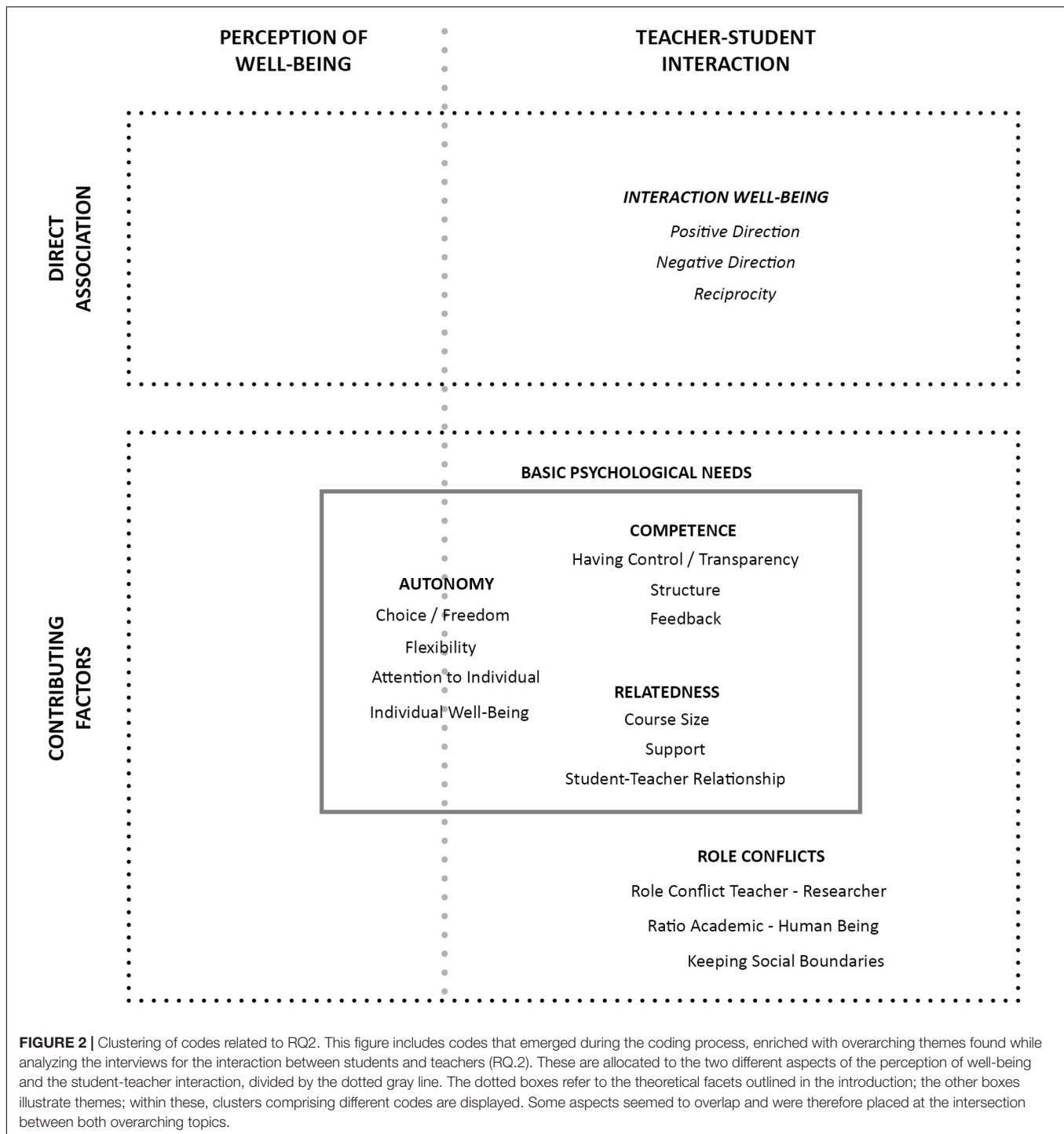
Similarly, if teachers perceived that their students were not feeling well, this seemed to negatively impact their well-being. On one hand, this was described to occur in the classroom context, where if students were bored, weren’t communicating, or were disengaged, teachers tended to experience negative emotions. On the other hand, they also described having more general feelings of anxiety or worriedness about students who felt unwell, which could be taken home with them and integrated into their personal thoughts:

[...] when they trust you, they tend to give you more information than you actually want. And for me that’s actually bad because I’m very worried and then I want to help and I want to make things good for them. (university teacher)

Reciprocity

Aside from single-direction interactions, it was also often mentioned that reciprocity existed between student and teacher well-being. When students seemed well, for example, by interconnecting with teachers or fellow students, participating in exercises, being engaged, or acting friendly and smiling, this

⁴RQ2a only contains quotes from teachers, as the question of whether and how student and teacher well-being interacted was solely asked to the teachers.



positively impacted teachers' well-being: "That definitely boosts my well-being, like 100%. Knowing that I've made a difference, I mean, that's everything" (university teacher). Their enhanced well-being, in turn, was described as an enabling factor that allowed them to create an atmosphere that promoted student well-being. In contrast, when students explained that they were struggling or appeared to be stressed, withdrawn, or physically unwell, teachers reported having negative emotional experiences.

These experiences, in turn, reinforced a negative atmosphere for students, as depicted in the following quote:

[...] if I'm too impacted by their problems then it gets too close to me, it also impacts my well-being and that's not a good thing. And on the other hand, [...] if I'm struggling and if I didn't sleep and if I'm not relaxed, then I can't fulfill the expectations that I have for myself as a teacher. (university teacher)

Thus, an important insight to be drawn is that student and teacher well-being appear to be connected through a reciprocal feedback loop. In particular, when one population experienced compromised well-being, this seemed to negatively impact the other population's well-being, which thereby perpetuated a negative atmosphere. Moreover, when one population felt well, this positively impacted the other population's well-being, resulting in a positive feedback loop.

RQ2b. How Do Factors Contributing to Student and Teacher Well-Being Relate?

Aside from the direct interaction between student and teacher well-being, contributing factors also emerged. These factors were not explicitly defined as components of well-being but rather as aspects that influenced student or teacher well-being and pertained to the interaction. To this end, two main themes describing these factors emerged, namely 'BPN' and 'role-conflicts' (see **Figure 2**). Regarding the theme of BPN, the clusters of 'competence,' 'autonomy,' and 'relatedness' emerged, which exclusively focused on the role that teachers held in supporting students' fulfillment of these needs. It is important to note that the present BPN theme differed from the one mentioned in the first research question. Here, the focus was instead on the student-teacher interaction, and thus warranted further distinction (see **Table 1** or **Figures 1, 2**, respectively, for a comparison of the different codes involved in the clusters of BPN).

Basic Psychological Needs Connected to the Student-Teacher Interaction

Competence

The cluster of competence in terms of the student-teacher interaction emerged through 'control/transparency,' 'structure,' and 'feedback.' Teachers seemed to promote these competence factors and, in turn, supported students' sense of capability in their studies along with their overall well-being. For example, 'feedback' referred to gaining critical information about how one is performing. Specifically, teachers believed students would be more satisfied with and feel more competent in their studies if there were "more opportunities for feedback loops back and forth between instructors and students" (university teacher). This aspect was also mentioned frequently by students and is well-elaborated in the following quote:

[...] you were pushed so hard and then never given feedback. You were just told to [...] write your essay every week, and then you'd hand in the essays and then you wouldn't get them back so you never really know what you had to improve on. (university student)

Autonomy

The cluster of autonomy concerning the student-teacher interaction related to 'choice/freedom,' 'flexibility,' 'attention to individual,' and 'individual well-being' (see additional material). Generally, teachers seemed to understand the importance of promoting a sense of autonomy in students through these factors which allowed students to feel more independent and ultimately more well. For example, choice/freedom referred to the ability to decide what, when, and how one does something. For students,

this freedom appeared to be rather important in terms of feeling that they could complete tasks and assignments in the way they wanted to. One student explained this by stating "it's up to you, how you-how you do it. And I mean that's also, a really nice task in order to develop responsibilities and [...] to take care of yourself." Likewise, teachers believed that providing students with choice and freedom in their courses gave students a sense of autonomy which they believed to be "very important for [...] students' success" (university teacher).

Relatedness

Lastly, the cluster of relatedness in reference to the student-teacher interaction was formed through the codes of 'course size' and 'support,' as well as the 'student-teacher relationship' (see additional material). Here, teachers supported students' feelings of social connectedness and their sense of being a part of a caring environment through these factors. Of particular relevance was the student-teacher relationship, which was mentioned in every interview. It appeared that through this relationship, a strong sense of connectedness and cooperation could positively impact both student and teacher well-being. Teachers, for example, described the feeling that they could connect on a deeper level with their students rather than seeing them as student numbers. This point was further elaborated on by a teacher who was asked what could be changed in order for students to be satisfied with their studies:

It would look like the- I enter the building and there are a couple of students and we drink coffee together and [...] (p), they have questions and we talk about our ideas about social problems that there are and how different theories apply to that. (university teacher)

Role Conflicts Connected to the Student-Teacher Interaction

There were additionally numerous role conflicts described which were intertwined with the student-teacher interaction. This theme could be grouped into the clusters of 'role conflict teacher-researcher,' 'ratio academic-human being,' and 'keeping social boundaries.'

The teacher-researcher role conflict was described as the feeling of having difficulties maintaining a high status in both teaching and research, and a tendency to invest more effort into one over the other. Teachers reported that they aspired to be supportive teachers to their students, but that this could be difficult with their simultaneous desire to succeed in research, as implied in the following quote: "And um, it is competing with, of course, research, [...] it is taking away time from something else. Just to be the teacher I want to be. And, yeah, that is a bit sad" (university teacher).

The ratio academic-human role conflict referred to teachers thinking of their students as individual people having emotions and needs, rather than solely in an academic sense as 'students.' Teachers seemed to realize the importance of treating their students in a more personal and supportive manner. One teacher expressed that students "shouldn't be a subject, they should be human beings with all their issues. This creates a more human

relationship than just grading and saying why you passed or you failed.”

Lastly, keeping social boundaries in terms of the student-teacher interaction constituted the feeling that teachers needed to maintain boundaries concerning their personal connection with students. Specifically, teachers seemed to be personally impacted by students’ problems. While most teachers desired to help their students and to listen, it was also important for them to uphold a “safeguard” to prevent them from lying awake at night thinking “how do we get to this deadline?” (university teacher), as elaborated on in the following quote:

And my big problem is that I tend to be involved too much. Like when someone tells me about a problem or when I see my students suffering or struggling then it comes very close to me. And part of taking care of my well-being is to keep them at a distance. (university teacher)

DISCUSSION

The overall aim of this paper was to better understand how students and teachers perceive well-being in academia, as well as how their well-being interacts. Within this, theoretically sound well-being perspectives were considered including positive psychology, the BPN, and resilience. To this end, important findings could be drawn concerning both research questions, which incorporated these perspectives. Strengths of the present work include having gathered comprehensive information from interview data, being able to incorporate results based on lived experiences into the literature, and addressing various research gaps such as a lack of positive psychology literature surrounding student and teacher well-being in higher education.

Conceptualization and Perception of Well-Being in Academia

One of the primary insights gained throughout the process of conceptualizing well-being was the fact that the clusters aligned with our theoretical assumptions of well-being. Therefore, we will focus on the four main findings concerning the conceptualization and perception of well-being: (1) the positive connotation of stress and well-being, (2) the role of resilience and well-being regulation, (3) the multifaceted components that were found to define well-being, as well as (4) the significance of the BPN.

First, it was notable that despite mentioning negative aspects, the participants defined well-being and stress in academia largely in a positive light. For instance, emphasizing awareness of well-being and functional stress as well as personal growth underlines the importance of a positive approach in well-being research. However, experiencing the “right amount of stress” to function properly, as stressed by students and teachers, is not a novel concept: what we identified as functional stress may relate to prior theoretical approaches such as flow theory (Csikszentmihalyi, 1990) or eustress (Selye, 1980). Both theories are intertwined and refer to a state of optimal performance along with a feeling of competence when experiencing a certain degree of stress. These notions are of considerable importance

in educational sciences as well, and, thus, also in well-being research in academia (Gibbons, 2015; Mesurado et al., 2016). In detail, flow theory addresses the state of feeling challenged and of being fully immersed in what one is doing, and therefore constitutes an essential notion in positive psychology research (Csikszentmihalyi, 1990). Eustress, defined as positive or good stress and, thus, as the opposite of distress, seems to be beneficial and to relate to various well-being factors (Selye, 1980). Indeed, previous research has linked both eustress and flow to concepts such as engagement, motivation, belonging, as well as competence; aspects that were often found in our data as well (Gibbons, 2015; Mesurado et al., 2016). Hence, stress theories such as flow and eustress seem to conceptually overlap with our definition of functional stress as a positive psychology aspect.

Secondly, the emphasis on resilience growth constituted a relevant finding as well. Although the respondents did not refer to resilience specifically, resilience growth was mentioned throughout various interviews. Given the unlikelihood of participants to directly refer to such an abstract theoretical construct, it seems rather unsurprising that they did not mention resilience itself. According to Mansfield et al. (2016), resilience depicts not only a capacity, but also a process and an outcome. The latter two aspects align with the process of resilience growth, or, in other words, the sustainable outcome of effective coping in situations of distress (Bonanno, 2004; Reich et al., 2010). As the participants explained how adverse experiences formed their capacity to face future stressors, it can be concluded that resilience growth plays a crucial role in well-being in academia as well. To this end, primarily students reported having experienced resilience growth throughout their studies compared to university teachers. Still, resilience appears to be relevant in the workplace as well and might therefore also be essential for university teachers (Bonanno, 2004; Britt et al., 2016; Mansfield et al., 2016). Consequently, this aspect warrants further research attention concerning university teachers.

As a third objective of the study, we wanted to identify the core components for conceptualizing well-being in academia, which emerged from the interviewees’ responses. Acknowledging the multidimensional approach of well-being, we expected various aspects of well-being to arise in our data. In line with this, we found an interplay between mental, physical, social, and eudaimonic well-being. In other words, students and teachers expressed that being well for them referred to being mentally healthy, taking care of themselves physically, feeling that they belonged to their institution, and being engaged in what they were doing. This definition coincides with the WHO’s conceptualization of well-being stated within the introduction (World Health Organization [WHO], 2020), yet is extended by the eudaimonic well-being facet.

Misselbrook (2014) criticizes the strictly positive view of health, such as the one advertised by WHO, to be a “utopian vision” and an “unattainable ideal” (p. 582). Such a positive approach, fixated on a presence of positive well-being aspects, seems to neglect certain aspects of human life, including negative emotions and undesirable experiences. We agree with this

critique to a certain extent, seeing the problem of stigmatizing a sense of not feeling well. In fact, we found that several participants appeared hesitant to acknowledge times in their life when they felt unwell and rather pretended to be well (see ‘pretended well-being’ in the codebook). We recognize these dynamics in the various states of well-being, which might impact one’s sense of well-being negatively from time to time. Yet, we believe that human beings can experience personal well-being despite—or in the case of resilience growth, even because of—negative circumstances. In line with this, Misselbrook (2014) conclusively defines well-being, from a medical perspective, as an “unimpaired flourishing” (p. 582). We strongly agree with this view in that individuals are capable of overcoming potential obstacles as well.

Our core conceptualization appeared to be combined with the potential of personal growth due to functional stress as well as with effective regulation of one’s well-being resulting in resilience growth. In this light, related aspects that were not defined as core aspects of the definition were nonetheless strongly intertwined. For instance, aspects such as emotional well-being (Diener et al., 1999), which were not directly reported as well-being components by the participants, played a regulatory or contributing role, respectively. Therefore, these aspects were just as important to include. However, it appeared difficult during the analysis to draw a line between what well-being constituted and which factors solely contributed to a sense of well-being. This is important to keep in mind concerning our decision to define aspects of SDT and well-being regulation as contributing or regulatory factors instead of core elements of well-being. Therefore, given the heterogeneity in conceptualizing and perceiving well-being as well as the difficulties in differentiating contributing factors from core components, other researchers might have come to different conclusions.

Lastly, we postulated that the BPN for competence, autonomy, and relatedness might play an essential role for perceiving well-being in academia. Indeed, all three BPN, autonomy, competence, and relatedness, can be considered as highly relevant when investigating well-being in academia. How autonomous students and teachers feel, how competent they perceive themselves to be, and how related they are to their social surroundings constitute central findings concerning the perception of well-being at the university. Taken together, this assumption reflects on previous research (e.g., Stanton et al., 2016; Larson et al., 2017; Stupnisky et al., 2017; Backhaus et al., 2020) and should also be considered to guide future investigations. On the one hand, all three aspects seemed to be relevant and to contribute to a sense of well-being for students as well as teachers. On the other hand, also within the student-teacher interaction, the satisfaction of these BPN depicted a central aspect. To elaborate, teachers seemed to contribute to their students’ well-being in satisfying their need for competence, autonomy, as well as relatedness when interacting with them. Within this, the need for relatedness concerning the student-teacher relationship, which has been previously suggested (Hagenauer and Volet, 2014b), played a strikingly important aspect of students’ and teachers’ well-being in our data as well. Having already expected such an outcome, the insights gained when investigating this interaction more in-depth were of special interest.

Insights Concerning the Interaction Between Student and Teacher Well-Being

In addition to the conceptualization and perception of well-being, the present study also shed light on important aspects concerning the until now uninvestigated link between students’ and teachers’ multi-faceted well-being in academia. Firstly, in line with expectations, a strong interaction was found in that when university teachers had better or worse well-being, this was, in their perception, associated with better or worse well-being in their students as well. This interaction appeared to be both multifaceted and multidirectional. Regarding the former, in line with Gasper (2004), who argued the importance of respecting the diversity of well-being, we observed that students and teachers were connected through various aspects of their well-being. In particular, their emotional well-being, social well-being, and mental well-being appeared to be strongly intertwined. This resonates with prior literature where, albeit considering individual facets of well-being, the importance of these reciprocal links has also been suggested (e.g., Hagenauer et al., 2015; Frenzel et al., 2018; Harding et al., 2018). Moreover, regarding the multidirectionality, the presence of reciprocal relations is a key finding and suggests that students and teachers can mutually benefit from positive states of well-being. This coincides with research in the university context which discusses the importance of reciprocal effects of emotional well-being (Hagenauer and Volet, 2014b), as well as the transactional nature of the student-teacher relationship (Cotten and Wilson, 2006).

Aside from the interaction itself, it was found that through various factors, students and teachers could impact one another’s well-being. Although the student-teacher relationship has consistently been recognized as a powerful factor in higher education research (Hagenauer and Volet, 2014b; Kezar and Maxey, 2014), our study extends this finding to the construct of well-being. In particular, teacher-related factors seemed to be an important determinant of student well-being, as also suggested by McCallum and Price (2010), who stated that well teachers promote well students. This falls in line with the systemic approach, where the university can be considered a co-contributing atmosphere in which it is critical to concentrate on the interplay of both groups for optimal well-being. However, as most research focuses on the student side of the equation, our findings suggest that it is important to consider both student and teacher well-being to determine what factors affect these relationships for both groups. Thus, a stronger emphasis should be placed on efforts to simultaneously support both populations.

Adding to this, the role conflicts described by teachers were also an interesting finding that emerged from our data. As mentioned by Hagenauer and Volet (2014b), teachers who primarily self-identify with their researcher role may hold different perceptions and values compared to those who identify more as a lecturer or supervisor. Indeed, empirical research documented that role conflicts between teaching and research and academics’ attitudes regarding the interrelatedness of these domains is tied to aspects of their well-being (Daumiller and Dresel, 2018, 2020). Extending this logic implies that not only switching between teaching and research roles, but also switching

between different teacher roles (lecturer and supervisor) might be conflicting. In the present study, we did not restrict the learning environment to either the interaction in class or in a thesis supervision relationship. Thus, it could be of interest to distinguish these two relationships to investigate if they might differ in quality concerning well-being.

Limitations

Despite the contributions that the present study makes to the literature, several limitations must be borne in mind when interpreting the findings. Firstly, we used a selective sample of university teachers and students and thus, our sample runs the risk of certain biases and causal relations cannot be drawn. Specifically, our sample voluntarily agreed to participate in the study, which likely reflects at least some levels of successful coping at the university in terms of well-being and interest in the topic. Thus, our findings might underestimate ill-being factors at universities; however, due to our positive focus on well-being and its facets, we do not consider this as problematic in terms of distorting our findings. Moreover, although an iterative process is commonly used in qualitative research (Watling and Lingard, 2012; Levitt et al., 2018), it can potentially lead to methodological issues in terms of changes within the interview script. In our case, the explicit question of whether and how the interviewees believed student and teacher well-being were intertwined was problematic and led to exclusively teachers reporting on an explicit interaction. Students, in contrast, tended to explain ways in which teachers supported their well-being indirectly rather than to mention the interaction directly. Finally, our study focused on the comprehensive findings gained from using a qualitative research design, which by nature entails limitations concerning quantitative insights. Thus, future studies could profit from incorporating mixed-method or quantitative designs into this line of research.

Implications and Future Research

Given that well-being in educational contexts is becoming increasingly important due to heightened stress and burnout levels, as mentioned within the introduction, we aimed to contribute to a coherent definition of well-being in academia for future research. Our conceptualization, including its core components as well as its regulatory mechanisms and contributors, might contribute to finding a common understanding. Such an overall definition of well-being is expected to benefit future research and to help researchers to talk about the same concept when investigating well-being in academia.

Adding to this, further relevant theoretical frameworks could be considered in future research on student and teacher well-being. First, the Job-Demands Resources Model (Bakker and Demerouti, 2007), in which stress and compromised well-being can be considered as an imbalance between demands and resources, may be especially relevant. Both students and teachers mentioned numerous responsibilities and demands that created stress, but also that different aspects that may be considered as personal resources, such as resilience growth or maintaining work-life balance, seemed to help. Second, numerous passages in

our interview data reflected the usefulness of Achievement Goal Theory as a lens for investigating well-being, which characterizes motivation as “more or less strong strivings toward task mastery and competence development or toward superiority and competence demonstration” (Daumiller and Dresel, 2020, p.1). Specifically, in describing their well-being experiences, students and teachers seemed to reflect different goal orientations, such as learning goals (being focused on gaining knowledge and competencies), relational goals (being focused on fostering close and caring relationships), appearance avoidance goals (being concerned with appearing incompetent to others), and work avoidance goals (being focused on getting by with little effort).

Despite evidence of interaction effects between students and teachers, there exists far more research on initiatives to promote students' well-being in academia than university teachers' well-being (Fernandez et al., 2016). This tendency is also reflected in present strategies to enhance well-being in academia, such as the Australian Health Promoting University Network or various interventions focused on helping the individual to face academic distress (for examples, see Gleeson, 2001; Conley et al., 2015; Dawson et al., 2019). Such academic initiatives to enhance student well-being have also been initiated in the Netherlands and Germany, such as the Dutch National Network Student Well-Being or German awareness-raising initiatives. Despite examples such as the Okanagan Charter, an international charter for promoting health in universities and colleges for both staff as well as university student well-being, similar initiatives remain scarce. Thus, to supplement the student side of well-being in academia, future research as well as university policy should further focus on practical methods to support academics in dealing with compromised well-being. In fact, the interconnectedness and reciprocity between staff and student well-being, which our findings supported as well, emphasize that to enhance mental health, university strategies must focus on both populations (Fernandez et al., 2016). Furthermore, policies should stress factors that are conducive to supporting the student-teacher relationship, as also suggested by Hagenauer and Volet (2014b) as well as Frenzel et al. (2016). Ultimately, positive interactions between students and teachers should be further encouraged as they constitute powerful tools in promoting well-being in academia.

CONCLUSION

Taken together, the present study contributes to a better understanding of what well-being means for students and teachers in the university context as well as how their well-being interacts. In particular, our findings indicate that well-being encompasses the core elements of mental, physical, social, and eudaimonic well-being. These core elements were strongly intertwined with several important contributing and regulatory factors, such as the BPN and resilience growth, keeping a work-life balance, as well as emotion, motivation, and self-regulation. Moreover, the aspects within our conceptualization reflected a positive, resilience-based, multifaceted, and basic need fulfillment

approach, as outlined in the results section. In line with these theoretical notions, indications of a pronounced and dynamic interplay between student and teacher well-being were found. Concrete next steps may involve quantitatively investigating the aspects found within this paper to further understand their impact on students' and teachers' well-being. This approach, in turn, might lead research and practical initiative efforts further in understanding how to promote well-being at the university and foster students' and teachers' well-being shoulder-to-shoulder.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because sharing the data openly was not possible due to the sensitivity of the qualitative data. Requests to access the datasets should be directed to l.kiltz@rug.nl.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics Committee of the Department

Teacher Education, University of Groningen, Netherlands. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

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

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Enhancing Internal Learning in Teams: The Role of Network Centrality and Psychological Capital of Undergraduate Students

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This study aims to analyze the mediating role of psychological capital (PsyCap) in the relationship between network centrality and internal learning in teams. A questionnaire was administered to 480 undergraduate students to test this relationship. The results confirmed the positive relationship between network centrality and internal learning in teams, and a mediating role of PsyCap in the relationship between student network centrality and internal learning in teams. This study suggests that it is important to promote centrality in advice networks among undergraduate students. In addition, this study might raise awareness among students, teachers, and public policymakers about the need to promote a socially responsible environment in higher education institutions.

Keywords: network centrality, psychological capital, self-efficacy, optimism, hope, resilience, internal learning in teams, undergraduate students

INTRODUCTION

The learning development can be considered complex because it can flow within a community since its members can have similar experiences, share the same language, and have a mutual understanding of specific problems (Huber, 1991). In particular, learning has been positively related to the cognitive and innovative adaptation of individuals, measures of network centrality, and performance improvement in different contexts (Gray and Meister, 2006; Wang et al., 2014; Grando et al., 2018). In educational settings, You (2016) has found that the development of students' learning skills allows them to overcome uncertainties regarding the labor market, due to high unemployment rates and low job security, and facilitates the achievement of future goals.

Internal learning processes involve the creation of knowledge by individuals, and it is necessary for individuals to realize that it is an issue over which they can exert some influence (Kessler et al., 2000; Goorha and Mohan, 2009). Therefore, understanding the factors that enhance the student learning process is important for uncovering why some students are successful and others are not (Fox and Ronkowski, 1997). Given that previous studies provided evidence that the expected benefits of the learning process include increases in students' civic responsibility and social justice, as well as the development of interpersonal and social problem-solving skills (McElravy et al., 2017).

While broadly ignored in the learning literature, we argue that the social network theory can be interesting to increase the understanding of the internal learning process. Social network theory emerges from people's efforts to shape their social relationships (Lee and Kim, 2010). From this perspective, the social network indicates that the individual performance can also be determined by the standard environment or relationship structure where individuals are inserted (Carboni and Ehrlich, 2013). On the other hand, Luthans et al. (2014) pointed out that it is important for individuals to be committed to promoting learning and overcoming barriers to success, so for it, they need to develop certain psychological skills.

Although no internal learning studies have included the social network theory directly, more recent research has shown interest in conducting studies that analyze the relationship between individual's psychological capabilities and his position on different types of social networks (Grando et al., 2018). However, there have been just a few attempts to run studies that allow us to examine the effects of the relationship between psychological capital (PsyCap) and network centrality in the learning process. Despite that, there is evidence of using social network analysis (SNA) in the classroom context (Soares and Lopes, 2017).

Recent studies by You (2016) and McElravy et al. (2017) noted this deficiency and suggested research on this important relationship. Our logic here is based on research that suggests that an individual's central position in a social network offers greater access to information and promotes greater confidence to learn (Vardaman et al., 2012). Therefore, this study aims to analyze the mediating role of PsyCap in the relationship between network centrality and internal learning in teams. We argue that the analysis of network centrality can provide a great theoretical and practical contribution to a broader understanding of the influence of PsyCap in the internal learning process.

The remaining of this paper is organized as follows. First, we present a review of the literature on network centrality, internal learning in teams, and PsyCap as well as the outline of the hypotheses of the study. Second, the presentation of the methodological options and procedures and the results are described. Third, we present the discussion of the results and outline of the main implications of this study for theory and practice. The paper ends with some concluding remarks.

THEORY AND HYPOTHESES

Network Centrality

In the last decade, SNA has experienced a golden age, with significant developments and productive expansion. These factors had a rapid impact on the growth of conceptual and empirical studies in substantial areas (Burt et al., 2013; Eid and Al-Jabri, 2016). On the other hand, recent conceptual, empirical, and technical advances have enabled a growing interest in SNA (Wölfer et al., 2015).

Therefore, SNA is an increasingly interdisciplinary field that focuses on a set of actors and the relationships that link them (Borgatti et al., 2009). The theory of social networks aims to explain the structure of relationships between social entities

and how social structure influences other social phenomena, such as psychological well-being, reciprocal support and social capital, knowledge management, and financial risk-adjusted performance (Bae et al., 2018; Rossi et al., 2018).

This approach allows for structuring links between network members through certain interdependencies and assumes that these interdependencies explain something about network members (Wölfer et al., 2015). Therefore, the position that each individual occupies in the social network has been considered crucial for the understanding of different results in various contexts (Fang et al., 2015). According to Lee and Kim (2010), studies on social networks highlight the position that the actors occupy, especially the network centrality.

Network centrality is the structural position most strongly linked to performance-related results (Carboni and Ehrlich, 2013). For Bae et al. (2018), centrality can be defined as the power and influence of an actor within a network, where the actor is defined as an individual that has diverse connections with other people. Centrality indicators using SNA are considered important because they allow us to investigate the degree of network connectivity, as well as identify individuals with more and fewer interactions within the network (Alarcão and Neto, 2016).

Based on the position that each individual occupies in a network, different studies, such as Fang et al. (2015), emphasize the role of centrality in instrumental network (also known as advice networks). Advice networks include interactions related to the performance of a particular work or task. Therefore, centrality in advice networks provides individuals with many connecting opportunities to receive and accumulate knowledge, skills, and information related to task performance (Vardaman et al., 2012).

According to Freeman (1979), there are different dimensions that allow us to analyze network centrality, namely degree centrality (in- and out-degree), closeness centrality, and betweenness centrality. This current research used the measure of in-degree centrality to analyze the centrality in advice networks. In-degree centrality is the measure most commonly used to show the position of the actor in a network, which is based on the number of direct links that an actor has with other actors (Badar et al., 2015). Additionally, in-degree centrality is considered as the relative extent to which an individual can be connected to all other individuals in the network, thus allowing to quantify the relative number of relationships of an individual in a given context (Vardaman et al., 2012). Furthermore, in-degree centrality allows comparisons across networks of different sizes and it is the most straightforward method to measure the network centrality of actors (Lee and Kim, 2010; Vardaman et al., 2012; Badar et al., 2016).

Positive Psychological Capital

Positive PsyCap refers to certain positive psychological resources, such as self-efficacy, optimism, hope, and resilience, and has been widely demonstrated as a higher-order construct (Luthans et al., 2018). According to Luthans and Youssef-Morgan (2017), PsyCap is considered as a relevant construct that reflects the positive psychological state of development of individuals.

For Luthans et al. (2006), the PsyCap consists of four capabilities, including: (1) self-efficacy: refers to individual trust

which consists in making the necessary effort to successfully perform challenging tasks; (2) optimism: consists in making positive attributions in the realization of future events; (3) hope: related to the perseverance to achieve goals and when necessary to redirect the paths to achieve success; and (4) resilience: refers to an individual's ability to recover from adversity, even when faced with problems in order to achieve success.

Despite that self-efficacy, optimism, hope, and resilience are depicted as different conceptual capabilities, certain authors such as Luthans et al. (2007) argued that these constructs share a common variation called PsyCap. PsyCap is widely cited in the literature as a malleable construct more open to development, as opposed to trait-like constructs such as the Big five personality factors (Datu et al., 2016; Chen et al., 2019; Xu et al., 2020).

For Luthans and Youssef-Morgan (2017), these aforementioned psychological capacities were the first to be incorporated into PsyCap because of certain criteria, such as adequacy to theory, measurement, development, and impact on performance. These four psychological capabilities together enable an individual to overcome obstacles and remain motivated to achieve goals and success (Harms et al., 2018; Wang et al., 2019).

The identification of PsyCap as a second-order construct has become increasingly common in many studies, especially in the area of organizational behavior (Luthans et al., 2008). Moreover, the interaction of these psychological capacities creates a synergistic motivational effect (Huang and Luthans, 2014). Thus, theoretical and empirical studies have considered PsyCap as an emerging nuclear construct related to different positive outcomes (Luthans et al., 2010).

In the academic environment, previous studies have shown a positive relationship between PsyCap and life satisfaction (Datu and Valdez, 2019), academic performance (Luthans et al., 2012), positive emotions (Carmona-Halty et al., 2018), motivation, engagement, and achievement (Datu et al., 2018). However, further studies are needed to better understand the relationship between PsyCap and other outcomes, especially with regard to internal learning in teams.

Internal Learning in Teams

The learning experience can be considered as a positive process involving support, motivational satisfaction, and task development. On the other hand, this experience may shift to a counterproductive trajectory, increasing motivational frustration and disengagement from the learning process (Jang et al., 2016). It is for this reason that learning-related activities are considered critical for achieving positive outcomes in different contexts (Song et al., 2014; Sáiz Manzanares et al., 2017).

Internal learning in teams is considered as an ongoing process that involves planning, monitoring, and evaluating different tasks and allows individuals to adapt flexibly the tasks defined to the progress achieved (Pekrun et al., 2002). According to Ortega-Maldonado and Salanova (2017), internal learning in teams refers to the knowledge acquired by students at the end of a study program. Moreover, Edmondson (1999) conceptualized individual learning as a continuous process of reflection and action, characterized essentially by asking questions,

seeking feedback, reflecting on results, and discussing errors or unexpected outcomes of certain actions.

According to Goorha and Mohan (2009), the learning process goes through various stages, namely: (1) collecting concrete experience on a concept, (2) reflection and observation on the main aspects of the concept, (3) abstract conceptualization of the concept using reflections, and (4) application of the concept through experimentation. According to Wang et al. (2014), learning is related to the intentional actions of individuals who seek access to knowledge, experiences, insights, and opinions.

Learning is linked to intrinsic motivation, as genuine student interest in course material will facilitate their academic success. Thus, student academic performance is an important indicator of how well the chosen course matches their interests and skills (Conti, 2000). According to Pekrun (1992), in a results-oriented society, learning should be considered one of the most important parts of the student's daily life. On the other hand, the attention to students' who worked in a team's settings can be beneficial to understand the learning process. Hassanien (2006) argues that working in teams can increase the development of internal learning through discussion, analysis of ideas, and assessment of the other member's ideas. For Dickerson et al. (2013), working in a team provides great learning opportunities, given that it allows team members to build on the ideas of others and enhance their thinking and understanding.

For Roorda et al. (2011), the study of internal learning in teams is considered important, given that it is a predictor of academic success and future career opportunities for students. Thus, analyzing the factors that drive learning in the academic context has been an important priority for students, university administrators, and policymakers (Martínez et al., 2019).

On the other hand, the tasks that students find in universities serve as preparation for the job market, given that the experimental activities, the workgroup, and structured opportunities to interact with other students of the same university resemble tasks and behaviors of employees in organizational contexts (Datu and Valdez, 2019). Students, as well as employees, need to have motivation and energy to learn and achieve their goals, especially undergraduate students who perform their activities in challenging circumstances, thus, they should value the learning process as they prepare for their careers (You, 2016).

Network Centrality and Internal Learning

Social network analytics has emerged as a powerful approach to understanding how an individual's position in a social network provides important new insights into patterns and structures of interaction that would otherwise be difficult to achieve, allowing a wide range of outcomes to be influenced (Russo and Koesten, 2005). In this context, the social network perspective complements the traditional focus on individual attributes and emphasizes the relationship between certain actors to better understand their behaviors within the network (Lee and Kim, 2010).

According to Borgatti and Halgin (2011), network centrality is a valuable source of information and proximity to the largest number of network members, as it allows communication on the network to be done quickly. Thus, central individuals are

those who can use a network connectivity framework to obtain and make information available quickly and effectively (Mantzaris et al., 2013; Reyachav et al., 2017). For Fang et al. (2015), people who occupy central positions in advice networks benefit from useful knowledge and social support and are likely to accumulate task information, which can boost the learning process.

However, there is little empirical evidence to support the positive relationship between network centrality and internal learning in teams. Previous empirical research, such as the study of Mantzaris et al. (2013), provided a theoretical view that allows us to develop the link between network centrality and different positive outcomes. This evidence leads us to formulate the following hypothesis:

H1: network centrality positively influences internal learning in teams.

Network Centrality and Psychological Capital

PsyCap represents individual motivational propensities that accumulate through positive psychological compositions that can be socially constructed (Chen et al., 2019). Authors such as Russo and Koesten (2005) argued that an individual with a high network centrality is in direct contact with many others in the network, which allows the development of certain psychological capabilities.

Additionally, central individuals in advice networks are considered to be successful. Therefore, they have higher levels of hope in terms of capacity and motivation to create alternative pathways leading to the achievement of academic goals and have high efficacy beliefs in their ability to confidently pursue academic goals, resilience in the face of uncertainties, setbacks, failures, and conflicts and optimism in obtaining positive results in stressful situations (Vardaman et al., 2012; Luthans et al., 2018).

For Lee and Kim (2010), network centrality is a potential measure of influence based on the actors who seek to interact within the social network. Network centrality plays a relevant role, as it is the mechanism that allows individuals to obtain information through contact with others, which can increase the positive psychological capabilities that make up PsyCap, namely self-efficacy, optimism, hope, and resilience (Dawkins et al., 2013).

Moreover, network centrality in advice networks consists of a set of interactions that are predominantly used for social and emotional support (Vardaman et al., 2012). Thus, central individuals in social networks can face greater sacrifices as they are rewarded for their value as a source of advice, information, and knowledge (Vardaman et al., 2015). Given this, we hypothesize that:

H2: network centrality positively influences psychological capital.

Psychological Capital and Internal Learning in Teams

PsyCap has been recognized as a driving force for positive outcomes in the academic field (Ortega-Maldonado and Salanova, 2017).

Certain studies refer to the positive relationship between PsyCap and academic performance. For example, You (2016) conducted a study with 490 college students, and the results showed that PsyCap has a positive and significant relationship in strengthening learning.

For Luthans et al. (2014), a proactive approach to the development of psychological resources for students can effectively promote learning and help to overcome barriers to academic success. In this context, the PsyCap of students contributes to improve learning and overcome uncertainties and facilitates future achievement of goals (Ortega-Maldonado and Salanova, 2017).

Datu and Valdez (2019) argue that the study of PsyCap in the academic field may be beneficial for the preparation of university students in creating favorable conditions for the learning process. Therefore, You (2016) suggests that education professionals should recognize students' PsyCap as a valuable resource for learning and, thus, develop effective strategies for assessing and managing PsyCap in the classroom. Given this kind of previous conclusions, we hypothesize that:

H3: psychological capital positively influences internal learning in teams.

The Mediating Role of Psychological Capital

Previous research has established a positive significant link between PsyCap and success in different academic outcomes (Luthans and Youssef-Morgan, 2017). Newman et al. (2017) argued that the social support from peer relations contributes to reinforcing their psychological capacities. For Luthans et al. (2012), PsyCap is a significant antecedent of positive outcomes in the academic field.

Previous studies have also concluded that support from advice networks is positively associated with individuals' PsyCap and drives the achievement of positive outcomes in different contexts (Nigah et al., 2012). According to Soares and Lopes (2014), network centrality has a special role, as it is the mechanism that allows individuals to obtain information through contact with others. Thus, Dawkins et al. (2013) argued that interactions with different actors can increase the PsyCap and allow the attainment of different positive outcomes. We, thus, hypothesize that:

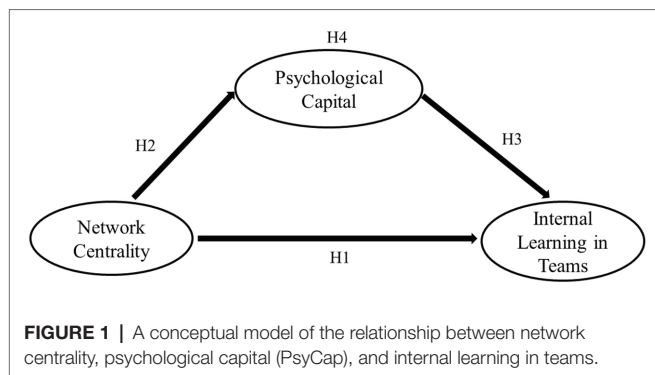
H4: psychological capital mediates the relationship between network centrality and internal learning in teams.

A conceptual model of the mediating role of PsyCap in the relationship between network centrality and internal learning in teams is presented in **Figure 1**. In addition, the conceptual model presents also the hypotheses under study.

MATERIALS AND METHODS

Participants

Participants in this study were undergraduate students from three large higher education institutions (two public institutions and one private institution). These higher education institutions were



selected from a list of eight higher education institutions. As a result, 600 questionnaires were distributed and 480 questionnaires (80% acceptance rate) were received during the month of August 2018 (4 months after the beginning of each module).

In total, 480 questionnaires from 22 classes (ranging from 19 to 44 students per class) were considered valid. Our sample size is greater than the minimum sample size (200) recommended for structural equation modeling analysis with maximum likelihood estimation (Hair et al., 1995). Of the entire sample, the participants were 54% men, and the average age of the participants was 24 years ($SD = 5.94$). The most significant classes were Economics (25%), Business Management (12%), Nursing (11%), and Linguistics-English (8%). Additionally, 61% were from the first year, 21% from the second year, 11% from the third year, and 7% from the fourth year.

Procedures

The data collection has been authorized by the board of each institution, and permission has been granted by the lecturer of the modules in which the survey took place. Thus, participants voluntarily completed the questionnaire during the class period, using paper and pencil. They first filled out a questionnaire measuring PsyCap and internal learning in teams. Then, a questionnaire measuring network centrality was administered. Moreover, it is important to note that all variables under study were measured at the individual level of analysis. Therefore, for the internal learning in teams variable, we asked the students to fill the questionnaire taking into account their individual work with team member collaboration, as suggested by Lee et al. (2018).

To ensure confidentiality given the sensitive nature of the research, the first author personally distributed and received all questionnaires and also clarified any doubts that arose during this proceeding. Furthermore, all participants were informed that participation was voluntary and the data collected would be processed solely by the researchers involved in this study. Given that we used network centrality measures, we were not able to guarantee the anonymity of the responses, but all the participants were informed of this fact.

Measures

Network Centrality

Network measures were collected by asking participants to nominate up to five same-class colleagues enrolled in a specific

module whom they turn to make an important decision related to the school task performance (advice networks). The number of same-class colleagues that each participant indicated is consistent with the research literature (e.g., Lopes, 2012). No list of students was provided in the questionnaire, so participants were free to choose same-class colleagues from their relations. The lack of constraint regarding the minimum number of same-class colleagues that each participant could indicate contributes to minimizing measurement errors, that is, a gap between the actual number of relations and the declared number (Vignery and Laurier, 2020).

Additionally, for each of the nominations, participants rated, “Sufficient” (1) to “Very Much” (7), how much they really turn to the nominees. After the data collection process, we have calculated the degree centrality (in-degree) for each advice networks using UCINET 6.681 software for Windows developed by Borgatti et al. (2002). Given that we used 22 advice networks of different sizes, we follow the recommendations from different authors, such as Vardaman et al. (2012) to correct an individual’s network size by aggregating responses by imputing the size of a network in an individual’s centrality score. According to Freeman (1979), this procedure allows comparing the relative centrality of individuals located within different networks.

PsyCap

We used the version of the 24-item questionnaire adapted for academic research by Luthans et al. (2012). The scale is composed by four subscales with six items each, corresponding to positive psychological capacities evaluating, respectively, self-efficacy (e.g., “I feel confident when I look for a solution to a long-term problem”); hope (e.g., “There are lots of ways around any problem concerning my schoolwork”); resilience (e.g., “I usually manage difficulties one way or another concerning my schoolwork”); and optimism (e.g., “In studies, I am optimistic about what will happen in the future”). The responses were given on a six-point Likert scale, from (1) “Totally Disagree” to (6) “Totally Agree”. According to Luthans et al. (2012), the 24-item PsyCap scale presented in the original study has a Cronbach’s α of 0.90.

Internal Learning in Teams

We used the scale developed by Edmondson (1999). The scale was confirmed by Bresman and Zellmer-Bruhn (2013) and is related to internal learning with seven items. Example of items: “We regularly reserve time to find ways to improve the group’s work processes” and “In the team, there is always someone who ensures that we stop to reflect on the work process.” The response scale used is a seven-point Likert type, from (1) “Totally Disagree” to (7) “Totally Agree” with a Cronbach’s α of 0.71.

The scales were translated into Portuguese using the translation/retroversion method. The original scale and translated versions were carefully compared, at this stage, an English-speaking native and a Portuguese-English linguistic lecturer assisted us in this process.

Measure Validity

We ran a confirmatory factor analysis on our two latent constructs: PsyCap and internal learning in teams, omitting network centrality, given that it has single-index scores rather than multi-item. The confirmatory factor analysis, carried out with the AMOS software (V.25) on the PsyCap scale, resulted in adequate values. The model presents moderate and good factorial weights ($\lambda \geq 0.30$) and appropriate individual reliabilities ($r^2 \geq 0.10$). The final model has excellent adjustment indexes [$\chi^2(145) = 242.993$, $p < 0.001$; TLI = 0.908; CFI = 0.922; GFI = 0.949; SRMR = 0.044; RMSEA = 0.038]. The Cronbach's alpha for the PsyCap dimension was 0.86. We used PsyCap as a second-order factor, given that PsyCap as a second-order construct has a stronger impact on positive outcomes in the academic field than the four psychological capabilities separately (Alessandri et al., 2018).

For the internal learning in teams scale, the confirmatory factor analysis allowed us to obtain adequate values. The model presents moderate and good factorial weights ($\lambda \geq 0.40$) and appropriate individual reliabilities ($r^2 \geq 0.16$). The final model presents excellent adjustment indices [$\chi^2(7) = 23.797$, $p < 0.001$; TLI = 0.950; CFI = 0.977; GFI = 0.984; SRMR = 0.034; RMSEA = 0.071]. Cronbach's alpha coefficient for internal learning in teams is 0.76.

RESULTS

Descriptive Statistics

Network centrality data generated with UCINET after correcting participants' centrality score due to the different sizes of the advice networks were entered into an SPSS V.25 software file along with the other latent constructs, namely PsyCap and internal learning in teams. **Table 1** shows the means, standard deviations, Cronbach's alphas (in parentheses), and Pearson's correlations among the variables being studied. The internal consistencies obtained for the scales used were good, and the pattern of correlations revealed significant direct relationships for all the variables in our sample.

Hypotheses Testing

According to Hu and Bentler (1999), the model fit indices suggest an acceptable fit for our hypothesized structural model ($\chi^2 = 542.842$, $df = 317$, $p < 0.001$, TLI = 0.90; CFI = 0.89; GFI = 0.92; SRMR = 0.049; RMSEA = 0.039). Thus, for the

hypothesis test, we used a bootstrap approach with a 90% confidence interval over the indirect standardized effects. The results show that network centrality has a positive influence on internal learning in teams ($\beta = 0.085$; $p = 0.009$) and network centrality positively influences PsyCap ($\beta = 0.173$; $p = 0.004$). Thus, hypotheses 1 and 2 were supported. PsyCap is significantly and positively related to internal learning in teams ($\beta = 0.325$; $p < 0.001$), which supports H3.

The results show that PsyCap fully mediates the relationship between network centrality and internal learning in teams (indirect effect = 0.058; 90% CI limits to 0.030 and 0.104), supporting hypothesis H4. The final model (**Figure 2**), presents the results of the hypothesis test.

DISCUSSION

The main purpose of this study was to analyze the mediating role of PsyCap in the relationship between network centrality and internal learning in teams. The results confirmed the positive relationship between network centrality and internal learning in teams (hypothesis 1). These results lead us to argue that academic achievement within the advice networks can contribute to maintaining the link between student centrality and student learning.

According to Kretschmer et al. (2018), undergraduate students tend to cluster with peers who share the same levels of performance. On the other hand, Barnes et al. (2014) argued that this process is unconscious, that is, students during their academic process are probably not opportunistically related to their peers. For Vignery and Laurier (2020), it seems preferable that a student does not resort to other colleagues to address

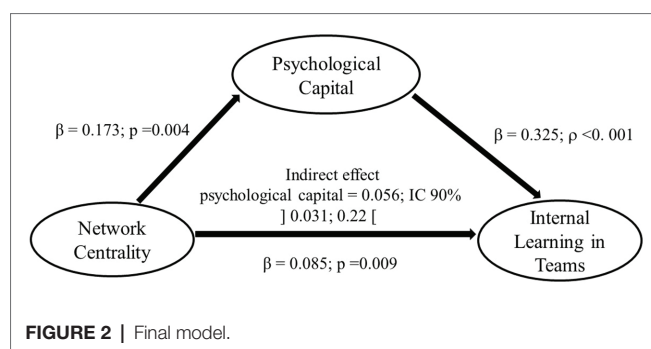


TABLE 1 | Means, standard deviations, and correlations between study variables.

Study variables	M	SD	1	2	3	4	5	6	7
1. Network centrality	1.40	0.99	-						
2. Psychological capital	4.77	0.56	0.124**	(0.86)					
3. Self-efficacy	4.69	0.74	0.051	0.645**	(0.70)				
4. Optimism	5.15	0.81	0.070	0.710**	0.252**	(0.72)			
5. Hope	4.83	0.68	0.123**	0.720**	0.368**	0.320**	(0.74)		
6. Resilience	4.41	0.90	0.113*	0.781**	0.281**	0.418**	0.449**	(0.80)	
7. Internal learning in teams	3.95	1.19	0.117*	0.258**	0.196**	0.147**	0.234**	0.175**	(0.76)

N = 480. Cronbach's α s (in parentheses). *The correlation is significant at the 0.05 level (2-tailed); **The correlation is significant at the 0.01 level (2-tailed).

issues related to task performance, than maintaining strategic relationships with underperforming colleagues. So, we can argue that the process of referring colleagues in advice networks can be a strategic choice and is related to learning. Previous research on the centrality of undergraduate students (e.g., Balyer and Gunduz, 2012; Barnes et al., 2014; Kretschmer et al., 2018) has shown positive and significant results between academic achievement and centrality in advice networks.

The relationship between network centrality and PsyCap was also confirmed (hypothesis 2). This relationship seems to happen because, according to Huang and Luthans (2014), PsyCap allows individuals to build confidence and endure hard times in challenging environments. Thus, individuals with high levels of PsyCap are less likely to give up when faced with obstacles and challenges, because they usually have a positive outlook and can look for creative ways to solve problems and, thus, seize opportunities (Chen et al., 2019). For Luthans et al. (2018), PsyCap allows individuals to focus on performing tasks and achieve success in completing these tasks. Therefore, it is understandable that central individuals in advice networks develop positive psychological capacities, such as PsyCap.

For Russo and Koesten (2005), the central position of the individual in social networks might be related to positive behaviors. According to Newman et al. (2014), the study of PsyCap has attracted great interest from academics and professionals and has been related to positive behaviors in different contexts. For example, Newman et al. (2017) argued that access to information may play a critical role in the development of an individual's psychological resources. This seems to happen because PsyCap represents individual motivational resources that are socially constructed (Dawkins et al., 2013). Thus, we argue that centrality in advice networks can promote the development of students' PsyCap. Moreover, these results are consistent with previous studies that highlight the benefits of individuals' centrality in advice networks (Vardaman et al., 2012, 2015).

Our third hypothesis, relating PsyCap and internal learning in teams, was also supported. These results are consistent with previous studies (Luthans et al., 2014; You, 2016), which demonstrated that PsyCap of undergraduate students had a positive and a significant relationship with strengthening learning. Lee and Song (2010) argued that the PsyCap in the academic field contributed to the strengthening of learning outcomes. For Martínez (2019), the development of PsyCap can help students balance the challenges of academic life or at least allow students to evaluate these challenges as manageable, which can facilitate the achievement of high performance. Thus, we argue that PsyCap can also allow students to set goals and work hard to achieve them, which can drive the learning process.

Finally, the mediating role of PsyCap in the relationship between network centrality and internal learning was also supported (hypothesis 4). In particular, these results show that central students in advice networks might develop their psychological capacities in order to achieve learning outcomes in the classroom. These results seem to happen because PsyCap would allow central students to have the confidence to face challenges times throughout their academic careers.

For You (2016), PsyCap is a resource that strengthens the learning process, allows students to overcome uncertainties, and facilitates the achievement of future goals.

Limitations and Future Directions

The present study has some limitations. We excluded the declared nominations corresponding to students who did not respond to the questionnaire related to other variables under study, as recommended by Vignery and Laurier (2020). However, 128 undergraduate students were excluded (average was six students per class), who was nominated at least once and did not answer the entire questionnaire (as they were absent during the data collection process). Thus, we were left without registering these students' nominations, which could probably increase the centrality scores of the 480 participants. According to Huisman (2009), high levels of non-response in social network studies may underestimate the calculated coefficients. Therefore, future studies should choose to determine network boundaries.

Another limitation relates to a potential common method variance problem, given that the data were collected at the same point in time. However, we argue that same-source bias cannot be considered a threat to the findings of this study, for the following reason. Network centrality data were derived from a sociometric questionnaire, while the remaining variables, PsyCap, and internal learning in teams were measured using a psychometric scale. This is important given that a recommended technique for addressing common method bias is to have predictor and criterion data come from different data sources (Vardaman et al., 2015). For further researches, a longitudinal analysis could help to explore these relations.

Finally, it would be important to use different data collection methods. For Heale and Forbes (2013), the combination of different data collection methods (e.g., qualitative and quantitative) can be important to compare findings from different perspectives. For example, performing interviews of some students who have good network centrality and some who have weak network centrality might add another perspective. Therefore, further studies are necessary in order to explore this alternative path.

Theoretical and Practical Implications

Our study contributes to the literature in several ways. First, we provide evidence that the centrality in advice networks can influence internal learning in teams, which means that the application of social networking theory in the academic field contributes to achieving learning outcomes. Thus, this study suggests that it is important to promote centrality in advice networks in the academic field. In addition, this study might raise awareness among students, teachers, and public policymakers about the need to promote a socially responsible environment in higher education institutions.

The second contribution of this study comes from explaining the mechanism by which centrality in advice networks can promote internal learning in teams. In hypothesis 4, we proposed PsyCap as the mediator of this relationship. This result is interesting because it reinforces the advantages of PsyCap

beyond the organizational context and might contribute to the management of the PsyCap of undergraduate students. For Luthans et al. (2014), the development of PsyCap can be beneficial to promote academic success and, thus, contribute to the preparation of valuable human resources for a professional career.

Our third contribution comes from the notion that centrality in advice networks may be useful in fostering PsyCap. These findings fill an important gap in the PsyCap field, which led certain authors such as Grando et al. (2018) to highlight the importance of explaining the role of an individual's position on PsyCap fostering (Grando et al., 2018). For Heled et al. (2015), the creation of the dissemination mechanisms that enable individuals to share their knowledge and insights has been theorized as a factor that promotes PsyCap. Given this, PsyCap training programs should have individuals' centrality in social networks and group work into consideration.

Finally, this study emphasizes the need for effective relationship building within higher education institutions through different interactions between students. So, we argue that this process may contribute to enhance centrality in advice networks. On the other hand, specific efforts should be done to promote student interactions. For example, teachers should focus more on group work and lectures promoted by students as priorities in the teaching and assessment process.

CONCLUSION

The main purpose of this study was to analyze the mediating role of PsyCap in the relationship between network centrality and internal learning in teams. Knowing more about the relationship between centrality in advice networks and internal learning of undergraduate students is relevant, given the different positive learning outcomes, such as cognitive and innovative adaptation of individuals, the development of performance in different contexts and engagement (Gray and Meister, 2006; Wang et al., 2014; You, 2016; Grando et al., 2018).

The study results show that network centrality appears to play a positive role in the internal learning in teams of undergraduate students. In addition, the study also found evidence of the relationship between network centrality and PsyCap. Also, as predicted, PsyCap has related to internal learning in

teams. Finally, we find evidence of the mediating role of PsyCap in the relationship between network centrality and internal learning in teams. As such, we argue that the present study is important because it suggests specific efforts to promote internal learning in teams in academic settings. In particular, the importance of network centrality and PsyCap should not be underestimated by students, teachers, and public policymakers interested in enhancing internal learning in teams.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by higher education institutions in the province of Huíla, Angola. It is the only condition required for the data collection process in higher education institutions in Angola. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

RG designed, prepared, carried out the data collection process, and written the article. ML revised the section of the analysis and discussion and corrected the entire manuscript. AS analyzed and verified the data in this article. All authors contributed to the article and approved the submitted version.

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Effects of a Mindfulness Intervention Among Arab Teachers Are Mediated by Decentering: A Pilot Study

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Although mindfulness-based interventions (MBIs) in education are widely spreading in the world, examination of mindfulness effects in Arab schools is still scarce. This pilot study aimed to fill this gap by examining the effects of an MBI among Arab teachers in Israel. This examination was conducted within the framework of the mindful self in school relationships (MSSR) model, which suggests that the positive effects of MBI on teachers' emotion regulation are mediated by decentering. The participants ($N = 39$) were teachers from two Arab elementary schools in Israel, who underwent an MBI course (the MBI condition, $N = 20$) and another cognitive intervention (the control condition, $N = 19$). In a pre-post design, participants completed mindfulness, decentering, emotion regulation, and stress questionnaires. We hypothesized that (1) only in the MBI group, teachers' mindfulness, decentering, and emotional regulation will increase and stress will decrease, and (2) changes in teachers' decentering would mediate the associations of changes in teachers' mindfulness with changes in their emotion regulation. ANOVA analyses show that, only in the MBI condition, teachers showed an increase in three mindfulness subscales (acting with awareness, non-reactivity, and observance), in decentering, and in adaptive emotion regulation (reappraisal) and a decrease in stress. Furthermore, changes from pre-intervention to post-intervention in teachers' decentering mediated the associations of their pre-post changes in mindfulness with changes in emotion regulation. This study provides initial support to the feasibility and efficacy of MBI among Israeli Arab teachers and suggests decentering as a potential mediator of its effects in initial support of the MSSR model.

Keywords: mindfulness, teachers, decentering, emotion regulation, arab schools

INTRODUCTION

Mindfulness is a meditative practice originating in the Theravada Buddhist tradition, defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 2011, p. 291). In the last three decades, there has been a rapid growth of interest in mindfulness in educational settings (Meiklejohn et al., 2012; Roeser and Pinela, 2014) due to growing evidence for the contribution of mindfulness-based practices to attention and emotion

regulation abilities and to increased physical and mental health (Roeser, 2014; Tang et al., 2015; Schonert-Reichl and Roeser, 2016). These compelling effects have motivated mindfulness cultivation in education and specifically among teachers [e.g., the Inner Resilience Program, Lantieri et al., 2016; the Cultivating Awareness and Resilience in Education (CARE), Jennings et al., 2013]. These mindfulness-based interventions (MBIs) for teachers' professional development aim to reduce stress and improve performance and classroom environments by cultivating teachers' mindfulness and emotion regulation. Indeed, research on MBIs for teachers shows that it enhances teachers' well-being, performance (Hwang et al., 2017), teaching efficacy (Harris et al., 2016), and classroom management and promotes supportive relationships with students (Jennings, 2016) while reducing teacher burnout (Roeser et al., 2013).

Although MBIs in educational settings are becoming widespread in the world, especially in the United States and Europe (Ostafin et al., 2015) and, to a lesser extent, in Israel (Tarrasch, 2015; Ergas et al., 2018; Tarrasch et al., 2020), studies of mindfulness effects in Arab schools are still scarce. Although a few recent studies show a beneficial effect of MBIs on students in the United Arab Emirates (Nabulsi, 2015) and Saudi Arabia (Al-Ghalib and Salim, 2018), there is no report on such training targeting Arab teachers to the best of our knowledge. Furthermore, the vast majority of studies on teachers' mindfulness are conducted in the United States and the United Kingdom (see Hwang et al., 2017). We found only one study that reported teachers' MBI outcomes in an Islamic (but not Arab) country. In this Persian study (Jenaabadi et al., 2017), the 15 participants in the experimental group (but not the 15 in the control group) received eight sessions of training mindfulness skills. The results show a decrease in teachers' stress and increase in teachers' well-being in the MBI group compared to the control group. This scarcity of information about teacher MBI in diverse cultural contexts demonstrates the need for further examination of its outcomes and the underlying mechanisms in an educational context.

This is important, as cultural contexts differ in manners that are related to mindfulness. Specifically, Arab cultures differ from most Western cultures in a few ways that may impact the effect of mindfulness: (1) Arab cultures are more collective (Buda and Elsayed-Elkhouly, 1998) and interdependent within their in-groups (Triandis, 2001). In collectivist cultures (opposed to more individualistic cultures), people tend to prioritize the goals of their in-groups (e.g., family, tribe, nation) over their personal goals and are especially concerned about relationships (Triandis, 2001). (2) Arab cultures are typically more hierarchical than most Western cultures, and thus, not all people are considered equal (in essence), and the social structure is more strict and less flexible (Hofstede and McCrae, 2004). (3) There is higher uncertainty avoidance in Arab cultures which also typically means lower openness to changes and flexibility (Hofstede and McCrae, 2004). Such cultural differences are shown to affect social functions (e.g., Lavy et al., 2009) and propose different perceptions of the self, its importance, and its positioning in the social context (Shoshana, 2016). Furthermore, it can also be related to differences in well-being antecedents (Diener and Suh, 2003; Shoshana and Schade, 2018). Thus, the salutary effect of MBIs for

teachers in Western society cannot automatically be generalized to Arab teachers and warrants research. The present pilot study aims to fill this gap by examining the effects of MBI in an Arab school.

The research was conceptualized within the novel framework of the mindful self in school relationships (MSSR) model (Lavy and Berkovich-Ohana, 2020). Briefly, the MSSR model delineates how the positive effects of teachers' mindfulness in schools stem from the capacity of mindfulness to enhance teachers' decentering, which, in turn, contributes to their relationship-promoting capacities because it increases their emotion regulation, empathy, and compassion abilities in interactions with students. Improved teacher–student relationships, in turn, contribute to teachers' and students' well-being and achievement (see Lavy and Bocker, 2018). This recent model (Lavy and Berkovich-Ohana, 2020) is theoretical, albeit solidly built on accumulating literature showing that mindfulness training shifts one's self-awareness mode and the core understanding that education is an interpersonal, relational endeavor, which requires teachers to shift from a “self-centered” (or “self-focused”) processing mode in order to enable effective, nourishing teacher–student relationships (see also Berkovich-Ohana et al., 2019). Here, we assess only the first part of the model: examining the effects of MBI on mindfulness, decentering, emotion regulation, and stress and the role of decentering in mediating the effects of increased mindfulness on teachers' emotion regulation and stress.

Decentering is defined as “the capacity to shift experiential perspective – from within one's subjective experience onto that experience” (Bernstein et al., 2015, p. 599), i.e., shifting from identification with to observing of the experience or “the ability to step outside of one's immediate experience, thereby changing the very nature of that experience” (Safran and Segal, 1996, p. 117). Decentering, considered a core underlying mechanism of mindfulness (Dahl et al., 2015), involves taking a non-judgmental attitude toward one's inner experiences (Fresco et al., 2007). It involves a meta-cognitive awareness that one's thoughts and emotions are only mental events, which can be observed without inner reaction (Shapiro et al., 2006; Grabovac et al., 2011; Bernstein et al., 2015). Decentering is shown to mediate the effects of MBIs (Carmody et al., 2009; Erisman and Roemer, 2010; Feldman et al., 2010) due to its explicit therapeutic effects, such as enhancing positive emotions, and reducing levels of distress, depression, and dysfunctional attitude (Hayes et al., 1999; Ashcraft and Moore, 2009; Salmon et al., 2009; Salmon et al., 2017; Hoge et al., 2015). In the present study, we suggest that decentering may also underlie the potential positive effects of MBI on emotion regulation.

Emotion regulation is generally defined as the processes by which individuals influence their emotions, emotional experiences, and emotional expressions (Gross, 1998). Emotion regulation is highly important for teachers because it enables them to relate to their experiences in a present-centered and responsive manner (Berkovich-Ohana et al., 2019) rather than in reactive ways that are past or future-oriented (Meiklejohn et al., 2012). The two key emotion regulation strategies most studied are expressive suppression and cognitive reappraisal (Gross and John, 2003). Cognitive reappraisal is the reinterpretation of a situation to alter its meaning and reduce its emotional impact,

and expressive suppression is the attempt to inhibit, reduce, or hide emotion-expressive behavior; it is generally shown to have controversial effectiveness and negative health-related outcomes (Gross and John, 2003; Grandey and Melloy, 2017). Research generally shows that cognitive reappraisal is associated with more effective emotion regulation processes with fewer negative effects on the person conducting the regulation although both strategies can have psychological costs (Hülshager and Schewe, 2011; Chang, 2013; Lavy and Eshet, 2018). Previous research has shown that MBI generally enhances teachers' emotion regulation skills (Meiklejohn et al., 2012; Flook et al., 2013).

The specific aim of this pilot study was to explore the effectiveness of MBI among Arab teachers in Israel. Specifically, we hypothesized that (1) the MBI would result in enhanced levels of mindfulness, decentering, and emotion regulation and reduced stress, and (2) building on the MSSR model, the positive effects of enhanced mindfulness on emotion regulation would be mediated by teachers' decentering.

MATERIALS AND METHODS

Study Procedure and Interventions

In Israel, all schools and teachers must periodically undergo continuing education programs (in various topics), which typically include 30 training hours and are given either by private organizations or through the Development Education Personnel (PISGA). These programs are often given to all schoolteachers in the school. For this study, two Arab schools were chosen (and compared) due to their similarities: Both were elementary schools (grades 1–8), serving 300 (MBI school) or 242 (control school) students mostly with low socioeconomic status (lowest 30% according to the Ministry of Education index).

The MBI was a 30 h, 3-month training course, called Applied Mindful Pedagogy for Educators and aimed at developing mindfulness and reducing stress. Its main components were (a) group activities, including experiential practices, group discussions, lectures on stress and forgiveness, etc.; (b) mindfulness practices, including, for example, attentional focus on the breath, body scan, and monitoring experience with the aim to develop concentration and non-reactivity; and (c) homework assignments, including daily formal mindfulness practices, journaling, and other weekly assignments (e.g., loving kindness for particular students) (for more details, see **Supplementary Appendix**). The control intervention was a 30 h, 6-month training course given by Branco Weiss¹ called Teaching for Understanding, aimed at promoting constructivist teaching and in search of understanding and development of higher order thinking. All participants completed questionnaires at three time points: a week before the interventions started (Time 1, T1), after 3 months at the end of the MBI intervention (Time 2, T2), and after 6 months at the end of the control intervention (Time 3, T3). The study was approved by the University of Haifa IRB committee.

¹<https://brancoweiss.org.il/en/>

Participants

All teachers involved in this study comprised a convenience sampling, most suitable for pilot studies (Etikan et al., 2016). None of the participating teachers had any prior mindfulness training. The mindfulness intervention (MI) group comprised 20 teachers, out of which 12 completed the intervention. The control (C) group comprised 19 teachers, all of which completed the intervention (see **Supplementary Table 1** for complete demographic details and study limitations for explanation of the compliance discrepancy). All participants signed a consent form.

Research Tools

We used Hebrew forms of the questionnaires, which were validated in previous studies, as Arab teachers in the mixed cities (in which the study was conducted) are fluent in Hebrew due to daily contact with Hebrew-speaking neighbors (Mar'i, 2013). Apart from a demographic questionnaire, we used the following scales (reliability scores in our sample are given in **Table 1**):

1. Perceived Stress Scale (PSS, reliability 0.85; Cohen et al., 1983), in which participants rank on a scale ranging from 1 = almost never to 5 = very often the extent to which they feel in the ways described in each of the 14 items (e.g., "nervous and stressed").
2. Experiences Questionnaire (EQ, reliability 0.81–0.84; Fresco et al., 2007), designed to measure decentering with two subscales: decentering – the realization that thoughts, feelings, and reactions are transitory patterns of mental activity and that they are not necessarily true representations of the self and events (e.g., "I notice that I don't take difficulties so personally") – and rumination, which reflects disengagement from habitual ruminative thoughts (e.g., "I think over and over again about what others have said to me"). The measure comprises 19 items, which are ranked on a scale ranging from 1 (never) to 7 (always).
3. The Emotion Regulation Questionnaire (ERQ, Gross and John, 2003), a 10-item measure assessing two emotion regulation dimensions: cognitive reappraisal (reliability 0.79, e.g., "When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about") and expressive suppression (reliability 0.73, e.g., "I control my emotions by not expressing them"). Participants ranked their agreement with each statement on a scale ranging from 1 = strongly disagree to 7 = strongly agree.
4. The Five Facet Mindfulness Questionnaire (FFMQ, reliability range for all facets 0.72–0.92; Bohlmeijer et al., 2011), which is a 24-item questionnaire that assesses five mindfulness facets: observing (e.g., "I pay attention to physical experiences, such as the wind in my hair or sun on my face"), describing (e.g., "I'm good at finding words to describe my feelings"), acting with awareness (e.g., "I find it difficult to stay focused on what is happening in the present moment" – reversed item), non-judging of inner experience (e.g., "I tell myself I shouldn't be feeling the way I'm feeling" – reversed item), and non-reactivity to inner experience (e.g., "When I have distressing thoughts

TABLE 1 | Descriptive statistics and differences within and between groups for all questionnaires' subscales.

Questionnaire	Measure	Alpha cronbach	Group P	Time 1 (M ± SD)	Time 3 (M ± SD)	Paired-samples t-test Time/Group (t-values)	Independent samples t-test Time1 (t-values)	Independent samples t-test Time 3 (t-values)
Five Facets Mindfulness Questionnaire	Total	0.69	MI	76.50 ± 6.03	85.41 ± 3.96	4.29**	2.06*	3.93***
			C	82.78 ± 9.39	74.00 ± 5.72	7.12***		
	Act-aware	0.86	MI	17.83 ± 3.56	20.50 ± 1.38	2.49*	.03	4.95***
			C	17.78 ± 4.10	15.31 ± 3.43	3.94**		
	Non-react	0.57	MI	14.00 ± 1.47	16.33 ± 2.49	3.38**	1.48	2.86**
			C	15.47 ± 3.22	14.05 ± 1.92	3.04**		
	Non-judge	0.51	MI	16.5 ± 2.67	16.5 ± 3.11	0.00	1.27	2.07*
			C	15.26 ± 2.76	14.52 ± 2.19	2.16*		
	Describe	0.54	MI	15.25 ± 3.33	17.50 ± 2.50	2.13	3.56**	0.89
			C	18.84 ± 2.29	16.73 ± 2.20	6.33***		
	Observe	0.83	MI	11.50 ± 4.25	14.58 ± 2.19	2.55*	2.89**	1.28
			C	15.42 ± 3.27	13.36 ± 2.75	4.02**		
Experience Questionnaire scores	Decentering	0.80	MI	50.08 ± 7.12	78.41 ± 9.30	-8.86***	0.07	-9.79***
			C	17.78 ± 4.10	44.26 ± 9.23	0.83		
	Rumination	0.65	MI	42.66 ± 5.98	19.75 ± 4.30	9.15***	0.66	8.35***
			C	43.84 ± 7.88	37.15 ± 6.33	2.60*		
Emotion- Regulation scores	Cognitive	0.66	MI	5.22 ± 0.72	5.70 ± 0.36	2.42*	0.69	-6.77***
	Reappraisal		C	5.41 ± 0.75	4.38 ± 0.60	12.53***		
	Expressive	0.69	MI	4.12 ± 0.65	4.08 ± 0.62	0.18	0.62	-1.29
	Suppression		C	4.36 ± 1.23	3.72 ± 0.82	5.52***		
Stress Scores	Total	0.83	MI	26.50 ± 1.53	17.16 ± 1.39	3.87**	2.92**	2.23*
			C	20.50 ± 1.42	23.15 ± 1.48	-1.255		

Mindfulness intervention group (MI, $n = 12$), and Control group (C, $n = 19$). * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

or images, I don't let myself be carried away by them"). Participants rate the degree to which each statement is true for them on a scale ranging from 1 = never or very rarely true to 5 = very often or always true.

Statistical Analyses

Before examining the intervention effects, we first compared scores from T2 and T3 in both groups. We found no significant differences between T2 and T3 in any of the dependent measures within each group, suggesting that no significant differences occurred between the end of the MBI and the end of the control intervention. Thus, we report only the scores from T1 and T3 (pre-post).

We examined the effects of MBI by conducting a set of repeated-measures ANOVAs for group (MI, C) by time (T1, T3), separately for each questionnaire, supplemented with *post hoc* independent samples *t*-tests for group comparisons and paired *t*-tests for time comparisons. In order to examine the mediation hypothesis for the changes from pre to post measurement (T3 minus T1), a parallel multiple mediation model was estimated for all study participants ($N = 31$), using ordinary least squares path analysis to determine the effect of change in mindfulness levels on change in emotion regulation through changes in decentering and changes in rumination. These two models were examined using PROCESS (Hayes, 2012; Model 4) to estimate the indirect effects of each mediator; 5,000 bias-corrected bootstrap samples were used for the 95% confidence interval (CI).

RESULTS

Preliminary analyses indicate no differences between the groups in most demographic parameters (years of education, teaching hours per week, gender, religion). However, there were significant differences in age and in teaching experience: MI participants were younger and had less teaching experience than the control group participants (Table 1).

Changes in Mindfulness Scores (FFMQ)

A three-way, repeated-measures ANOVA was conducted with one grouping variable, Time, and FFMQ subscales (Observe, Describe, Act with Awareness, Non-judgement, Non-reactivity). A main effect was uncovered for the FFMQ subscales (lowest scores for Observe, highest scores for Describe and Act Aware). In addition, we found a significant Group \times FFMQ subscales interaction [$F(4, 116) = 3.80$; $MSE = 19.83$; $p < 0.05$], stemming from generally higher scores for Act Aware, Non-judge, and Non-react in the MI vs. C group and the opposite for Observe and Describe. More importantly, we found a significant Group \times Time interaction [$F(1, 29) = 67.48$; $MSE = 3.89$; $p < 0.001$], where FFMQ scores generally increased from T1 to T3 for the MI group and vice versa for the C group (Figure 1A and Table 1). Indeed, *post hoc t*-tests show a significant increase in overall mindfulness for the MI group [$t(11) = 4.29$; $p < 0.01$] as well as a significant decrease in the C group [$t(18) = 7.12$; $p < 0.001$]. The detailed effect of MBI can be best seen in the

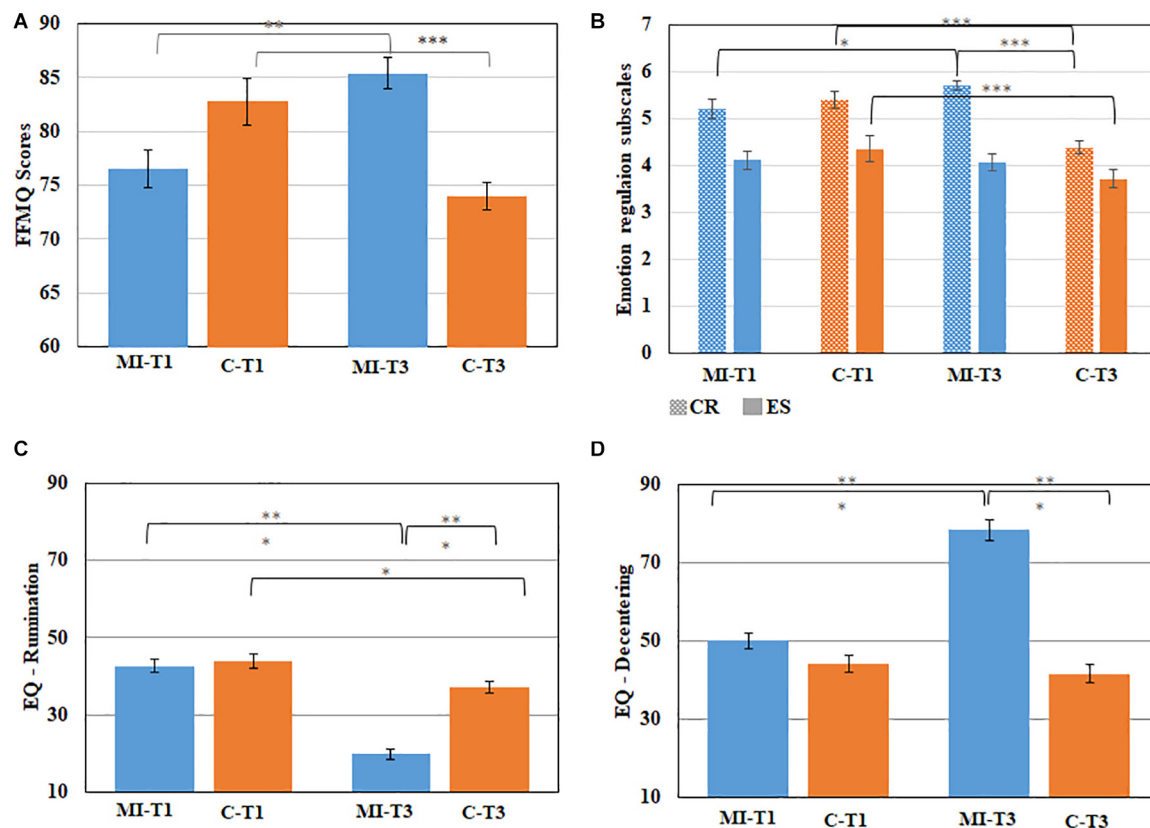


FIGURE 1 | Questionnaire scores. Significant interactions for Group [the mindfulness intervention group (MI, $n = 12$), and the Control group (C, $n = 19$)] and Time [Time 1 (T1, pre-intervention), and Time 3 (T3, post-intervention)], for the following scales ($M \pm SEM$): **(A)** Five Facets Mindfulness Questionnaire (FFMQ); **(B)** Emotion Regulation Subscales. CR, Cognitive Reappraisal; ES, Expressive Suppression; **(C)** Rumination scores; **(D)** decentering scores. Blue and orange denote the MI and control groups, respectively, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

significant Group \times Time \times FFMQ subscales interaction [$F(4, 116) = 3.69$; $MSE = 3.64$; $p < 0.01$]. *Post hoc t*-tests for this interaction show that all 5 FFMQ facets significantly decreased in the C group, and 3 facets (Act with Awareness, Non-reactivity, and Observe) significantly increased in the MI group. It should be noted that there was a significant difference between the groups for T1 for 2 FFMQ facets (Describe and Observe) with the MI group scoring lower than the C group; thus, this did not drive the effect of enhanced mindfulness in the MI group following the intervention but rather supports and emphasizes it. As for T3, there was a significant difference between the groups in the 3 other FFMQ facets (Act with Awareness, Non-judge, Non-react), not observed for Describe and Observe (perhaps due to the opposite difference between them in T1).

Changes in Emotion Regulation Scores

A three-way ANOVA was conducted with one grouping variable (MI, C), Emotion Regulation subscales (Cognitive Reappraisal, Expressive Suppression), and Time (T1 and T3). The results indicate a main effect [$F(2, 58) = 33.30$; $MSE = 1.08$; $p < 0.001$] as Expressive Suppression scores were generally lower than Cognitive Reappraisal scores, and a significant main effect for Time [$F(1, 29) = 17.91$; $MSE = 0.15$; $p < 0.001$] as generally scores

were lower in T3. We also found a Group \times Time interaction [$F(1, 29) = 53.28$; $MSE = 0.15$; $p < 0.001$]; Emotion Regulation scores generally increased from T1 to T3 for the MI group but decreased for the C group. Aligned with our hypotheses, we found a significant Group \times Time \times Emotion Regulation interaction [$F(2, 58) = 8.57$; $MSE = 0.17$; $p < 0.01$] (Figure 1B and Table 1). *Post hoc t*-tests show a significant increase in Cognitive Reappraisal scores [$t(11) = -2.4$; $p < 0.05$] from T1 to T3 in the MI group although, for the C group, there was a decrease in both Cognitive Reappraisal [$t(18) = 12.53$; $p < 0.001$], and Expressive Suppression scores [$t(18) = 5.52$; $p < 0.001$]. At T3, there was a significant difference between the groups only for Cognitive Reappraisal scores [$t(29) = 6.77$; $p < 0.001$].

Changes in Decentering and Rumination (EQ) Scores

A three-way ANOVA was conducted with one grouping variable, Time, and repeated measures on EQ scores (Rumination and Decentering). Results indicate a main effect for the EQ subscales as Rumination scores were generally lower than Decentering. We also uncovered a main effect for Group [$F(1, 29) = 13.76$; $MSE = 77.05$; $p < 0.01$] as the EQ scores were generally higher for

the MI group. In addition, we found a significant Group \times EQ subscales interaction [$F(1, 29) = 143.81$; $MSE = 47.86$; $p < 0.001$], stemming from higher scores for Decentering in the MI group and the opposite for Rumination. We also found a Group \times Time interaction [$F(1, 29) = 4.44$; $MSE = 89.71$; $p < 0.05$], where EQ scores generally changed from T1 to T3 for the MI group but did not change for the C group.

Importantly, in support of our hypotheses, we found a significant Group \times Time \times EQ subscales interaction [$F(1, 29) = 90.17$; $MSE = 45.42$; $p < 0.001$]: for the MI group, there was a significant increase in Decentering [$t(11) = 8.86$; $p < 0.001$] from T1 to T3 and a significant decrease in Rumination [$t(11) = -9.1$; $p < 0.05$], and for the C group, there was only a significant decrease in Rumination [$t(18) = 2.60$; $p < 0.05$] and no change in Decentering (Figures 1C,D and Table 1). It should also be noted that there was a significant difference between the Groups at T3 for both Decentering [$t(29) = 9.79$; $p < 0.001$] and Rumination [$t(29) = 8.35$; $p < 0.001$] in support of our hypotheses.

Changes in Stress Scores

A three-way ANOVA was conducted with one grouping variable, Time and Stress Scores. We found a significant Group \times Time interaction [$F(1, 29) = 11.93$, $MSE = 46.87$; $p < 0.01$], indicating that Stress scores changed from T1 to T3. *Post hoc t*-tests suggest that this change was driven by a significant decrease in stress at the MI group between T1 and T3 [$t(29) = 3.87$; $p < 0.01$] (Table 1). There was also a significant difference between the groups at T1 [$t(29) = 2.92$; $p < 0.01$] and at T3 [$t(29) = 2.23$; $p < 0.05$] (Table 1).

Mediation Results

The unstandardized correlations and bootstrap solutions of the analyses are presented in Table 2 (see also Figure 2). Only one model supported the mediation hypothesis (i.e., the first model), indicating a significant path from changes in mindfulness (from T1 to T3) to changes in emotion regulation and mediation of this path via changes in decentering (Table 2; zero was not within the 95% confidence intervals in all three analyses).

DISCUSSION

This pilot study examined the effects of MBI among Arab teachers in Israel and explored the role of changes in decentering in mediating the associations between changes in teachers' mindfulness and changes in their emotion regulation. As such, the study provides an initial understanding of potential teachers' MBI effects in this cultural context. Teachers in Israel generally face challenges that differ from those in other countries (e.g., the United States and the United Kingdom) in which teacher MBI is usually explored; see review by Tarrasch et al. (2020). Such challenges include, for example, larger classes, more violence, and lower payment compared to the average in the Organization for Economic Co-operation and Development (OECD, 2011, 2019). Within Israel, Arab schools also suffer from decreased budgets and increased pedagogical difficulties (Viniger, 2018). Such

TABLE 2 | Mediation model for predicting changes in teachers' emotion regulation from changes in teachers' mindfulness with the changes in decentering and rumination as mediators.

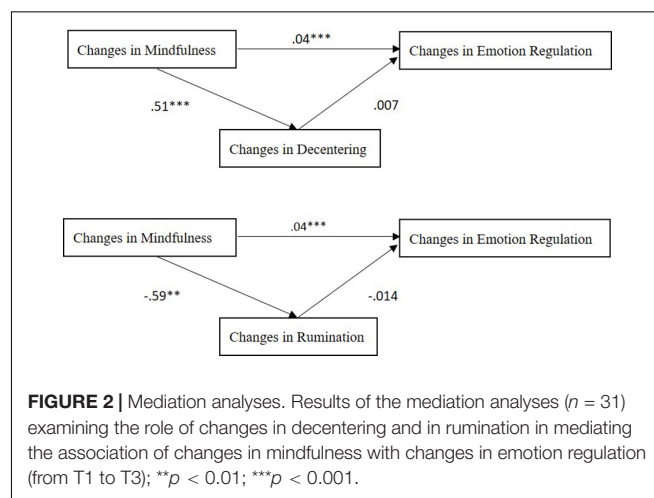
Mediation model with decentering as mediator

	Bootstrap 95% CIs (LLCI, ULCI)	Effect	SE
Direct effect of mindfulness		0.04***	0.01
Indirect effect of mindfulness via decentering	[0.0002, 0.019]	0.008	0.005

Mediation model with rumination as mediator

Direct effect of mindfulness		0.04***	0.01
Indirect effect of mindfulness via rumination	[-0.0003, 0.022]	0.008	0.006

95% confidence intervals are presented in brackets; LLCI, lower-level confidence interval; ULCI, upper-level confidence interval; Confidence intervals that do not include 0 (null association) are significant; Coefficients for all models are presented in Figure 2. *** $p < 0.01$.



contextual factors may lead to differences in teacher's attitudes as supported by a few previous studies showing that Israeli teachers exhibit stricter classroom discipline strategies compared to other teachers (e.g., Australian teachers; Lewis et al., 2005). Arab teachers may also tend to use more hierarchical management strategies, typical in hierarchical collectivistic cultures. In the present study, we focus on the effects of an MBI among Arab teachers as they have not been explored before despite the large Arab population (without comparing them directly to other populations).

As hypothesized, we found a significant increase following MBI in teachers' mindfulness scores in three mindfulness subscales (Acting with Awareness, Non-reactivity, and Observe), and there was a significant decrease in all mindfulness subscales in the control group. These findings are partially consistent with the results of previous studies (Bohlmeijer et al., 2011) showing that these three mindfulness facets (Acting with Awareness, Non-judging, and Non-reactivity) often change as a result of MBI, and the other two facets (Observing and Describing) are less susceptible to change. However, others (Carmody et al., 2009) report moderate-to-large effect sizes in all facets following an

MBI. Failing to find effect in all facets of FFMQ in our study might be due to the small sample size. In support of this explanation, the Describe scale did show a strong trend, which did not reach significance. Finally, our results are strongly aligned with a recent study in Israel testing the effect of the “Call to Care – Israel for Teachers” (C2CIT) program, which employs mindfulness, compassion, and social – emotional skill training (Tarrasch et al., 2020). In a slightly larger group size (starting with 20, but ending with 17 in the intervention group and starting with 24 and ending with 22 in the control group), the authors found a significant increase following MBI among Jewish teachers’ mindfulness scores in three mindfulness subscales – the first two identical to our findings (Acting with Awareness, Non-reactivity, and Describe). Future studies with larger samples may shed light on this issue.

We observed a significant change in EQ scores following the intervention only in the MI group, including an increase in Decentering and a decrease in Rumination as hypothesized. These findings correspond with previous studies (Shapiro et al., 2006; Fresco et al., 2007) that demonstrated MBIs cultivate a fundamental shift in decentering. The fact that we found a significant effect in such a small group size demonstrates the strong effect that MBI may have on enhancing decentering and reducing rumination.

We hypothesized, based on previous literature reviews (Chambers et al., 2009), that MBI would promote emotion regulation in the MI group. The findings indicate that the MBI contributed only to increased use of Cognitive Reappraisal and not to changes in the use of Expressive Suppression. Failing to show reduced Expressive Suppression following MBI can stem from the small group size. At the same time, there was a significant decrease in both Expressive Suppression and Cognitive Reappraisal in the control group after the control intervention, suggesting that this intervention also facilitated emotional regulation and enabled reduced use of both strategies.

Interestingly, emotion regulation rankings in the study were significantly higher than reported in the literature for Western cultures. For example, Cognitive Reappraisal values were higher than 5.2 for both groups and, for the Expressive Suppression, higher than 4.1, and they were reported for Westerners as 4.6 and 3.36, respectively (Moore et al., 2008). A possible explanation can be due to cultural differences between Western and Arab cultures, the latter showing a strong norm for emotional moderation (Diener et al., 2003), possibly stemming from the need to maintain cooperation and harmony (Noon and Lewis, 1992; Mesquita and Delvaux, 2013). In Arab cultures, emotions are related to the social context and, thus, less related to the inner self (Safdar et al., 2009); hence, they tend to be more controlled.

As for the stress scores, although the MI group showed significantly enhanced stress scores pre-training compared to the control group, possibly related to their younger age and lower teaching experience, they showed significantly reduced stress post-intervention in contrast to the controls. This is aligned with another recent study on Israeli teachers (Tarrasch et al., 2020).

Finally, Decentering was found to mediate the relationship between mindfulness and Emotion Regulation in initial support

of the first part of the MSSR model (Lavy and Berkovich-Ohana, 2020), suggesting that mindfulness effects on teachers’ social capacities are mediated by decentering. Indeed, this result is aligned with previous studies showing the contribution of decentering to emotion regulation, specifically linking it with reduced anxiety and depression (Hoge et al., 2015) and enhanced mental health (Hayes et al., 1999; Kabat-Zinn, 2009). The study suggests that further exploration of decentering and its role in fostering mindfulness’ positive outcomes may be worthwhile even in collectivist cultures.

To summarize, the results of our pilot study provide initial evidence that a 30 h MBI can enhance mindfulness, decentering, and emotion regulation as well as reduce stress among Arab teachers, indicating a potential positive effect of MBIs in this population (beyond the cultural differences). The relevance of the results to Arab teachers is very high, considering the novelty of MBIs in Arab societies and the scarcity of previous publications in this population. The current pilot study supports the results of previous studies demonstrating the benefits of mindfulness practice in reducing educators’ stress as well as enhancing their mindfulness and emotion regulation. Considering the larger classes, lower payment, and higher violence in Israel compared to other Western countries (OECD, 2011, 2019), these results are highly promising, considering both the short intervention (30 h), and the non-elective nature of the intervention for the teachers, which is, by large, the situation in many other schools. Finally, our results provide initial support to one part of the MSSR model, warranting further investigation.

Study Limitations and Future Directions

The major limitation of our study is the small group size, which limits its generalization ability. However, considering the total lack of reports on MBI in Arab teachers, we believe that this pilot study points toward promising potential, albeit cultural differences. Another limitation is the nature of the groups; the interventions were given to the teachers within the school, comprising a convenience sampling. Hence, we can make only weak statements about the population of interest (Etikan et al., 2016). Yet convenience sampling in this case was affordable, and the subjects were readily available through the school manager’s cooperation. Importantly, the sample does not differ much from the population of interest as it is often the case that MBIs in schools are mandatory. Thus, this design can give a realistic view as often the case is a mandatory school intervention to which the teachers need to accommodate. A related limitation is the initial demographic difference between the groups as teachers in the MI group were younger and had less teaching experience (Table 1) and, not surprisingly, also showed less compliance to complete the training (compared to the control group). The reason is that young teachers in Israel are required to attend more continuing education training hours and simultaneously took such additional training both within and outside school. Thus, some teachers in the MBI group were obliged to miss some of the sessions (due to conflicts with their other training). They were excluded from the study after two absences. The older teachers in the C group needed less simultaneous continuing education, enabling all of them to complete the training.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

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

AUTHOR CONTRIBUTIONS

AB-O: conceptualization, supervision, writing – original draft. KS: data curation, formal analysis, investigation, writing – review.

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SL: writing – original draft, and formal analysis. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.542986/full#supplementary-material>

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Introducing the Study of Life and Death Education to Support the Importance of Positive Psychology: An Integrated Model of Philosophical Beliefs, Religious Faith, and Spirituality

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Life education, also known as *life and death education*, is an important subject in Taiwan with institutions (e.g., high school) offering degree programs and courses that focus on quality learning and implementation of life education. What is interesting from the perspective of Taiwanese education is that the teaching of life education also incorporates a number of Eastern-derived and conceptualized tenets, for example, Buddhist teaching and the importance of spiritual wisdom. This premise contends then that life education in Taiwan, in general, is concerned with the promotion, fulfillment, and cherishing of quality life experiences (e.g., personal contentment, happiness). One example of life education, which resonates with other spiritual beliefs and religious faiths (e.g., Hinduism), is related to spiritual cultivation and the enlightenment of life wisdom. Our own teaching of the subject, likewise, places emphasis on the goal of teaching students to seek meaningful understanding of and appreciation for three major, interrelated components of life education: *life wisdom*, *life practice*, and *life care*. It has been acknowledged, to a certain degree, that life education has made meaningful contributions, such as the creation and facilitation of a civil, vibrant society, and that many Taiwanese individuals show dignity, respect for elders, and reverence for spiritual and religious faiths. For example, aside from high-quality hospice care, many Taiwanese engage in different types of benevolent acts (e.g., providing spiritual advice to someone who is dying), where possible. Life education is a beneficial subject for teaching and learning as its theoretical understanding may help individuals cope with pathologies and negative conditions and life experiences. One negative life experience, in this case, is the ultimate fate of humankind: death. Approaching death and/or the onset of grief is something that we all have to experience. How does one approach death? It is not easy feat, and of course, grief for a loved one is personal, and some of us struggle with this. We contend that spiritual cultivation and enlightenment, arising from life education, may assist us with the topic of death (e.g., the possibility of transcendence beyond the realm

of life). More importantly however, from our own teaching experiences and research development, we strongly believe and rationalize that the subject of life education could, indeed, coincide with and support *the paradigm of positive psychology* (Seligman, 1999, 2010; Seligman and Csíkszentmihályi, 2000). Forming the premise of the present conceptual analysis article, we propose that a person's "spiritual and enlightened self," reflecting the convergence of three major aspects of life education (i.e., philosophical reflection, enrichment of personal well-being, and spiritual cultivation), would result in the initiation and creation of a number of virtues and positive characteristics, for example, having a *positive outlook* in life, having a *perceived sense of spirituality*, showing *compassion*, *forgiveness*, etc. These virtues and quality characteristics, from our philosophical reasoning, are equivalent to those qualities that the paradigm of positive psychology advocates for. In summary, we conceptualize that the subject of life education, from the perspective of Taiwanese education, may intertwine with the paradigm of positive psychology. A person's spiritual and enlightened self, or his/her "holistic self," from our rationalization, is the ultimate optimal life experience that he/she may have, enabling him/her to address the gamut of life conditions and experiences. The distinctive nature of life education in this case, as a point of summary, is that it incorporates spiritual beliefs and religious faiths (e.g., Buddhist faith), encouraging a person to seek nature and divine-human relationships, as well as to contemplate and to explore the complex nature of his/her inner self. The notion of *Buddhist samsāra*, for example, as "evidence" of spirituality, entailing the endless cycle of birth, rebirth, and redeath, may provide a person with hope into the afterlife. Such esoteric discourse, we contend, is positive and optimistic, allowing individuals to discard the dividing line between life and death.

Keywords: life education, death education, positive psychology, spiritual cultivation, optimization, wisdom, mindfulness

INTRODUCTION

Life education, also known as *life and death education*, has gained vast interests both in terms of teaching and research development. Specifically, with reference to the case of Taiwan and its education systems, life education is taught in schools and universities, as well as applied in society in the form of educational and social programs. What is significant, however, with reference to Taiwanese education, is that the teaching and learning of life education also incorporate Eastern-derived theoretical tenets of Buddhism (Yeshe and Rinpoche, 1976; Sheng Yen, 2010), Confucianism (Yao, 2000; Havens, 2013), and spirituality (Carmody et al., 2008; Lazaridou and Pentaris, 2016). The teaching of Buddhist meditation (e.g., a focus on *enlightenment*), for example, has been incorporated to emphasize the salient nature of the study of life education—that life education is concerned with exploration of death, which is inevitable, and the fulfillment of a cherished life. How can a person overcome grief and accept that a close relative has moved on from this physical world? How does life wisdom assist a person in his daily functioning? Are immortality and the notion of transcendence beyond death a possibility? These questions, we contend, are significant, which the study of life education makes attempts to address.

Death, grief, negative outlook, and maladaptive life experience are inevitable. Overcoming these life deficiencies, obstacles, and difficulties is an important quest, which we believe the study of life education (Shi, 1987; Huang, 1993; Chen, 2017) could assist. Indeed, aside from life education, we acknowledge that the *paradigm of positive psychology* (Gilham and Seligman, 1999; Seligman, 1999; Seligman and Csíkszentmihályi, 2000) could also play a prominent role in helping to alleviate suffering, helplessness, grief, negative life conditions, etc. Our existing research inquiries into the effect of positive psychology have resulted in the development of a psychological concept that we termed as "personal resolve" (e.g., Phan et al., 2017, 2018, 2020c). Despite our emphasis on educational processes, we contend that personal resolve, briefly defined as "person's mental resolute and "unwavering focus" to stay on task without any uncertainty or reservation to achieve optimal best" (Phan et al., 2020c, p. 450), could feature and assist individuals to overcome barriers, negative life experiences, etc.

An interesting question, though, is whether we could integrate the study of life education and the paradigm of positive psychology into a holistic framework for research development and/or implementation. To date, to our knowledge,

no researchers have yet made this attempt to unify the two theoretical orientations into one coherent model. This inquiry, we contend, is significant for the purpose of cross-cultural contribution, especially when we consider the uniqueness of Eastern epistemologies and philosophical reasoning. Recently, we published an article in *Frontiers in Psychology* (Phan et al., 2020a), where we focused, in particular, on the unification of positive psychology (Gilham and Seligman, 1999; Seligman, 1999; Seligman and Csikszentmihályi, 2000) and mindfulness from the perspective of Buddhism (Hanh, 1976; Loden, 1996; Sheng Yen, 2010). From this account, a focus on life and death education from the perspective of Taiwanese education is insightful in terms of elucidation of theoretical understanding of the relationship between the two orientations.

LIFE EDUCATION: AN INTRODUCTION

It is interesting to note that Taiwan places strong emphasis on the study of life education. It is a subject that is taught in school and university. Indeed, many scholars, government officials, and teachers would attest that the study of life education has played a central role in transforming Taiwanese society into what it is today—civil, democratic, robust, and stable. One clear example, in this case, is the recent COVID-19 coronavirus pandemic where Taiwan had only seven cases of death (Note: dated as of June 30, 2020) (source: <https://www.worldometers.info/coronavirus/#countries>). In a similar vein, high-quality service of hospice care for senior citizens in Taiwan is commendable. Some Taiwanese, for example, serve as hospice care volunteers to provide religious and spiritual advice.

Given its importance, we have devoted a complete chapter in our forthcoming book on the subject of life and death education. The history of life education in Taiwan, which we covered in detailed in this chapter, is quite interesting—for example, in part, it arose from the study of *thanatology* (Fonseca and Testoni, 2012; Doka, 2013; Meagher and Balk, 2013; Chapple et al., 2017), or death education, from the United States and other Western countries. To understand and appreciate the nature of life education, it is important for us to identify the Chinese characters of “生命教,” which translate to mean “life education.” The term *life education* has been in use since 1997, when Taiwan started to promote various life education programs for secondary school teaching and learning (Ministry of Education Taiwan, 2008, 2011, 2018). Likewise, and interestingly, the Ministry of Education, Taiwan, dedicated 2001 as the Year of Life Education in acknowledgment and recognition of its significance and relevance to individuals, families, and the community. The National Taipei University of Education, where four of the authors work, has also established the Life Education and Health Promotion Institute, which serves to promote life and death education. Other institutions have similar programs and courses that promote the cultivation of life and death education.

WHAT IS LIFE EDUCATION?

Despite our brief mentioning so far, it is noteworthy to ask the question of what life education is about. We contend that this question does not have a definitive, consistent answer as the study of life education is relatively broad in scope. Our attempt to provide a balanced definition and description of life education, from historical accounts (e.g., evolution of life education with the introduction of a seminal paper by Professor Song-Yuan Huang (Huang, 1993), titled: “Death Education: A controversial subject in School Health Education”), has resulted in the following: that life education is concerned with “spiritual and personal cultivation,” via different means (e.g., formal learning of a subject titled “Spiritual Cultivation” in university) in order to elicit appreciation and meaningful understanding of life and death (Chen, 2012, 2013). In this analysis, life education is a formal process of delivery of knowledge that could, in effect, assist in the promotion, fulfillment, and cherishing of quality life experiences. From this account, it is noted that life education in Taiwan is a valuable subject matter that could educate Taiwanese citizens to appreciate and live productive life.

It is important to note, however, that life education is not simply concerned with the nature of life. Death is also a topic of discussion within the teaching of life education (Huang, 1993), hence why life education is also known as life and death education. For many Taiwanese and Asians, in general, death is a taboo topic that is often not talked about. This point is interesting as life and death are on the opposite ends of a spectrum. Life is perceived as being positive (e.g., celebration, joy), whereas, in contrast, death is negative (e.g., sorrow, grief). Any person for that matter would choose life, and not death, for studying in school and/or university. Death, of course, is inevitable and is the ultimate fate that we all have to face. Grief, sorrow, and despair, upon death of a loved one, are personal experiences that require assistance, counseling, and resolution. In this sense, life education, complementing with the teaching of Buddhism (Hanh, 1976; Loden, 1996; Sheng Yen, 2010), may assist and counsel Taiwanese to confront and face death with sense of dignity, serenity, and respect (Fu, 1993). For example, the notion of Buddhist *samsāra* may provide understanding into the possibility of “personal transcendence” beyond death itself.

An interesting question that is often asked within the context of life education is the following: *What is life?* This question, similar to that of life education, does not have a straightforward answer. Death, in contrast, is perhaps more easily defined—for example, we can define death as simply the permanent ceasing of a person or a biological organism. Life, however, is more complex and may entail different interpretations and theoretical approaches—philosophical, scientific, theological, and metaphysical speculation. From a general point of view, though, we could say that the nature of life is concerned with a person’s fulfillment of his/her purposes and goals in life, which are structured and timed for different periods in life (e.g., as part of life, the fulfillment of a goal to attend university). One Taiwanese scholar, Tsai (2008), proposes that life in itself is not a passive “pathway”; rather, there are dynamic and proactive operations and contextual influences that ultimately

portray unique, differing pathways for each person. One person's pathway, unique in its depiction, is likely to differ from other individuals' pathways. In this discussion of Tsai's (2008) writing, we need to consider two major points:

- i. We can perceive that there are different types of life and their respective "courses" that individuals may have, which are fundamental to the appearance and interpretation of life itself. In other words, as we mentioned, a person's life course is relatively unique, and this uniqueness, of course, may be detected and observed by us. Importantly, however, despite this uniqueness, it is poignant that different compositions within a person's life course (e.g., a person's employment and his/her family life) are balanced, coherent, and connected.
- ii. Life course trajectory, which there are many, constitutes the total nature of a person's life. In other words, life and life course trajectory have an inseparable relationship. Multiple life course trajectories, in this case, constitute to the totality of a person's life. By the same token, from the above description, there are underlying operational mechanisms (e.g., a person's mental fortitude to persist), which may then assist and facilitate a person's successful life trajectory and/or life trajectories.

In summary, from the two aforementioned points of view, it is noted that life is made up of different life course trajectories. In a person's lifetime, he/she may possess and manifest different life course trajectories—for example, a life trajectory as a spouse vs. a life trajectory as an employee at a local bank. We anticipate that different life course trajectories are complementary with each other, despite their uniqueness (e.g., a spouse vs. an employee). In a similar vein, of course, there are underlying operational mechanisms or principles (Tsai, 2008) that may contribute to assist and facilitate in the achievement of different life course trajectories. In the course of a person's life as a university student, say, he/she may rely on the *process of optimization* (Phan et al., 2017, 2019a, 2020b) as an operational mechanism to assist with his/her schooling experiences. In a similar vein, another person's life trajectory as a senior citizen may consist of his/her social relatedness to others.

Goals and Significance of Life Education: In Brief

The preceding sections have highlighted the nature of life and briefly, likewise, the importance of death and its aftermath. Life education, as detailed, has a number of purposes that are related to both life and education. The goals of life education in this sense are unambiguous, focusing on meaningful appreciation for quality life experiences and in-depth understanding of death-related matters (e.g., the coping of grief). In our recent writing, surmising other scholars' discussions (Huang, 1993; Chen, 2012, 2013), we purport that the main goal of life education is to *educate*, *cultivate*, and *enrich* a person's knowledge and ability so that he/she is able to (i) continuously refine the daily practice and wisdom of life, (ii) initiate the importance of care (e.g., looking out for others), and (iii) live a meaningful life through different

stages. We surmise that the goal of life education, likewise, is to empower individuals with personal belief and resolute to accept death and/or to overcome death-related matters (e.g., sorrow). For example, the teaching of Buddhism (Yeshe and Rinpoche, 1976; Sheng Yen, 2010), situated within the framework of life education places consistent emphasis on spiritual cultivation (Chen, 2001, 2009), which in this case encourages a person to seek meaningful understanding into the transcendence of oneself toward an ultimate, better self, and the transformation of the complexity of life experiences (i.e., positive and negative) into some form of unity. This emphasis of spiritual cultivation, likewise, considers the incorporation of mystical and esoteric sentiments such as a person's quest to strive for "awakening" or enlightenment experiences, and to offer hope into the possibility of the afterlife.

The significance of life education is reflected by the objectives and subject contents that different courses and educational programs offer. In the course of a person's life, there are three aspects for consideration in development:

- i. *The wisdom of life*: It is important for a person, from birth to death, to continuously reflect on his/her acquired knowledge and experiences, which could help refine understanding into the meaning of life wisdom (e.g., "Why is it important for us, as a nation, to offer free health care?").
- ii. *The caring of life*: Life wisdom, as we briefly described, may cultivate an appropriate mindset, which could emphasize the importance of empathy, compassion, mercy, and love toward oneself and toward others. These attributes, in turn, may motivate and compel a person to show love and care for others.
- iii. *The practice of life*: It is a noteworthy feat for a person to live a meaningful life with the main purpose of contemplation, refinement, and improvement. Meaningful practice of life, in this case, may consist of voluntary community service (e.g., helping out at church on Saturday).

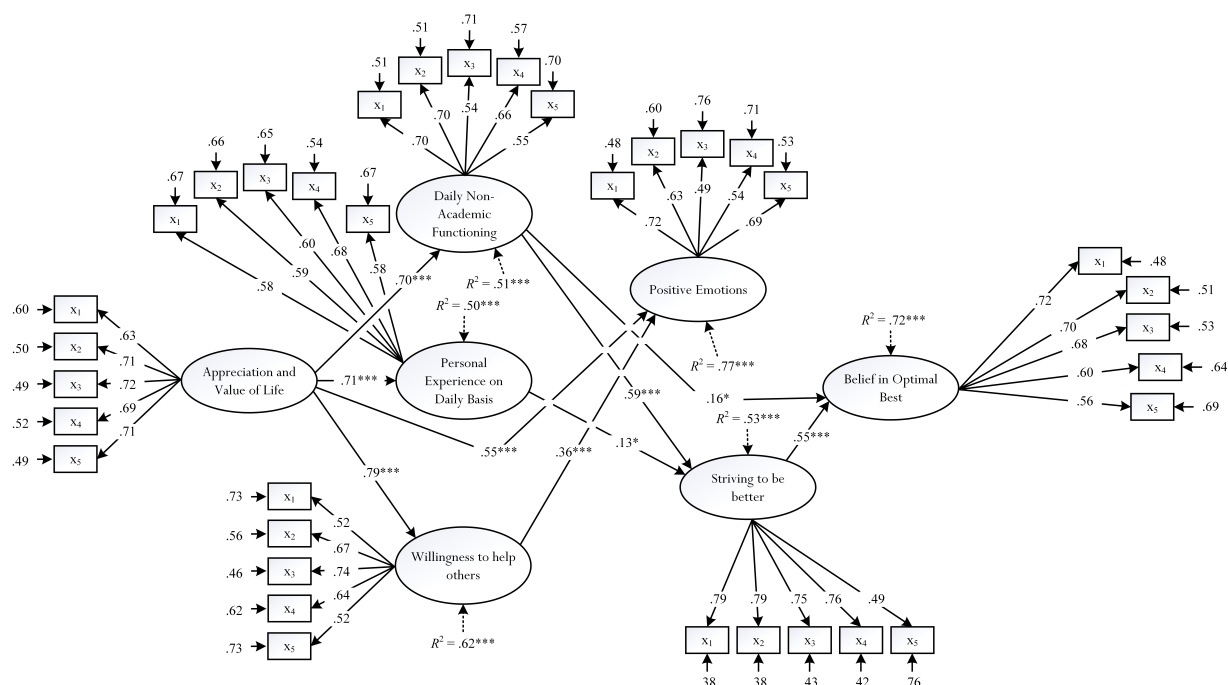
From this understanding, it can be seen that with reference to life, there are three distinctive elements that are of significant value: wisdom, care, and practice. As we explore next, wisdom, care, and practice are inseparable and may, in fact, unite the two contrasting topics: life and death. Thus, as a point of summation, we could say that the main goal of life education is to explore the true meaning and nature of the wisdom, caring, and practice of life. In a course of study at university, for example, an educator may choose to include subject contents that focus on and/or reflect the importance of wisdom, care, and practice of life. At the same time, of course, subject contents via whole-class teaching, individual learning, and/or collaborative may also entail the study and understanding of death-related matters—for example, the coping of sorrow using faith in Buddhism as a possible means (Phan et al., 2019b, 2020a).

Research into the positive effect of life education in Taiwan, over the years, has focused on different aspects of development—for example: empirical establishment, application, theorization, and conceptualization (e.g., Tsai, 2008; Huang, 2014; Chen, 2017;

Tsai et al., 2018, 2019, 2020). For example, recently, we conducted an empirical study that consisted of Taiwanese undergraduate students from 12 public and private universities, where our focus of inquiry delved into the empirical validation of a concept that we developed, termed as “appreciation and the valuing of life.” For us, appreciation and the valuing of life, as a psychosocial concept, is defined as a person’s gratitude, respect, and cherishing of life and/or toward others in society (e.g., “I appreciate Bau-Yi for who she is, regardless of her poor upbringing”). Importantly, however, we conceptualized and reasoned that acquired knowledge of the subject of life education could assist in the development of the concept of appreciation and the valuing of life. Moreover, as shown in **Figure 1**, we postulate that personal experience of appreciation and the valuing of life could act as a potent antecedent of future outcomes. Using Likert-scale measures and the statistical technique of structural equation modeling (Loehlin, 2004; Kline, 2011), we found evidence to substantiate our hypothesized *a priori* model—for example, appreciation and the valuing of life positively predicted the concepts of daily functioning ($\beta = 0.70, p < 0.001$), personal experience ($\beta = 0.71, p < 0.001$), willingness to help others in society ($\beta = 0.79, p < 0.001$), and happiness (i.e., positive emotions) ($\beta = 0.55, p < 0.001$). This study overall, we contend, is significant as it underlines the potency of the study of life education—that meaningful understanding life education, in this

case, could yield in the development of perception and personal experience of appreciation and the valuing of life.

Aside from empirical research, we have noted that many scholars, educators, government officials, etc. have also made concerted efforts to advance the study of life education. One interesting line of inquiry has involved advancement into the nexus between research and application. This emphasis, in this case, focuses on the successful transformation of theoretical tenets of life education into practice. For example, in 1990, a Buddhist Master, Master Xiao Yun, used “Enlightenment Education” as a philosophical foundation to establish Huafan University, currently located in New Taipei City, Taiwan. Master Yun advocated the use of *humanistic education* (e.g., the study of self-actualization) to enrich a person’s mindset. Master Xiao Yun, in particular, believed in the integration of both humanities and technological advances and that, likewise, there was a need to acknowledge and recognize the importance of compassion and wisdom. To promote this thinking, Huafan University offered a unit, titled “Enlightenment Wisdom and Life,” which was compulsory for enrolment. This enlightenment education is based on the theoretical premise of enlightenment, taking into consideration both Chinese culture and Buddhist teaching. Specifically, reflecting our previous mentioning, this unit incorporates contemporary pedagogical practices and places emphasis on the integration of both humanities and technological



Note:

The results are at $*p < .05$ and $***p < .001$. The study, as described in-text, involved university students from Taiwan. Our focus of inquiry, in this case, delved into a recently developed concept, which we termed as ‘appreciation and the valuing of life’. We contend that personal experience of appreciation and the valuing of life would arise, in part, from the study of *life education*. In other words, one positive impact of the subject of life education is the development of the concept of appreciation and the valuing of life, which could in fact act as an antecedent of future outcomes. Our proposition, for example, is that appreciation and the valuing of life could act as a predictor of three interrelated variables: *daily functioning*, *personal experience*, and *willingness to help others*.

FIGURE 1 | The importance of appreciation and the valuing of life.

advances, as well as the promotion of compassion and wisdom (Shi, 1987). It was hoped at the time that enlightenment education, focusing on the cultivation of compassion and life wisdom (e.g., caring for another person), would bring peace and happiness to Taiwanese society.

Other institutions in Taiwan, similar to Huaan University, have also made attempts to highlight and promote the importance of life education. For example, from our observations and professional experiences, we note that there are pastoral care programs, courses and degree programs, extracurricular and social activities, and campus events that place emphasis on religious and spiritual cultivation, the enrichment of personal well-being, and the proactive caring for others (Chen, 2017). One notable goal from these positive initiatives is to educate and to encourage students to practice care, love, compassion, and life wisdom (e.g., looking out for friend in time of needs). At Huaan University, even to this day, there are weekly classes on Buddhist meditation practice and mindfulness that are intended to cultivate spirituality and beliefs in religious sentiments (e.g., the seeking of understanding of transcendence).

THE PARADIGM OF POSITIVE PSYCHOLOGY

The main premise of the present conceptual article is to consider the possibility that life education, in general, could coincide with and/or support and substantiate the paradigm of positive psychology (Gilham and Seligman, 1999; Seligman, 1999; Seligman and Csikszentmihályi, 2000). As we briefly mentioned in the preceding sections, we recently published a conceptual-analysis article, titled “Advancing the Study of Positive Psychology: The Use of a Multifaceted Structure of Mindfulness for Development,” which explored the interrelationship between Buddhist mindfulness (Hanh, 1976; Loden, 1996; Sheng Yen, 2010) and positive psychology. This conceptual analysis is poignant as it acknowledges the possibility that both Western and Eastern epistemologies and philosophical rationales (e.g., psychological thoughts vs. spirituality) could combine into a holistic framework, which would then provide detailed information about the proactivity of human agency (Bandura, 1986, 1997). The advent of technologies and globalization has encouraged social dialogues and, importantly, the sharing of knowledge, ideas, opinions, and viewpoints across cultures. Our cross-institutional research collaborations over the past 10 years, for example, have resulted in our propagation of meaningful and interesting cross-cultural discussions of topical themes, such as subjective well-being, optimal best, and personal fulfillment. How does life education, from the perspective of Taiwanese education, fit in with the teaching of positive psychology? An alternative question that we could inquire, likewise, is whether and/or to what extent positive psychology would fit in and support the teaching of life education. This attempt to integrate the two theoretical frameworks is innovative as it would add credence to the prominence of positive psychology as a driver of life’s proactivity and, by the same token, the promotion of the teaching of life education in school, college, and society.

Positive Psychology: An Overview

Positive psychology, in brief, explores life conditions and experiences both in terms of negativities (e.g., the remedy of pathologies and maladaptive functioning) and positivities (e.g., the encouragement and promotion of enriched life conditions) (Gable and Haidt, 2005). This theorization of positive psychology (Gable and Haidt, 2005) largely arises from the work of Seligman, Csikszentmihályi, and Peterson, who seek to understand the psychological well-being and optimal functioning of people (Quick, 2008). From the literature, Seligman and Csikszentmihályi (Seligman and Csikszentmihályi, 2000) have been credited with coining the term “positive psychology.” According to Sheldon et al. (2000), positive psychology is defined as:

“the scientific study of optimal human functioning. It aims to discover and promote the factors that allow individuals and communities to thrive. The positive psychology movement represents a new commitment on the part of research psychologists to focus attention upon the resources of psychological health, thereby going beyond prior emphases upon disease and disorder”.

This definition, as reflected in Pawelski’s (2016) comprehensive review of this topic, suggests that positive psychology incorporates and emphasizes personal characteristics, such as *internal drive*, *character building*, *human strength*, and *family and civic virtue*. From this emphasis, the study of positive psychology may entail the “building of the most positive qualities of an individual” (Seligman, 1999, p. 559) and “on building of what makes life most worth living” (Seligman, 1999, p. 562).

Seligman and Csikszentmihályi’s (2000) published work, likewise, emphasizes the science of positive psychology may exist on three levels—subjective, individually, and institutional: “the field of positive psychology at the subjective level is about valued subjective experiences: well-being, contentment, and satisfaction (in the past); hope and optimism (for the future); and flow and happiness (in the present). At the individual level, it is about positive individual traits: the capacity for love and vocation, courage, interpersonal skill, aesthetic sensibility, perseverance, forgiveness, originality, future mindedness, spirituality, high talent, and wisdom. At the group level, it is about the civic virtues and the institutions that move individuals toward better citizenship: responsibility, nurturance, altruism, civility, moderation, tolerance, and work ethic” (p. 5).

Interestingly, Ancient Greek philosophers refer to the concept of “eudaimonia,” which is translated to connote good spirit, happiness, and a state of flourishing. Psychologists in early as the 1950s, likewise, recognized the need to examine the virtue of strength-based approaches to prevent and treat a person’s mental illness. In the area of human motivation (Franken, 2007), likewise, Maslow’s (1954a, 1962) *humanistic theory* describes the importance of self-fulfillment of inner psychological needs. Maslow (1954b) argued that the science of psychology has been far more successful on addressing the negatives than improving the positives. It has revealed man’s and woman’s shortcomings, his/her illness, and his/her sins, but little about his/her

potentialities, his/her virtues, his/her achievable aspirations, or his/her full psychological height (Maslow, 1954b, p. 354).

Indeed, positive psychology has been and is difficult to define because of its nature and broad scope of psychological domains (Donaldson et al., 2015). Over the years, of course, there have been different theories proposed to explain and/or to reflect the tenets of positive psychology—for example, Phan et al.'s (2017) *Framework of Achievement Bests*, Seligman's (2010) PERMA model (i.e., Positive Emotions, Engagement, Relationship, Meaning and Accomplishment), Keyes's (2002) *Continuum of Psychological Well-Being*, and Peterson and Seligman's (2004) *Character Strengths and Virtues Framework*. In their seminal writing, Seligman and Csikszentmihályi (2000) defined positive psychology as “the combination of valued subjective experiences, which could contribute to the optimal experience of well-being.” This testament, based on our analysis, may incorporate reflection of a person's past (e.g., achievement), as well as his/her hope and optimism for the future (e.g., positive emotions), and flow and happiness in the present moment (e.g., engagement and meaning) (Phan et al., 2020a). This personal experience, indeed, attests to a continuation of time: past, present, and future. At an individual level, it is operationalized through positive individual traits such as the capacity for love, vocation, courage, interpersonal skill, aesthetic sensibility, perseverance, forgiveness, originality, future mindedness, spirituality, high talent, and wisdom. At the community or the organization level, in contrast, positive psychology is concerned with civic virtues and the goal of institutions to move individuals toward better citizenship, responsibility, nurturance, altruism, civility, moderation, tolerance, and work ethic (Seligman and Csikszentmihályi, 2000).

Significance of Positive Psychology: Striving to Achieve Optimal Best

As noted from the preceding section, positive psychology may act to negate pathologies and maladaptive states of functioning (e.g., continuing failures in mathematics learning) and, in contrast, to also promote positive life conditions and experiences (e.g., enjoyment in seeking mastery in music composition). The *theory of optimization* (e.g., Fraillon, 2004; Phan et al., 2017, 2019a, 2020b), recently developed to coincide with the paradigm of positive psychology, interestingly places more emphasis on positive life experiences and adaptive outcomes—for example, the achievement of optimal best (Liem et al., 2012; Phan et al., 2016). This focus of development (i.e., a focus on the achievement of optimal functioning) is beneficial and insightful as it seeks to promote the importance of positive life conditions and different types of adaptive outcomes. It is a central feat of human agency that individuals in society strive to achieve their optimal bests and flourish in life. In terms of schooling, for example, what is it that could encourage a student to strive for optimal best in gymnastic? In a similar vein, in a non-academic sense, what could we do to cultivate optimal health?

Optimal best, also known as optimal functioning, is an important hallmark of positive psychology (Seligman and Csikszentmihályi, 2000; Fraillon, 2004; Phan et al., 2019a) and,

by the same token, is an antithesis of pessimism, procrastination, a state of demotivation, and suboptimal functioning. Optimal best, as the term connotes, is concerned with successful accomplishment and/or fulfillment of a state of functioning (e.g., cognitive functioning) that, in this case, reflects the maximization of a person's capability (Fraillon, 2004; Phan et al., 2019a). In terms of diversity, for example, achievement of optimal best may involve the following:

- Academic learning, for example, a student's optimal cognitive functioning in essay composition, where he is able to write a 5,000-word essay and subsequently receiving an A⁺ grade.
- Personal well-being in a workplace environment, for example, a bank employee's optimal state of resilience, personal resolve, and motivation to overcome difficulties and achieving exceptional KPIs.
- Health functioning on a daily basis, for example, a senior citizen's optimal state of health despite her recent temporary illness from the COVID-19 pandemic.
- Professional sports performance (e.g., European football), for example, a football player's optimal physical and creative ability to score 50 goals in the 2020/2021 season.

The above examples emphasize the general nature of optimal best for different life contexts. Optimal best, which Fraillon (2004) also terms as “notional best,” is a point of reference by which a person strives to achieve. “What is my optimal best?” indeed is a phrase that one may commonly use as a source of aspiration and motivation to succeed. In their recent article, Phan et al. (2019a) provided a comprehensive overview and conceptual analysis of this concept of optimal best. According to the authors, determination of optimal best in a subject matter (e.g., a football player's optimal physical and creative ability), denoted as “L₂,” requires some form of “benchmarking” or referencing from a current level of best practice, denoted as “L₁.” Interestingly, from their conceptualization, Phan et al. (2019a) argued that the difference between L₁ and L₂, denoted as $\Delta(L_1-L_2)$, would represent and define a person's *state of flourishing*. From this account, we contend that a person's experience of flourishing, $\Delta(L_1-L_2)$, entails some positive, enriched quantitative and/or qualitative change. Importantly, however, Phan and his colleagues' research work of optimal best is seminal and innovative for their emphasis on the process of optimization—that is, what is it that governs and causes a person to achieve optimal best?

Positive psychology does not simply focus on optimal functioning, nor does it entail the masking of negative life conditions and experiences (Pawelski, 2016). Indeed, helplessness, sorrow, depression, continuing failures, and despair are some notable pathologies and negative life conditions, which we contend are noteworthy for consideration and addressing. In brief, the taboo subject of death itself is something that we all have to confront. It is the ultimate fate of humankind: the ceasing of life itself. In life, there are many personal situations, circumstances, events, experiences, etc. that are ongoing and/or repetitive, allowing us to recall and inform others—for example,

“...it was like this for me when the COVID-19 coronavirus pandemic happened...” and “...I really enjoyed the music concert the other day...” Death, however, is not an experience, situation, events, etc. that we can recall and repeat to someone (e.g., “... for me, death was like ...”). Interestingly, there is an article by Jennie Dear (September 9, 2016) published in *The Atlantic* (titled “What It Feels Like to Die”) that seeks to clarify the question of what it feels like to die. By all accounts, Dr. James Hallenbeck, a palliative care specialist at Stanford University, compares dying to blackholes—“We can see the effect of black holes, but it is extremely difficult, if not impossible, to look inside them. They exert an increasingly strong gravitational pull the closer one gets to them. As one passes the ‘event horizon,’ apparently the laws of physics begin to change” (source: <https://www.theatlantic.com/health/archive/2016/09/what-it-feels-like-to-die/499319/>).

Dear’s (September 9, 2016) article and personal account of death is interesting as it makes attempts to understand death. Of course, the article does not completely elucidate the complex nature of death in terms of the emergence of onset experience (e.g., one’s onset experience as he/she approaches death), grief, suffering, etc. Despite this caveat, the article does, in part, support the use of positive psychology, as a form of remedy, to address death and other related negative aspects of life (e.g., a person’s experience of trauma). Moreover, as an interesting premise from Dear’s (September 9, 2016) article, we contend that the subject of life education in itself could coincide with the paradigm of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000) and serve as an important remedy. That life education, in this sense, could play a prominent role in helping to alleviate negative emotions, feelings, and experiences and, by contrast, improve and enhance positive life characteristics (e.g., a state of personal resolve). From this account, we posit that life education (Chen, 2012, 2013; Huang, 2014), as a subject, could act as an informational source, which then would help to facilitate in the achievement of optimal best, academically and non-academically. Let us now consider this possibility in detail in terms of the focus of theoretical orientation.

LIFE EDUCATION AND POSITIVE PSYCHOLOGY

By all accounts, we acknowledge that life education is not the only subject and/or theory that could coincide with the paradigm of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000) and/or that it is the only framework, which could facilitate a person’s achievement of optimal best. Our examination of the literature, for example, has indicated that there are a number of notable theories that may successfully explain the achievement of optimal best: academic buoyancy (e.g., Martin et al., 2013; Collie et al., 2015), personal thriving (e.g., Su et al., 2014; Wiese et al., 2018), and academic striving (e.g., Phan and Ngu, 2020; Phan et al., 2020c). What is unique, though, from our proposition, is that the study of life education may delve into the premise of philosophical psychology, spiritual psychology, and religious psychology. Its scope, as we indicated earlier on, is

more broader than just the teaching of theories pertaining to the different stages of human development (e.g., stage of cognitive development) (Inhelder and Piaget, 1955/1958; Erikson, 1968).

Life education from the perspective of Taiwanese education is quite unique in terms of its theoretical premise, which we contend may coincide with other religious faiths, cultural practices and values, and philosophical beliefs, for example, Christianity (Davis, 2004; Knitter, 2009; Van der Merwe, 2018), Hinduism (Warrier, 2006; Srivastava and Barmola, 2013; Goswami, 2014), and Islam (Nasr, 1987/2008; Bonab et al., 2013; Marzband et al., 2017). In this analysis, as a point of prominence, life education’s focus is more philosophical, spiritual, and personal, delving into a person’s inner self and his/her relationship with nature, others in society, and some form of “divine being” (e.g., Buddha). At its core, perhaps, is the fact that the teaching of life education makes a concerted attempt to promote and facilitate the enrichment of personal well-being via means of what we term as “divine-human relationships” (Bonab et al., 2013). Enrichment of subjective well-being (e.g., a person’s experience of optimal health well-being) is positive and, in this case, reflects one of the theoretical tenets of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000), namely, to encourage and promote positive life experiences and conditions (i.e., in this case, to encourage and promote optimal health well-being). Of particular interest, from our point of view, is that life education shares a point of commonality with other religious faiths and philosophical beliefs (e.g., Saksena, 1970; Jones, 2004; Kourie and Ruthenberg, 2008; Marzband et al., 2016) in terms of emphasis in acknowledgment of the importance of nature and its intimate association with life, inclination and human attachment to some form of divine being (e.g., the importance of God), and the seeking of spiritual cultivation and connectedness between personal and transpersonal realms (Nasr, 1987/2008; Bonab et al., 2013). This theoretical contention, interestingly, suggests that life education espouses the importance in unity of the spirit, the mind, and the body in both worldly and non-worldly esoteric contexts.

It is evident that there is consensus among researchers’ conceptualizations and established findings (e.g., Saksena, 1970; Jones, 2004; Koenig, 2012; Marzband et al., 2016; Wagani and Colucci, 2018; Villani et al., 2019), which showcase the positive impact of religious faith, spiritual cultivation, and personal enlightenment toward the optimization of one’s personal well-being. Bonab et al.’s (2013) theoretical overview of Islamic spirituality, for example, is interesting as it highlights the relationship between personal religious commitment and mental health and coping ability (Miller and Thoresen, 1999). In this analysis, a person’s perceived positive relation with God is likely to enhance his/her coping and mental health condition (Galanter et al., 1979; Pargament, 1997; Belavich and Pargament, 2002). Testament of appreciation of spirituality, likewise, has also been found to make a profound impact on a person’s well-being. In a recent study in North India, interestingly, Wagani and Colucci (2018) explored an important “negative” aspect of positive psychology with reference to Hindu faith—in this case, the remedy and prevention of pathologies and maladaptive experiences. The authors found that spirituality (e.g., defined

as “the improvement and knowledge of oneself. Spirituality... defined as a way to know oneself, the inner self, or the soul”: Wagani and Colucci, 2018, p. 5) positively impacted on a student’s well-being and, more importantly, served as a protective measure against suicidal tendency.

As we have acknowledged earlier, the subject of life education is not new to Taiwan and has, in fact, been credited elsewhere in terms of theoretical development. What is novel, though, is that Taiwan has placed strong emphasis on the application of life education theories into practice. How can life education assist individuals to appreciate their sense of self-worth? How can life education negate a person’s perception of life dissatisfaction? How does life education complement a person’s emphasis on a need to have financial wealth? These questions are authentic and have life-related relevance, emphasizing the importance of theoretical understanding into the multiple purposes of life, personal reflection, and philosophical reasoning, all of which account for the goals of life education. That life education, specific to the case of Taiwan, is concerned with a focus on enrichment of personal well-being, appreciation for life and the fulfillment of life qualities, and the development of coping mechanisms to deal with life matters.

Our quest is to consider a coinciding support for positive psychology from the study of life education. How does the subject of life education, from the perspective of Taiwanese education, support and/or coincide with the theoretical tenets of positive psychology? This consideration acknowledges, from our viewpoint, the perspective and understanding that life education, in general, is positive and/or that it entails positive life characteristics for development (e.g., emphasizes the importance of positive emotional well-being). On this point, we concur and strongly believe that life education, in terms of its proposed theoretical tenets (e.g., a focus on the development of life wisdom, which may consist understanding of spiritual cultivation), is a positive subject that may soundly support the paradigm of positive psychology. This testament, indeed, is the hallmark of this conceptual analysis article.

Let us now explore three major components of life education, which we consider as being prevalent to supporting our seminal postulation—that the subject of life education is closely aligned with and in support of the paradigm of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000). Our proposition, drawn from professional teaching practices and existing theoretical and research development, posits that *life wisdom* (i.e., acquired knowledge pertaining to the importance of spirituality), *personal daily engagement of life practices* (e.g., engagement in meditation), and *one’s willingness to show care for others in society*, in general, produce a number of positive life qualities, for example, a person’s positive outlook in life. In a similar vein too, from our point of view, Taiwanese life education studies (Chen, 2012, 2013; Huang, 2014) also facilitate and enhance the following:

Philosophical Reflection: Personal reflection, we contend, encourages a person to internalize and to reflect on daily happenings in a philosophical manner in order to attain meaningful understanding. The main premise, in this case, is for a person to philosophically reflect and reason why things in life

happen and why they are the way they are. Buddhist meditation, resulting in calmness and serenity of the mind (Loden, 1996; Phan et al., 2020a) may, in this sense, enable the person to reflect from “within the mind” and to provide sound philosophical reasoning. As an example, consider the case of social stigma and its subsequent effect (Major and O’Brien, 2005; Frost, 2011) that an adolescent is experiencing. Philosophical reflection, in this analysis, would encourage a person to seek understanding from all sides, not necessarily for the purpose of resolution for this social mishap. This act, in turn, formulates evidence of life wisdom, which a person may refer to and use for other contexts.

Spiritual Cultivation: Spiritual cultivation, also known as the cultivation of spiritual mind, seeks to enlighten a person in a religious and/or spiritual sense. Specifically, with reference to the incorporation of Buddhist teaching (Yeshe and Rinpoche, 1976; Sheng Yen, 2010), Taiwanese scholars and students alike believe that spiritual cultivation, via means of acquired knowledge (e.g., Buddhist scripture) and meditation practice, would enable a person to attain meaningful understanding and appreciation of esoteric matters, such as the possibility of transcendence beyond the realm of death itself, unexplained phenomena of this physical world, and the true meaning of satori (Phan and Ngu, 2019; Phan et al., 2020a), that is, the achievement of perfection and/or tranquility. Spiritual cultivation, indeed, is a form of teaching, both formal and informal, which may serve to enlighten a person’s view and mindset of the world in a positive manner. For example, compassion, love, and willingness to forgive are all evidence of the success of spiritual cultivation.

Enrichment of Personal Well-Being: Enrichment of personal well-being reflects the nature of life care in which a person may show love, care, and compassion for oneself and for others in the community. Enrichment of personal well-being may reflect a person’s mindset, as well as his/her physical being. Importantly, however, enriched personal well-being may espouse the development and acquired experience of a “spiritual self”—in this case, the perception in experience of calmness, serenity, peace, and harmony with reference to the surrounding. Moreover, research development and the study of life education (e.g., Chen, 2001, 2009; Chen, 2012) in Taiwan posit that spiritual cultivation (e.g., the teaching of satori) could assist and encourage individuals to show willingness in care, love, and wisdom for others’ well-being. Taiwan is relatively advanced in terms of quality services of hospice care to senior citizens. One of the authors of this article, for example, works as a volunteer on weekends and afterhours to look after senior citizens. His personal account, as he describes, entails spiritual advice, which may consist of Buddhist chanting and reading of Buddhist scriptures.

From our rationale, we contend that philosophical reflection, spiritual cultivation and enlightenment, and a person’s enriched well-being are positive experiences and characteristics that may arise from the study of life education. By all accounts, we acknowledge that this viewpoint and rationalization may resonate elsewhere with other religious faiths, teaching subjects, cultural practices, etc. Indeed, as attested from the extensive literature, religious faiths such as Christianity (Davis, 2004; Knitter, 2009; Van der Merwe, 2018), Hinduism (Warrier, 2006;

Srivastava and Barmola, 2013; Goswami, 2014), and Islam (Nasr, 1987/2008; Bonab et al., 2013; Marzband et al., 2017) also explore the importance of spiritual cultivation and life enlightenment. For example, as we briefly referenced, Hindu faith places emphasis on a need for a person to “know and live in the highest self, the divine, the all-embracing unity, and to raise life in all its parts to the divinest possible values” (Goswami, 2014, p. 242). What is poignant, however, is that Taiwanese society and education systems place self-awareness and prominence on these elements, all of which are quality characteristics that coincide with positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000).

A Proposition for Consideration

Drawing from the preceding section, our proposition considers the extent to which life education would yield quality life characteristics that, in turn, support the paradigm of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000). Positive psychology, in a general sense, entails the promotion of optimal best, academically [e.g., optimal cognitive achievement (e.g., mastery) in Algebra] and non-academically (e.g., optimal emotional well-being despite one's obstacle). We rationalize that, in this instance, spiritual cultivation and enlightenment, philosophical reflection, and enriched well-being, all of which are positive qualities, would naturally converge, resulting in the development of life-relevant characteristics, which are shown in **Figure 2** and summarized in **Table 1**.

Our rationalization for the support of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000) from the study of life education (e.g., Chen, 2001, 2009; Chen, 2012) is shown in **Figure 2**. Foremost from **Figure 2** is our conceptualization, shown as a Venn diagram, which depicts a point of convergence (i.e., denoted as ‘X’) between three described components—spiritual cultivation and enlightenment, philosophical reflection, and enriched well-being. In particular, we propose that life education would create a specific form of knowledge, understanding, and personal experience that we term as “spiritual and enlightened self.” A person's spiritual and enlightened self is religious and spiritual and, from our proposition, may emphasize his/her intimate connectedness with some form of divine being and/or divinity. This point about spirituality and enlightenment, in a general sense, is not novel and has been noted to resonate with other religious faiths. For example, aside from Islam faith, Hindu faith, etc., Christian spirituality also recognizes the importance of a “dynamic divine–human dialogue—between the divine and the spiritual person” (Van der Merwe, 2018, p. 9). What is of consistency, perhaps, is that a perceived sense of spirituality could give rise to a person's “eureka moment” of awakening, or enlightenment (Schneiders, 1986; Knitter, 2009), resulting in his/her experience of connectedness with nature, people, and divinity (Van der Merwe, 2018).

What do the characteristics, or “virtues,” in **Table 1**, as we conceptualize, actually represent? Our rationale, in this analysis, posits the following: that the study of life education, focusing

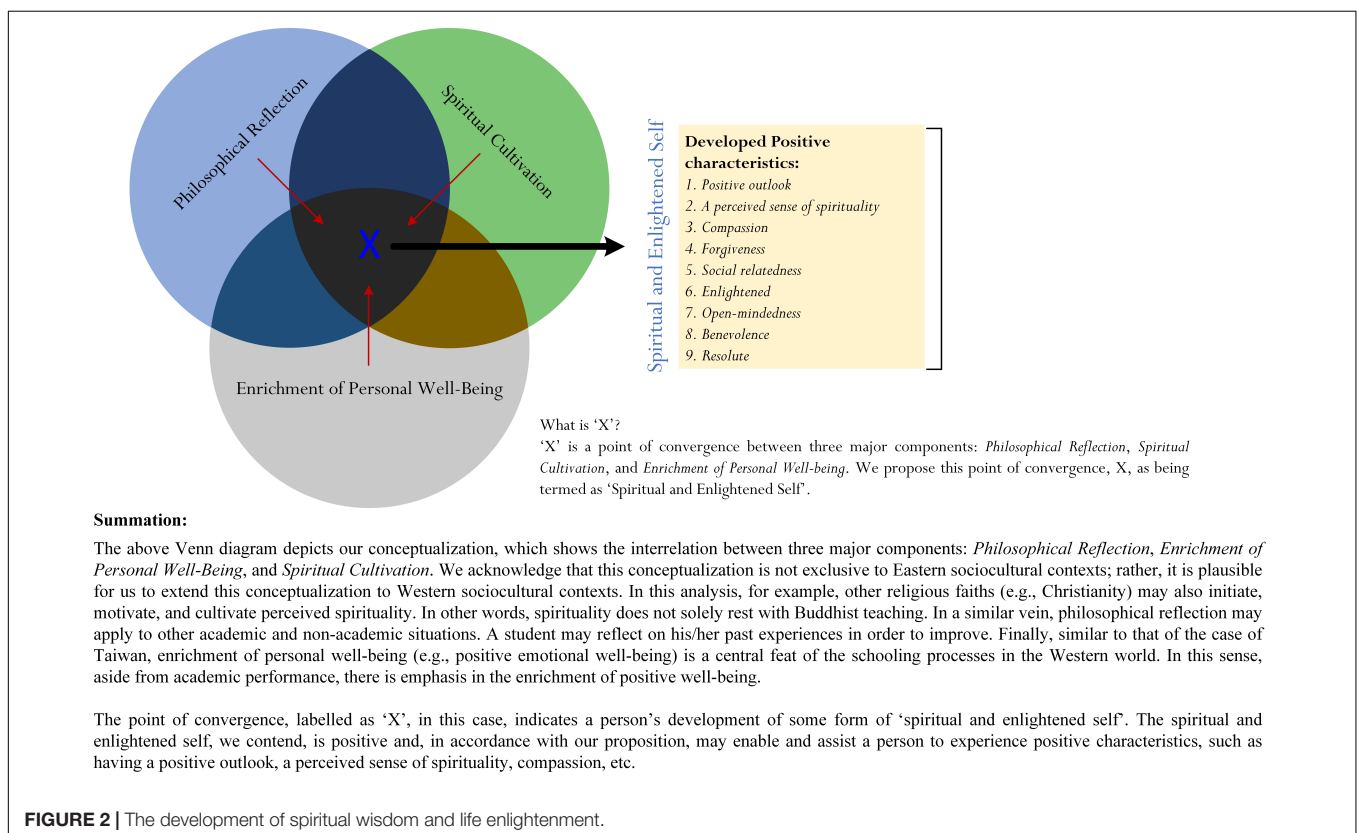


TABLE 1 | Characteristics of spiritual wisdom and life enlightenment.

Characteristics	Definition
1. Positive outlook	A person's non-judgmental, positive outlook about life—for example, that everything in life is aesthetic regardless of negative life conditions, obstacles, difficulties (e.g., racism)
2. Perceived sense of spirituality	Acquired knowledge and manifestation of spiritual belief—for example, a person's striving to appreciate and/or to engage in the practice of tranquility.
3. Compassion	A person's willingness to show love, empathy, and care for others in society, regardless of their ethnicity, race, social standing, political affiliation, etc.
4. Forgiveness	A person's willingness to be non-judgmental and to forgive others for their deeds, regardless of subsequent effects. Forgiveness, in this sense, reflects a person's magnanimous state
5. Social relatedness	Social relatedness is more than just evidence of proactive social interactions between individuals. It is also about empathetic thoughts and acts, such as offering friendship to a person who is in need
6. Enlightened	The word “enlightened” arises from personal understanding and/or, perhaps, experience of enlightenment, or nirvana. This emphasis identifies the beatitude of life, both in the physical sense and the esoteric sense
7. Open-mindedness	A person's understanding, acknowledgment, and acceptance that anything in this physical world is possible. This description, in particular, reflects a person's state of inquisitiveness to understand about the world
8. Benevolence	A person's disposition to engage in charitable acts and to show kindness and good will to others in the community. Benevolence, in this case, may also reflect sacrifice and willingness to go beyond of what is expected
9. Resolute	Personal resolute, a concept recently developed, emphasizes a person's unwavering focus, concentration, and mental fortitude, which may then account for his/her state of decisiveness in a particular context.

on the teaching of philosophical reflection, the cultivation of spirituality, and the enrichment of personal well-being would give rise to the “creation” of a holistic entity—a person's spiritual and enlightened self. When a person experiences spirituality and feels enlightened or awakened) (i.e., his/her holistic self), he/she is likely to exhibit different types of life characteristics and virtues such as having a positive outlook about life, being compassionate and showing forgiveness, etc. By all accounts, these positive life characteristics (e.g., a positive outlook) are comparable with those established elsewhere, especially in relation to other theoretical perspectives, cultural viewpoints, religious faiths, and customary practices. For example, our description of the positive characteristic of “positive outlook in life” (i.e., a person's inclination to be positive about life, regardless of his/her current situations, etc.) has been referenced in existing research development pertaining to the subject of *future time orientation* (e.g., Wallace, 1956; Nuttin, 1964; Mehta et al., 1972) in the field of psychology. A positive future time orientation at school, according to research evidence, would result in an improvement in academic performance. In a similar vein, a person's experience and manifestation of compassion is well-documented with other religious faiths, for example, Islam (i.e., the concept of *rahmah*) (Engineer, 2001; Taib, 2004; Nasir, 2016) and Christianity (Cornelius, 2013; Godlaski, 2015; Zylla, 2017).

A Holistic Self: Spirituality, Enlightenment, and Connectedness

Holistic self, from our proposition, is a virtuous and magnanimous entity that arises from the study of life education. This consideration of a person's holistic self is personal for us, drawing from our own teaching experiences, existing theoretical

understanding, and ongoing research development. A person's holistic self, we contend, reflects his/her state of liveliness, awakening, and spirituality, yielding a number of virtues and life qualities (e.g., indication of compassion) that largely support the paradigm of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000) in helping to address different types of pathologies and/or the achievement of optimal best. Let us consider a negative condition of death and how a person would overcome this fate. Death as a topic is dark, negative, and something that not many of us would like to discuss and/or talk about. Death is the ultimate destruction of life. For a person who is approaching death, it is a daunting and suffering experience. By the same token, for a close relative of someone who is dying, this “confrontation” of death is also a daunting experience, for example, the self-cognizance of grief, denial, and pain. How would positive psychology and, more importantly, a person's holistic self-address this fundamental topic? Likewise, how would life education assist someone who is approaching death, and/or the close relative who is experiencing the onset of grief, etc.?

Referring to our previous discussion, an acquired spiritual and enlightened self (i.e., a person's holistic self) in this case may provide relevant information (e.g., meaningful understanding of life wisdom) and experiences (e.g., realization that everything in life is aesthetic) (Loden, 1996; Phan et al., 2020a), which could assist a person to confront and cope with death. Buddhist faith, in particular, could encourage and instill the following comparable beliefs and/or perceptions:

- i. The spiritual belief of samsāra, that is, the endless cycle of birth, rebirth, and redeath. That is, in this case, every rebirth is temporary and impermanent. Upon death, a person is reborn elsewhere in accordance with his/her

own karma. Hence, from this spiritual belief, those who are approaching death may view death with a sense of encouragement, hope, and optimism, knowing that this is simply a cycle of life and death.

- ii. The spiritual belief that the nature of life and death is aesthetic and that negativity, pain, suffering, etc. are part of the norm and subjective, depending on a person's resolve, outlook, open-mindedness, etc. This emphasis connotes, in particular, the importance of enlightenment, which would potentially allow a person in this case to achieve the everlasting the beatitude of life.
- ii. The spiritual belief into the esoteric nature of life and death, which may involve the possibility of transcendence beyond the realm of the physical world. In other words, spiritual cultivation may allow a person to view death as not being the ultimate end, but rather as a dividing line that separates one physical world life cycle from that of another cycle.

In contrast to death, pathologies, and other forms of maladaptive functioning, likewise, a person's acquired holistic self is also able to facilitate the achievement of optimal best (Fraillon, 2004; Liem et al., 2012; Phan et al., 2020b) and the experience of flourishing (Diener et al., 2009; Seligman, 2010; Phan et al., 2019a). Our consideration in this matter connotes that virtues (e.g., compassion) and quality characteristics (e.g., having a positive outlook), in this case, may reflect a person's optimal "individual experience." In other words, a person's achievement and/or experience of spirituality and enlightenment is more than just perceived evidence of positivity; rather, we rationalize that development of the holistic self is the ultimate optimal achievement or fulfillment that a person may experience. This optimal personal experience of spirituality and enlightenment, enabling a person to feel connected with God or some divine being (Nasr, 1987/2008; Bonab et al., 2013; Goswami, 2014; Van der Merwe, 2018), is of an exceptional level, which many of us may not achieve.

CONCLUSION

The study of death education in Taiwan is extremely prominent. Over the past four decades, institutions have offered degree programs and courses that emphasize the importance of life education. One unique aspect of life education in Taiwan has been the incorporation of specific Eastern-derived epistemologies, philosophical and religious beliefs, and cultural practices. This uniqueness has led to the conceptualization and meaningful understanding that life education, in general, is concerned with enrichment of life qualities, cultivation of spiritual wisdom, and the pursuing of personal contentment and happiness. The main premise in this case is that aside from social stability and financial wealth, the notion of having a spiritual, fulfilling life is a noteworthy feat for development. Hence, on a daily basis, many Taiwanese engage in Buddhist meditation and other forms of meditation, as well as partaking in charitable acts and short courses, which would facilitate in the achievement and fulfillment of life qualities.

Our premise, as explored in the preceding sections, is to consider the extent to which life education, from the perspective of Taiwanese education, could coincide with and/or support the study of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000). This consideration is innovative as it emphasizes the potential nexus in terms of epistemologies, philosophical reasoning, and theoretical psychology between Western and Eastern contexts. The study of life education in Taiwan, for example, is interesting, delving into the complex nature of three interrelated elements that, in this sense, incorporate Eastern-derived epistemologies (e.g., Buddhist spirituality): life wisdom, life practice, and life care. Our concerted effort, in this analysis, led to the proposition of a theoretical-conceptual model for continuing research development. The proposed point of convergence, labeled as "X" in **Figure 2**, is significant, highlighting a person's spiritual and enlightened self. This point of convergence, which we termed as spiritual wisdom and life enlightenment, is positive and, more importantly, would form part of a person's holistic development (Forbes, 2003; Hare, 2010).

Overall, then, what is the main premise of our conceptual analysis article and, more importantly, our proposition? For us, as scholars, we have a collective interest to seek understanding into the proactivity of human agency—for example, does having a positive mindset assist a person to flourish, and/or to cope with an impending health problem? From the "Western" literature, we note that the paradigm of positive psychology (Seligman, 1999, 2010; Seligman and Csikszentmihályi, 2000) has been effective in assisting individuals with their well-being experiences (e.g., facilitating positive emotional well-being, via means of resilience). Our viewpoint, largely derived from teaching and research development, likewise, considers the use of life education theories (Huang, 1993; Chen, 2013; Huang, 2014) to gauge into and facilitate the proactivity of human agency. In this case, we hope that researchers, educators, organizations, etc. will consider the use of life education and, in particular, our proposition (e.g., a person's holistic self) to encourage and promote quality life experiences. Quality life experiences for a person, in this case, may entail the following: (i) to appreciate and value life, regardless of personal hardship, socioeconomic standing, obstacles, etc.; (ii) to seek meaningful daily understanding, insights, and experiences about life and to live a meaningful life; and (iii) to plan and to have positive future outlooks about life, including death and other life-related negativities.

Our intent, as scholars of education and psychology, is to seek innovative and new frontiers in theory and research development, which may then assist students and educators alike in their learning and teaching experiences. A focus on the seeking of life wisdom, spiritual cultivation (e.g., endeavor and/or perceived connectedness with some divine being), and experience of enlightenment (e.g., personal feeling of contentment and inner peace) is a noteworthy feat for consideration, especially in terms of applicability, practicality, and continuing research development. Foremost, from the present article, we encourage readers to capitalize on our research proposition of life education and to consider other inquiries for development. Our future goal,

interestingly, is to use theoretical psychology and philosophical reasoning to unify comparable theories (e.g., life education, mindfulness, positive psychology) and cross-cultural viewpoints into an overarching framework for understanding—namely, to date, we have inquired into the process of optimization, the nature of holistic psychology, the multifaceted nature of mindfulness and the potential interrelationship between mindfulness and positive psychology, and of course life education and positive psychology. Of particular interest for us, in this case, is to develop and propose a unified theoretical model that could explain a person's holistic development in terms of his/her subjective well-being (e.g., emotional well-being), cognition, morality, and social relationship. Is this feat of developing a unified model possible, and/or can we develop a theoretical model of human agency (e.g., a person's achievement of optimal best in a particular domain of functioning) that could successfully take into account different philosophical beliefs, religious faiths, theoretical perspectives, etc.?

Caveats and Future Directions

Theoretical psychology, philosophical reasoning, epistemologies, etc. are interesting “academic strategies” and/or approaches that we could use to develop new innovative theories and conceptualizations. Like any proposed theory or theoretical model for that matter, however, it is important that we are able to scientifically validate a particular line of inquiry, theoretical model, conceptual framework, etc. For example, in terms of quantitative research, it is perceived as being straightforward to investigate, say, a one-factor (e.g., Brown and Ryan, 2003; Chadwick et al., 2008), a two-factor (e.g., Cardaciottto et al., 2008; Davis et al., 2009), and/or a more complex factorial structure of mindfulness (e.g., a four-factor model: Baer et al., 2004; Feldman et al., 2007) using Likert-scale inventories with confirmatory factor analysis techniques (Kline, 2011; Byrne, 2012). In a similar vein, despite modest empirical development at present, it is possible to explore and empirically validate the nature of subjective well-being (Diener et al., 2009, 2010; Wiese et al., 2018).

We acknowledge that our discussion in this article is theoretical and that, at present, there is only limited empirical evidence (e.g., **Figure 1**) to support its premise. In this sense, it is not always feasible and/or achievable to validate an inquiry, especially when it is esoteric and non-scientific in nature. For example, in accordance with our previous discussion, we contend that it is somewhat unachievable to design an appropriate methodological design for usage, which could measure, assess, and validate different types of esoteric experiences (e.g., “tranquility,” “enlightenment,” “samsāra”). In this analysis, we are extremely constrained in our quest to validate the experience of and the concept of transcendence—that is, the possibility of life transcending beyond death. How would we scientifically determine whether this notion of postdeath experience is plausible?

One interesting topic and/or line of inquiry in the social sciences is related to methodological design (Bordens and Abbott, 2008; Gravetter and Forzano, 2009; Babbie, 2014), which a researcher could use to investigate and validate a particular concept, relationship, etc. For example, as a

question for consideration, would a two-group experimental design (e.g., control group vs. experimental group) be the course for usage in terms of validating the negative impact of cognitive load imposition (Sweller et al., 2011; Sweller, 2012)? In our research development (Phan et al., 2020a) and, in particular, our recent conceptual-analysis article (Phan et al., 2019a), we introduced a term, coined as “methodological appropriateness.” Methodological appropriateness, in brief, is concerned with a researcher's consideration of the appropriateness (or inappropriateness) and adequacy (or inadequacy) of a methodological design that he/she would use to validate a concept, association, etc. Methodological appropriateness, from our point of view, may explain limitations, as well as the ineffectiveness, inconsistency, and inaccuracy of established findings of empirical research. Poignant to this discussion, though, is the fact that the topic of methodological appropriateness (Phan et al., 2019a, 2020a) is also associated with conceptualizations and theorizations drawn from philosophical reasoning, theoretical psychology, and non-scientific intuitions. In other words, it is still plausible for researchers to consider the relevance and applicability of methodological appropriateness for esoteric and non-scientific matters.

From the above, we contend there are a number of caveats that are worthy for continuing research development. Foremost, in this analysis, is the “scientific” validation of our proposed conceptualization, as shown in **Figure 2**. With reference to **Figure 2**, there are two notable issues for researchers to consider:

- i. Develop Likert-scale measures [e.g., (1) not true at all, (3) neutral, (5) complete true], other forms, which could assist in the measurement and assessment of positive life characteristics, such as a perceived sense of spirituality (e.g., Likert-scale rating of item: “I often experience a sense of spirituality for the unknown”), forgiveness (e.g., Likert-scale rating of item: “I am a forgiving person”), benevolence (e.g., Likert-scale rating of item: “I find it fulfilling to help others in the community”), etc.
- ii. Develop a comparable framework, which we could perhaps use to cross-validate the described theoretical model as depicted in **Figure 2**. Researchers often use this methodological approach to cross-validate and establish psychometric properties of a Likert-scale measure. The rationale, in this case, is that comparable measures would positively associate with each other [e.g., Measure A \leftrightarrow Measure B, where \leftrightarrow (i.e., association) is postulated to be positive] and that comparable measures would exert similar predict effects on an outcome [e.g., Measure A \rightarrow O (β_A effect), Measure B \rightarrow O (β_B effect), where $\beta_A \sim \beta_B$].

In a similar vein, as one of our reviewers recently pointed out, our conceptualization of the spiritual and enlightened self may have relevance and applicability to the Western context. In other words, in addition to Buddhist teaching (Yeshe and Rinpoche, 1976; Sheng Yen, 2010), it is plausible for us to consider the impact of other cultural and religious faiths, which could also initiate, instill, and facilitate a person's spiritual belief regarding life [e.g., Christianity (Davis, 2004; Knitter, 2009;

Van der Merwe, 2018), Hinduism (Warrier, 2006; Srivastava and Barmola, 2013; Goswami, 2014), Islam (Nasr, 1987/2008; Bonab et al., 2013; Marzband et al., 2017), etc.]. In a similar vein, resonating with the focus of our conceptual analysis, we contend that support for the study of positive psychology (Gilham and Seligman, 1999; Seligman, 1999; Seligman and Csikszentmihályi, 2000) could involve other cultural practices, religious faiths, and theoretical understanding. An important question then for consideration is whether and/or to what extent there is a central point of commonality between different cultural practices, religious faiths, and theoretical understanding, which in turn could support the paradigm of positive psychology and/or the teaching of life education. In this sense, is it plausible for us to establish some form of “convergence” in terms of commonalities of theoretical understanding between, say, Christianity, Buddhism, and Islam? How does this convergence point, in particular, assist a person to appreciate, value, and/or understand the true meaning of life? By all accounts, we contend the possibility that there are contrasting and diverse viewpoints, resulting in dissimilarity and inconsistency with reference to the study of life education. For example, in terms of life wisdom, we note that Hinduism also places emphasis on the notion of *moksha*, or the freeing of the samsāric cycle altogether (Warrier, 2006). Spiritual enlightenment, the personal striving for inner discipline, and one’s detachment from the external world at large may all assist a person to free himself/herself from the endless cycle of birth, death, and rebirth.

Social sciences research, as we mentioned, places emphasis on the topic of methodological appropriateness and the use of different methodological data collection techniques to gather evidence. Some subject matters are relatively straightforward, relying on quantitative methodological approaches and robust statistical analyses. It is sound and possible, from our point of view, for researchers to consider their own teaching practices, professional and personal experiences, personal reflections and interpretations of life, and social interactions as “anecdotal evidence,” which could provide insights and theoretical understanding into the study of life education. For example, documenting our own experiences of meditation and teaching of mindfulness (Hanh, 1976; Chen, 2012; Phan et al., 2020a) has helped us to appreciate the importance of spirituality and the meaning of life wisdom as opposed to

cognitive intelligence in a subject matter. Continuing practice of Buddhist meditation, in this sense, has encouraged and motivated us to engage in benevolent acts. By the same token, our anecdotal experiences, in tandem with our existing research and personal intuitions, have enabled us to develop different conceptualizations and theorizations of positive psychology (e.g., the theory of optimization) (Phan et al., 2017, 2019a). Researchers may adopt our lead and take a similar pathway, sharing with the academic community personal practices, experiences (e.g., esoteric experience), intuitions, etc. that could, likewise, assist in theoretical understanding of life education.

Having said this, however, we acknowledge that personal anecdotal evidence is non-scientific and contentious in nature, raising the question of validity, acceptance, and generalization. To a certain degree, the same point of acknowledgment also lends itself to the study of positive psychology, which has received relatively modest scientific evidence to date. On this basis, we encourage researchers to consider pathways, conceptualizations, methodological designs, etc. that could, similarly, help validate the paradigm of positive psychology. In this analysis, taking our cue, it is plausible to consider the establishment of “proxy” evidence that could affirm the prevalence of positive psychology.

AUTHOR CONTRIBUTIONS

HP and BN were responsible for the literature search and write-up of this article. HP, BN, SC, LW, WL, and CH contributed equally to the conceptualization and theoretical contribution of the article.

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Increasing Students' Long-Term Well-Being by Mandatory Intervention – A Positive Psychology Field Study

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Is it possible to help students experience increased well-being that proceeds by volitional actions from mandatory participation in interventions? The aim of this field study was to better understand the influence of expectancy, motivation, and well-being experiences during a positive activity intervention on long-term behavior change and long-term well-being. The study included 59 students enrolled in a course that included choosing a positive activity that they would plan for and implement in their lives for 6 weeks. The participants answered questionnaires before (pre-measure) and after the intervention (short-term measure), as well as an unannounced follow-up questionnaire 6 months later (long-term measure). Overall, the results indicate the importance of coexisting intrinsic motivation and high expectancy in the outcome and that the key driver of sustained volitional behavior change and experiencing long-term increased well-being is to experience increased well-being during the intervention. The results of the study show that it is possible to help students experience increased well-being that proceeds by volitional actions. The study shows that a mandatory positive activity intervention, including free choice of activity and course of action, can induce new long-term behaviors and long-term increased well-being.

Keywords: students, long-term, well-being, change, positive activity intervention, positive psychology

INTRODUCTION

Positive psychology focuses on well-functioning individuals' mental health improvement and well-being, as compared to the traditional psychology perspective of reducing mental illness (Seligman and Csikszentmihalyi, 2000). It has been argued that the school and university environments are ideal settings to increase and sustain individual well-being (Norrish et al., 2013; Seligman et al., 2009; White and Waters, 2015). The present study was conducted in a university environment and focused on how to use a mandatory positive psychology intervention to increase long-term student well-being. Before deepening the perspective of positive psychology interventions on students, it is useful to define well-being. The most frequently used definitions of well-being available are subjective well-being and psychological well-being (Weiss et al., 2016). Subjective well-being takes a hedonic perspective and has been described as a sophisticated measurement of happiness that focuses not only on circumstances but also on processes and interactions with situations, with

other people, and within oneself (Diener et al., 1999). Hedonic aspects of well-being are measured as life satisfaction and a balance between negative and positive affect (Diener, 1984). By contrast, psychological well-being takes a more eudemonic perspective and has been described as self-acceptance, relations with others, autonomy, environmental mastery, purpose in life, and personal growth (Ryff, 1989). Eudemonic aspects of well-being comprise a broader and multifaceted set of needs for optimal functioning, personal growth, self-determination, and having a meaningful life. The terms *subjective well-being* and *happiness* are often used interchangeably (Lyubomirsky, 2001; Diener et al., 1999), so we have used them interchangeably in this paper.

From the positive psychology perspective, individuals can make the most of their resources by using their personality traits and signature strengths in ways that cultivate their specific capacities and increase well-being. This approach could be appealing and easily accessed by students. Several meta-analyses (see, for instance, Bolier et al., 2013; Hone et al., 2015; Sin and Lyubomirsky, 2009; Weiss et al., 2016) have enforced the efficacy of positive psychology interventions in increasing well-being and ameliorating depressive symptoms, especially for those in the middle range of the well-being continuum. Lyubomirsky (2008) presented 12 positive activity interventions, which can be adjusted to suit each individual. The positive activities have been shown to increase well-being if implemented in everyday life for 8 weeks. Lyubomirsky argued that when mindful practical actions are executed in everyday life, positive emotions emerge connected to the area in focus, which reproduce themselves (Lyubomirsky, 2008). **Table 1** provides a brief presentation of the nature of the activities and how they can be practiced.

The very nature of an intervention implies a targeted action during a limited timeframe with the aim of changing a specific

behavior or state of affairs. Thus, the goal of the intervention is to help individuals adopt new behaviors such as committing to goals. Understandably, behavior change interventions are carried out with the intention of changing behaviors, not only during the intervention itself but also having sufficient impact to sustain the intervention-induced behavior. Therefore, it is necessary to investigate the effects of behavior change interventions, in terms of both short-term effects in immediate conjecture with the intervention and long-term effects in terms of sustained behavior.

Motivation

When participating in a behavior change intervention, motivation is needed to carry through with it. Thus, to understand the present study's angle on students' motivation, we briefly present the related motivational theory. As Sheldon and Ryan (2011) argued, Self-Determination Theory (SDT) (Deci and Ryan, 2008) is a motivational theory meeting positive psychology, both in its framework for understanding optimal functioning and in the need for autonomy and met needs for succeeding in well-being interventions. According to SDT, three basic human needs that activate behavior are central for motivation to occur: competence, autonomy, and relatedness. The desire to control the outcome of one's actions (competence); the need to act in harmony with true interest and values and out of free will (autonomy); and the need to perform actions that include belongingness, social support, and togetherness (relatedness) are associated with psychological health and effective performance. SDT divides motivation into intrinsic and extrinsic forms. Intrinsic motivation is the drive to do things autonomously, out of curiosity, for the joy and internal reward of feeling good, excited, or pleased. Intrinsic motivation reflects the instant gratification of performing a behavior. Extrinsic motivation is a controlling form of motivation and typically refers to the drive to do things in order to receive an external reward, such as money, praise, or awards, or to avoid punishment, such as scolding or disgrace (Deci and Ryan, 2008). In SDT, the latter form of extrinsic motivation is referred to as external regulation. Ryan (2012) explained that extrinsic motivation can be internalized, where introjection is a controlled (and therefore the least autonomous) form of extrinsic motivation. Examples include parents reacting to their child's academic performance by rewards or punishment, which leads to negative well-being consequences for the child because of contingencies of self-worth and usually does not result in long-term performance because of the non-volitional nature. A more autonomous form of internalization is identified regulation; for example, the child in the above example would understand and accept the value of the behavior (doing well at school). The most autonomous form of internalization is integrated regulation, which refers to when the behavior has been adopted and becomes in line with the individual's own identification and needs. Thus, externally motivated behavior can become volitional. Externally motivated behaviors normally do not transform into intrinsic ones because of their instrumental focuses (Ryan, 2012). However, different types of motivation can coexist, and a behavior can start in one form and transform to another. The difference between intrinsic motivation and a fully integrated extrinsic motivation – that is, integrated

TABLE 1 | Lyubomirsky's 12 positive activities with examples of behaviors that can be implemented in everyday life.

Positive activity	Description examples
Expressing gratitude	Observe, appreciate, and write down good things in your life
Cultivating optimism	Notice and express positive sides of things
Avoiding over-thinking and social comparison	Limit rumination to one "rumination hour" per day
Practicing acts of kindness	Offer help, give (honest) compliments
Nurturing social relationships	Express love, be supportive, show appreciation
Developing strategies for coping	Find meaning in traumas, turn to social support
Learning to forgive	Write forgiveness letter(s)
Increasing flow experience	Engage in activities with balance between challenge and control
Savoring life's joys	Be mindful when doing more of things you enjoy
Committing to your goals	Learn and practice authentic, harmonious goals
Practicing religion and spirituality	Perform spiritual activities, pray
Taking care of your body and soul	Practice meditation or physical activity

regulation – is that the former is, by definition, doing something for the joy and interest of it, while the latter is doing something for the value and meaning of it.

Lyubomirsky developed a self-diagnostic test – the Person–Activity Fit Diagnostic – which is recommended to be taken before choosing a positive activity to engage in, to determine which activity would be most valuable for each individual. The Person–Activity Fit Diagnostic consists of 12 activities to consider regarding five reasons one would possibly engage in them: how *natural* it would feel, how much one would *enjoy* doing it, how much *value* and identification it would bring, how *guilty* one would feel to not do it, and how one would do it because the *situation* or someone else forces them to do it. The reasons for engaging in positive activities tap into the different kinds of motivation: *natural* and *enjoy* tap intrinsic motivation, *value* taps identified motivation, *guilty* taps introjected motivation, and *situation* taps external motivation (Lyubomirsky, 2008). However, even with prerequisites for motivation in place, behavior change is still subject to another factor: the individual's beliefs (Bandura, 1997). The belief of what the future will bring is called expectation.

Expectation

Our expectations seem to influence what the future actually brings. Murphy (1999) researched the influence of expectancy on the outcome of therapy and defined expectancy as “the client's hope and expectancy of change as a result of participating in therapy.” From an intervention perspective, the idea of expectations having significant effects on outcomes of the intervention is intriguing. Previous research shows that expectation seems to be as important as the activity itself (Volkow et al., 2003).

Bandura (1977) self-efficacy theory focused on expectancies for success and divided expectancy into self-expectancy and outcome expectancy. Self-expectancy represents individuals' belief in their ability to perform a certain behavior, whereas outcome expectancy represents the belief that a certain behavior will lead to a certain outcome. Rather than focusing on different types of expectancy, the present study uses the term *expectancy* to describe the participants' general expectation of the overall possible success rate that their participation in the intervention may bring.

Behavior change interventions are carried out with the intention of changing specific behaviors; however, the ultimate goal is usually not the target behavior itself but the outcome – the experienced gain – which makes change worthwhile for the individual. Therefore, to understand well-being interventions, we must differentiate between the changed behavior and its outcome.

Outcome and Well-Being of Students

A desired outcome from well-being interventions in a school setting is that the students should experience increased well-being. The very nature of an intervention implies a targeted action during a limited timeframe with the aim of changing a specific behavior or state of affairs. Thus, the goal of this intervention was to help students adopt a new behavior and increase their well-being. Understandably, interventions are

enacted with the intention of changing behaviors, with enough impact to sustain the behavior. Consequently, a study of the effects of interventions must include short-term and long-term effects in terms of sustained behavior and sustained well-being.

It is helpful to promote a path to better mental health and well-being in an educational setting where students easily can access the perspective and be guided on how to apply and implement it in everyday life to build a foundation for the rest of their lives. A lot of previous research has examined well-being interventions in a school setting with a set course of action for students to follow (see, for instance, Shoshani and Steinmetz, 2014; Lambert et al., 2019). However, personal fit with positive activities has been argued to be important (Lyubomirsky, 2008) and could save monetary, personnel, and time resources. Additionally, from a motivational perspective, it would be desirable to make an externally prompted behavior become intrinsically or fully externally integratedly motivated. Therefore, the present study was conducted with the distinguishing parameters of mandatory participation in the intervention, but where the participants were free to choose one positive activity themselves and plan the implementation of the activity to fit their everyday lives. Research is needed in this course to create interventions that help students experience long-term increased well-being. Hence, the aim of present field study was to investigate the following research questions in the light of an externally prompted positive activity intervention:

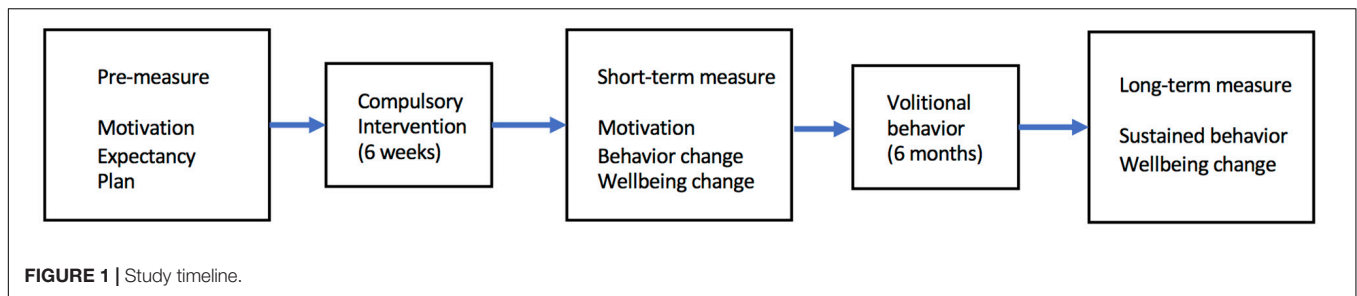
- RQ1: How does expectancy influence the effect of motivation on experienced well-being change?
- RQ2: How do students' motivation and expectancy relate to long-term behavior change and experienced long-term well-being increase?

MATERIALS AND METHODS

The study was based on a 6-week well-being intervention. Participants were given questionnaires before and after the intervention, as well as an unannounced follow-up measurement 6 months later (see **Figure 1**). Although the intervention was a compulsory class assignment, participation in the study was voluntary, and nothing was said about follow-up measurements. The participants received no support to continue the intervention-induced behaviors after the intervention. Therefore, results from the follow-up measurements can be taken to indicate the participants' volitional sustained behavior. Considering the motivational processes of the SDT, the participants were asked to specify whether their motivation was attributed to the ambition of being a good student and receiving good grades (encapsulated in extrinsic motivation in the present study) or to an inner will and genuine interest (intrinsic motivation) in behavior change.

Participants and Recruitment

As part of a mandatory course in the first year of the psychology program at Karlstad University, Sweden, students were obliged to study the 12 evidence-based positive activity interventions



and their implementation (Lyubomirsky, 2008) and select one that they would implement in their lives for the following 6 weeks. The assignment included planning for implementation that would fit the students' lives and writing a paper about their experiences linked to the literature. The students' plans were written down individually and included their choice of activity, activity frequency, time and place for the activity, as well as time, place, and form for journaling the activity. Among the students from three different cohorts of the course, volunteers were recruited for the present study and required to answer questionnaires before and after the intervention. In addition, participants were approached 6 months after the intervention ended to answer an unannounced follow-up questionnaire. The questionnaires were handed out in printed form: the pre-measure before the first lecture of the course, the short-term measure after the last lecture of the course, and the long-term measure before a lecture in a different course 6 months later. At the pre-measure, the students were asked about their plan (positive activity choice, frequency, and course of action), motivation (intrinsic versus extrinsic), and expectations (high versus low) regarding the intervention results. At the short-term measure, the students were asked about their experienced well-being change (if any), their behavior change, and their motivation at this point. At the post-measure, the students were asked about their experienced well-being change and about their current engagement in the target behavior. For an illustrative study overview, see **Figure 1**.

The handouts resulted in 59 complete questionnaires (with negligible drop-out). The sample consisted of 26 percent male and 74 percent female participants, ranging in age from 19 to 44 years old, with a mean age of 24.8 (SD = 5.93). Each questionnaire took approximately 15–20 min to complete. To reveal spontaneous volitional behavior change motivated from within the participants themselves, the follow-up measurement was not announced beforehand.

Material

Well-being can be measured by a single-item scale that simply asks people how happy they are (Abdel-Khalek, 2006) or by standardized batteries of questions. Lyubomirsky (2008) study on positive activity interventions applied the latter, specifically the Subjective Happiness Scale or SHS (Lyubomirsky and Lepper, 1999). The SHS is a global, subjective measurement of happiness that includes absolute ratings as well as comparison to other people. Lyubomirsky and colleagues argued that

positive activities increased happiness, based on before and after measurements using the SHS. In line with other studies (Gardner et al., 1998; Hoepfner et al., 2011), the present study used a single-item scale to measure happiness before and after the intervention, as well as at the 6-month follow-up.

Pre-measures

The questionnaires containing the pre-measures were distributed before the intervention began. In addition to basic demographics, the participants were asked questions regarding their belief in the intervention (expectancy) and how often they intended to execute the new behavior (plan). Expectancy is most often measured by a single-item scale (e.g., Ilgen et al., 1981; Wanous et al., 1997). Therefore, we used a seven-point Likert scale that asked the participants to indicate how much happier they expected to be after carrying out the intervention, with 1 being "not at all happier" and 7 being "a lot happier." Participants' new behavior plan was measured with the question "How often do you plan to carry out your chosen behavior during the course?" The response choices were "never," "very occasionally," "once per month," "several times per month," "once per week," and "several times per week."

Short-Term Measurement

The questionnaires measuring the short-term results were distributed ahead of a lecture at the end of the course and contained questions regarding motivation (intrinsic versus extrinsic), how often the new behavior was executed (short-term behavior change), and how much happier the participants felt after the intervention compared with before (experienced short-term change in well-being). In line with Markland and Hardy (1997), motivation was measured with a seven-point Likert scale indicating the level of motivation participants had to carry through the intervention, ranging from 1 ("not at all/doing it just because of the course;" that is, extrinsically motivated) to 7 ("very motivated/could do it totally voluntary;" that is, intrinsically motivated). Short-term behavior change was measured by self-report: "How often did you carry out the behavior you had chosen during the course?" with the responses "never," "very occasionally," "once a month," "several times a month," "once a week," and "several times a week." Given that our intention was to measure change rather than objective happiness, we used the self-report question "How much happier are you now compared to before the intervention?" to measure the participants' experienced short-term change in well-being, if any;

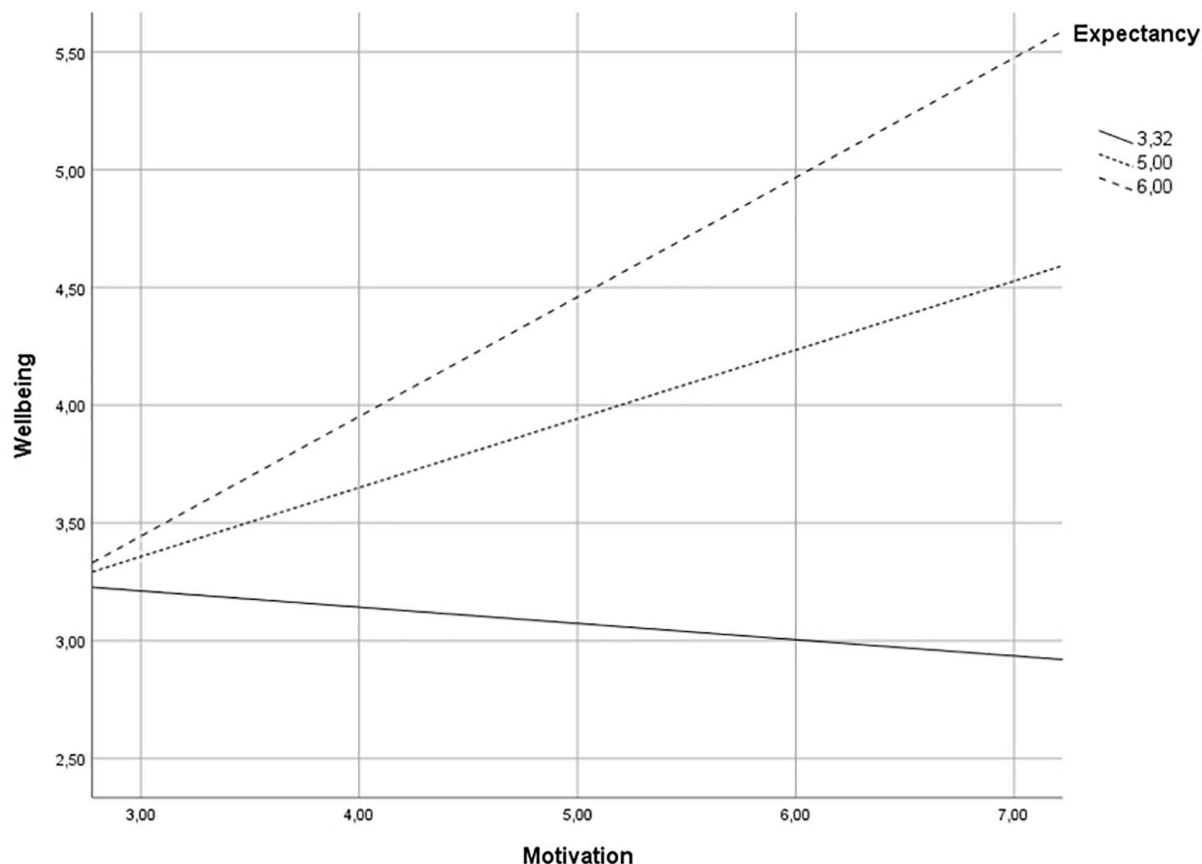


FIGURE 2 | The conditional effect of the focal predictor motivation (extrinsic to intrinsic) on the wellbeing (experienced change) at different levels of expectancy.

responses ranged from 1 (“not at all”) to 7 (“very much”). Self-reported measurements for well-being (Armenta et al., 2014) and behavior change (Cohn and Fredrickson, 2010) align with previous research.

Long-Term Measurement

The questionnaires measuring long-term results were distributed 6 months after the end of the course. Specifically, participants were asked a single-item question to measure long-term behavior change: “How often have you carried out the behavior you had chosen during the course since the course ended?” The response choices were “never,” “very occasionally,” “once a month,” “several times a month,” “once a week,” and “several times a week.” To measure the participants’ experienced long-term change in well-being, if any, they were asked to answer the question “How much happier are you now compared to before the intervention?” using a seven-point scale.

RESULTS

In answering RQ1, we first looked at the reported behavior change. All participants set ambitious plans, including significant behavior changes during the intervention and reported altered

behavior. Ninety-seven percent performed their new behavior one or several times per week. Experienced short-term well-being change indicated an increase (responses of 5, 6, or 7 on a seven-point scale) for 40.6 percent of the participants. To investigate the effect of motivation and expectancy on experienced well-being change, we conducted a simple moderation analysis using the model 1 PROCESS procedure for SPSS (Hayes, 2013), which indicated a moderating effect of expectancy on the relationship between motivation and experienced well-being change. The moderation analysis indicated that the overall model was significant ($p = 0.0032$, $R^2 = 0.25$). A follow-up spotlight analysis at the 16th, 50th, and 84th percentiles indicated that the positive effect of motivation on experienced well-being change was significant only when expectancy was high (see **Figure 2**).

As **Figure 2** shows, the more intrinsically motivated the participant, the greater the increase in experienced well-being change following the intervention, provided that the participant had a strong belief that the intervention would lead to a desired outcome. Consequently, without high expectancy, intrinsic motivation did not have a significant effect on experienced well-being change.

To answer RQ2, we utilized an unannounced follow-up questionnaire 6 months after the completion of the intervention finished, in which participants were asked about

TABLE 2 | Descriptive for participants who changed vs. did not change behavior (group 0 = did not change and 1 = changed behavior) * = $p < 0.05$.

	Group	N	M	SD
Motivation	0	12	4.50	1.57
	1	11	5.45	1.44
Expectancy*	0	11	4.18	0.60
	1	11	5.09	0.83
Experienced short-term wellbeing change*	0	12	3.42	1.51
	1	11	4.82	1.17
Experienced long-term wellbeing change*	0	13	4.08	1.12
	1	12	5.00	0.85

their spontaneous, self-initiated sustained behavior and its outcome. We were interested in any differences between those who spontaneously continued the intervention-induced behavior and those who did not. For a fairer picture, we divided the participants into two groups based on how frequently they reported engaging in the intervention-induced behavior. These two groups were (1) those who changed behavior (that is, engaged in intervention-induced behavior once a week or more: $n = 12$, 20.33 percent of the original sample) and (2) those who did not change behavior (that is, never engaged in intervention-induced behavior: $n = 13$, 22.03 percent of the original sample). Reports falling in between *change* and *not change* (that is, those who engaged in intervention-induced behavior “occasionally” or “one or a few times per month”) were classified as neither-nor and were excluded from the analysis.

Independent sample *t*-tests were run between those who had changed their behavior and those who had not. The *t*-test results indicated that the participants in group 1 (with significantly changed behavior) reported higher levels of expectancy [$t(20) = 2.936$, $p = 0.009$], measurement of experienced short-term change in well-being [$t(21) = 2.478$, $p = 0.022$], and measurement of experienced long-term change in well-being [$t(23) = 2.310$, $p = 0.03$]. Surprisingly, there was no significant difference in motivation between the two groups (see **Table 2** for means and standard deviations).

Lastly, in order to compare the relationship between short-term change in well-being, long-term change in well-being, and sustained volitional behavior change, we conducted a correlation analysis. The results show a slightly higher positive correlation between short-term change in well-being and sustained volitional behavior change (see **Table 3**).

DISCUSSION

The aims of this field study were to investigate (1) how expectancy influences the effect of motivation on experienced well-being change as a result of an externally prompted intervention and (2) how motivation and expectancy relate to volitional long-term change in behavior and experienced well-being. Overall, the results indicate the importance of coexisting intrinsic motivation and high expectancy in the outcome and that the key driver of sustained volitional behavior change and experiencing long-term increased well-being is to experience increased well-being during the intervention.

TABLE 3 | Correlations between experienced short-term change in wellbeing and the following variables: long-term change in wellbeing and sustained volitional behavior change (group 1 and 2).

		Short-term wellbeing change	Long-term wellbeing change	Long-term behavior change
Short-term wellbeing change	Pearson Sig. (2-tailed)	1	0.483* 0.020	0.476* 0.022
Long-term wellbeing change	N Pearson	23 0.483*	23 1	23 0.434*
Long-term behavior change	Sig. (2-tailed) N Pearson Sig. (2-tailed) N	0.020 23 0.476* 0.022 23	25 0.434* 0.030 25	0.030 25 1

*Correlation is significant at the 0.05 level (two-tailed).

In line with previous research (e.g., Deci and Ryan, 2000; Murphy, 1999; Strecher et al., 1986), the present study indicates that crucial factors for successfully changing behavior are intrinsic motivation and the participant's expectancy that the intervention will lead to desired outcomes. However, the positive relationship between intrinsic motivation and intervention outcome (represented in this study by experienced well-being change) hinges on expectancy. Thus, neither intrinsic motivation nor expectancy alone seems to lead to a positive outcome; the two factors must be present simultaneously.

As graduate psychology students, participants in this study were most likely to have gained both intrinsic motivation and belief in the intervention from studying previous research (lectures, mandatory literature, and other available literature and information sources) about intervention activities. Therefore, we propose that the use of information and study materials may be an efficient way for intervention designers to help participants increase their intrinsic motivation and belief in the intervention. However, we should note that the participants' levels of expectancy were measured at the beginning of the course, which meant they were not a result of class activities.

In line with Bandura (1977) and Deci and Ryan (2000), the present study indicates that intrinsic motivation and expectancy are important, for both changing behavior and experiencing well-being during the intervention. Before the start of the study's intervention, all participants seemed to have high intrinsic motivation and ambition (that is, they set high goals) to engage in target behaviors. During the intervention, they all also reported engagement in the new behaviors in line with these high standards. When the intervention ended, the participants did not have any obligation or external encouragement to continue any behavior. Nevertheless, more than one-fifth of them chose to continue the target behavior and were still engaged in it 6 months later. Thus, the externally prompted behavior had turned into a volitional behavior.

To tease out the drivers of this transformation, we can compare participants who sustained their target behavior with those who quit as soon as the intervention ended. The

results indicate that both expectancy and experienced well-being change differed between the two groups. Participants who continued their target behavior reported higher levels of expectancy before the intervention began and higher levels of experienced well-being change as a result of the intervention. Interestingly, the two groups showed no difference in reported intrinsic motivation. This finding indicates that actual experience of the intervention is a stronger predictor than self-reported motivation.

Thus, an externally prompted intervention such as a mandatory course can help students to volitionally make changes in their everyday behavior, even long-term, which can increase their well-being. As Lyubomirsky et al. (2011) discussed, results vary from studies with differing recruitment methods, such as voluntary versus non-voluntary selection. The results of studies in which participants voluntarily participated in interventions, with full awareness of the desired outcome (such as to improve well-being), tend to be more successful than the results of studies in which participants were unaware of the purpose of the study, such as participating in exchange for credits after being told that the study was a “cognitive exercise” (cf. Seligman et al., 2005; Fordyce, 1977; with Lyubomirsky et al., 2005; Sheldon and Lyubomirsky, 2006). Similar to the suggestion that knowledge about the intervention’s purpose may moderate the intervention’s effectiveness (Lyubomirsky et al., 2011), the present study included participants who were aware of the intervention’s purpose, although they did not self-select to participate. However, the effectiveness might rely on the motivation rather than on self-selection itself; this is shown in the present study in terms of the influence of intrinsic motivation on long-term behavior change and experiencing well-being change and also in terms of an extrinsic motivational transformation process. Consequently, in line with Deci and Ryan (2000), the results of the present study imply that the initial external motivation, in which behavior was controlled by the mandatory course setting, seemed to transform during the intervention and become integrated. Hence, integrated regulation of external motivation led to self-determined extrinsic motivation – the most complete internalization of extrinsic motivation (Deci and Ryan, 2000). In sum, the present study highlights the long-term impact of a 6-week mandatory positive activity intervention in school, which was shown to help students experience increased well-being.

Limitations and Future Research

Knowledge can influence expectancy and motivation. Therefore, a limitation of this study is that the participants had studied research and learned more about the intervention activities during the course and had therefore gained knowledge that has not been measured before or after the intervention. Hence, we cannot be certain about the reasons for increased motivation and expectancy during the intervention. Accordingly, future research is needed on how to help students raise their intrinsic motivation, transforming external motivation into integrated self-regulation, and on how studying research may influence motivation and expectancy. A possible limitation of this study is the issue of self-selection, as the sample consisted of students who had voluntarily

enrolled in the psychology program. Nevertheless, the results indicated differences in motivation among the participants, and those who were more intrinsically motivated were more successful at changing behavior and reaching a higher outcome from the intervention. Our choice of measuring change of well-being rather than choosing an objective measurement of well-being is a limitation of the study; we have tried to eliminate the negative effects of this limitation through a clear and replicable study and report. The reason for our decision to measure change rather than objective happiness was that we wanted to capture the participants’ experience of change with the aim of presenting a deeper layer including reflection of a wider time perspective rather than a more minutes-based “right-now” happiness. We argue that asking about change encourages participants to reflect on their experienced change rather than report a happiness rate that applies to a shorter timeframe. Another way to do this would have been to collect objective measurement of happiness, so we consider this choice to also be a limitation.

CONCLUSION

The results of this study indicate that predictors of long-term behavior change through a positive activity intervention are the participants’ expectancy before the intervention and their experience of desired outcome (that is, enhanced well-being) during the intervention. Those participants who continued to engage in intervention-induced behavior of their own volition 6 months after the intervention experienced a long-term increase in well-being. Intrinsic motivation modified the participants’ effect of expectancy and their experience of the desired outcome during the intervention. Accordingly, those who were intrinsically motivated and believed in the intervention experienced more change in well-being, which motivated them to proceed with the behavior that had increased their well-being. These results add to the knowledge regarding the relationships among motivation, expectancy, and well-being outcome and, consequently, how experienced short-term change in well-being can predict long-term behavior change and experienced long-term change in well-being. By strengthening prerequisites for intrinsic and fully integrated extrinsic motivation, belief in the intervention, as well as making positive outcomes of the intervention explicit, students can be supported to make volitional long-term behavior changes.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and

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

AUTHOR CONTRIBUTIONS

FS contributed with the initial idea generation, data collection, data analysis, and manuscript writing. EW contributed to supervision, study design improvement, interpretation

of the results, and critical reviews of the manuscript. Both authors contributed to the article and approved the submitted version.

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Book Review: The Emotional Rollercoaster of Language Teaching

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Keywords: language teacher, emotion labor, emotion regulation, well-being, resilience, anxiety

A Book Review on

The Emotional Rollercoaster of Language Teaching

Christina Gkonou, Jean-Marc Dewaele, and Jim King (Bristol: Multilingual Matters), 2020, 296 pages, ISBN: 9781788928342

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While emotion, as a key factor in positive psychology (Moneta, 2014), has long been researched in the psychological field, it has received less attention in the field of language teacher education (King and Sarah Ng, 2018; Martínez Agudo, 2018). The “emotional turn” (White, 2018) in the field of language teacher education, however, has led to a call for more attention to the language teacher emotion (LTE). The editors of the volume under review respond to this call in an exploration of the complexity and dynamism of LTE.

This edited book consists of 16 chapters. The first chapter introduces LTE and presents the collection’s purpose and organization. The final chapter, Chapter 16, reviews the collection’s research findings and methods, explains the definition of “emotional rollercoaster,” and emphasizes the role of emotions and emotion regulation in language teacher training and professional development. The rest of the volume consists of empirical studies that can be divided into three thematic groups. The first group (Chapters 3, 4, 8, 9, and 12) includes representative topics about teacher emotions. The chapters discuss the emotional labor of foreign language teachers in the US public school system (Chapter 3) and at a US university (Chapter 4), the emotional experience of English teachers in six tertiary education programs in the United States and United Kingdom (Chapter 8), and, finally, the emotional labor and burnout of Japanese language teachers (Chapter 9) and Nepali English teachers (Chapter 12).

The second thematic strand (Chapters 2, 5, 6, 7, 10, 14, and 15) concerns cognitive psychological factors related to teacher emotions. The chapters consider the subjective well-being of CLIL teachers in Austria (Chapter 2); language teacher identity and emotion in an action research program (Chapter 5); the resilience of pre-service language teachers in their first practicum (Chapter 6); past L2 selves, emotions, and classroom group dynamics (Chapter 7); the anxiety of Japanese elementary school English teachers in a training intervention program (Chapter 10); the emotional well-being of language teachers (Chapter 14); and EFL/ESL teachers’ motivation and emotional intelligence (Chapter 15). The third thematic group (Chapters 11 and 13) comprises strategy

and intervention studies on teacher emotional regulation, which primarily examine the emotion regulation behavior of experienced EFL teachers in Japan (Chapter 11) as well as the stressors of language teachers and functions of intervention (Chapter 13). This unique book about LTE is highly worth reading. Its contributions lie in the following three aspects. First, it performs pioneering work by interweaving classic topics, such as emotional labor and intelligence, and cutting-edge themes, such as L2 selves and teacher well-being, in the field of language teacher education. It draws transdisciplinary support from psychology and teacher psychology, in which teacher emotion has long been researched. Emotional labor, emotional intelligence, and an array of psychological factors (e.g., burnout, identity, and self-efficacy) pertinent to LTE have become central research topics in teacher psychology and, consequently, are regarded as the core themes in language teacher education. This collection explores many psychological factors pertaining to emotions, including well-being, resilience, and motivation and highlights the impact of previous emotion research on LTE. It also points to future research directions for scholars interested in those topics.

The collection investigates novel research topics in language teacher psychology as well, including the L2 self. For example, Chapter 7 dwells on the relationships between past L2 selves, emotions, and classroom group dynamics. The chapters reflect contemporary research trends in LTE, such as relationships between teacher emotional labor, emotional intelligence, emotional regulation, well-being, and identity. Another strong point of the volume is its exploration of the dynamism and complexity of LTE in diverse cultural contexts; the chapters concentrate on LTE in various countries and areas, including Australia, America, Japan, Nepal, and West Africa, and involve elementary school, secondary school, and university language teachers as well as pre-service language teachers. The exploration of why and how teacher emotions fluctuate over time is of great benefit to recognizing common stressful events in language teaching and preparing teachers to resist mental stress and regulate their emotions. For example, Chapter 2 examines subjective well-being and its influencing factors of Australia CLIL teachers using qualitative research methods, and Chapter 12 analyzes the influencing factors of language teacher's emotional labor in Nepal.

Multiple research methods are used to investigate LTE in this volume, and this diversification of research methods should be given significant attention. Qualitative methods are often used for LTE research due to its changeability and intricacy (Xu, 2018). This methodological tendency is also reflected in this book, in which 14 chapters are empirical studies and 10 adopt

qualitative research methods. However, quantitative research methods, such as questionnaires or scales, are also utilized to examine some emotion-related topics in general education, such as teacher emotional labor (e.g., Yin et al., 2019). In this volume, two studies adopt quantitative research methods. Furthermore, mixed-methods research, combining the strengths of quantitative and qualitative methods, can probe the complicated processes of teacher emotions, making it a particularly promising research method. It is utilized in two chapters of this book.

Finally, the research on emotion regulation in this collection provides strategic guidance for language and non-language teachers to navigate negative emotions and challenges. Language teachers experience many pressures originating from institutions, colleagues, and students. Indeed, language teaching is a profession full of crises (Hiver and Dörnyei, 2015), making it crucial to explore emotion regulation in the field. The empirical discussion about emotion regulation strategies guides teachers in regulating their emotions and maintaining a positive attitude and professional commitment. For instance, Chapter 11 analyzes four types of strategy—related to situation, attention deployment, cognitive change, and response modulation—for handling teaching adversities.

Providing fundamental insights into the complexity of teacher emotions, this collection is devoted to exploring the role of these emotions in diverse cultural contexts by combining emotion theory, emotion-related psychological factors, and language teaching practice. It is suitable for anyone interested in learning about and further investigating teacher emotions.

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WC and HL chose this book together. WC wrote the review. HL provided valuable guidance for the draft. All authors contributed to the article and approved the submitted version.

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Beyond Passion and Perseverance: Review and Future Research Initiatives on the Science of Grit

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Grit, which is originally conceptualized as passion and perseverance for long-term goals, has been associated with optimal performance. Although previous meta-analytic and systematic reviews summarized how grit relates to performance outcomes, they possess considerable shortcomings, such as (a) absence of summary on the association of grit with well-being outcomes; (b) absence of discussion on social, psychological, and emotional mechanisms linking grit to well-being; and (c) lack of elaboration on how alternative models can resolve fundamental problems in the grit construct. This integrative review provides a comprehensive summary on the link of grit to performance and well-being outcomes. Importantly, it elaborates how alternative models can potentially address flaws in the existing grit theory. Future research directions are discussed on how to move forward the science of grit.

Keywords: grit, passion, perseverance, performance outcomes, well-being

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Psychological scientists have recognized the importance of exploring non-cognitive predictors of success in work, school, and other domains of life (Robbins et al., 2006; Duckworth and Yeager, 2015). One of the non-cognitive constructs gaining considerable attention in the existing literature is grit (Duckworth et al., 2007). Grit was originally defined as one's disposition to demonstrate perseverance and passion for long-term goals (Duckworth et al., 2007, p. 1087). Earlier studies have pointed out that grit was a higher-order construct composed of consistency of interests (ability to stick to a similar set of interests over time) and perseverance of effort (tendency to show diligence despite challenges or difficulties associated with pursuing a long-term goal), which could predict variety of positive performance outcomes including success in school, spelling quiz bee competition, and work among others (Duckworth et al., 2007; Duckworth and Quinn, 2009; Eskreis-Winkler et al., 2014).

There has been accumulating body of empirical evidences demonstrating the power of grit in predicting useful outcomes, success at school (Duckworth et al., 2007; Eskreis-Winkler et al., 2014; Strayhorn, 2014), positive organizational behaviors (Suzuki et al., 2015; Ceschi et al., 2016), and well-being (Vainio and Daukantaite, 2016; Li et al., 2018b; Datu et al., 2019). Moreover, Lee and Duckworth (2018) have accentuated the promising institutional benefits of "gritty" organizations.

Despite the growing interest on the role of grit in fostering success and well-being, a recent meta-analytic evidence has casted serious doubts regarding the theoretical validity of the originally theorized two-factor model of grit (Credé et al., 2017). The result of the authors' meta-analysis has shown that compared to consistency of interests, perseverance of effort is a stronger predictor of performance outcomes. Furthermore, the correlation of grit to

academic achievement was not comparable to other known predictors of academic success. Studies have demonstrated that whereas perseverance was associated with various indicators of positive student functioning (i.e., academic adjustment and engagement), consistency was not significantly correlated with such outcomes (Bowman et al., 2015; Datu et al., 2016). The authors have also pointed out that the “primary utility of the grit construct may lie in the perseverance facet” (p. 113). Moreover, another review (Datu et al., 2017b) has pointed out possible cultural biases in the original grit framework. Indeed, more effort is needed to resolve empirical threats to the science of grit.

Although existing reviews on grit (Credé et al., 2017; Datu et al., 2017b; Credé, 2018; Lam and Zhou, 2019; Fernández et al., 2020) have provided comprehensive, detailed, and nuanced review on how grit tracks performance and other positive psychological outcomes, they have a number of considerable shortcomings. As these meta-analytic (Credé et al., 2017) and systematic (Datu et al., 2017b; Lam and Zhou, 2019; Fernández et al., 2020) reviews primarily focused on summarizing the association between grit and domain-specific performance (e.g., achievement in school contexts), conclusions have myopic implications for understanding the role of grit in optimizing other equally important outcomes, such as psychological well-being and physical health. Moreover, previous reviews have paid little attention to summarizing studies on psychological processes underpinning the complex link of grit to a wide range of outcomes. Most importantly, whereas these reviews have pinpointed fundamental theoretical flaws in the theorizing of grit, they failed to discuss alternative models that can potentially address such conceptual and measurement issues.

Therefore, this integrative review aims to provide a comprehensive summary regarding the measurement, correlates, and alternative models of the grit construct through answering these overarching questions: (1) What’s wrong with the existing grit theory? (2) What are alternative theoretical models on grit? and (3) how can these alternative grit frameworks address fundamental flaws in the original grit theory? This article addresses such questions via (a) defining the grit construct; (b) summarizing literature on how grit is linked to adaptive performance, psychological, and physical outcomes as well as neural bases of grit; (c) providing a summary about the predictors of grit and its dimensions; (d) discussing theoretical flaws of the extant grit theory; (e) describing the caveats of continuously incorporating consistency of interests as a dimension of grit; (f) elaborating alternative conceptualization of grit, such as triarchic model of grit (Datu et al., 2017a, 2018a) and refined conceptualization of passion (Jachimowicz et al., 2018); and (g) elucidating how theoretical refinement of grit can potentially address its major conceptual shortcomings. Future research agenda and initiatives are elaborated.

WHAT IS GRIT?

Grit was operationalized as trait-level passion and perseverance for long-term aspirations (Duckworth et al., 2007). Specifically,

Duckworth et al. (2007) conceptualized grit as a hierarchical construct underpinned by two interrelated dimensions, namely, consistency of interests and perseverance of effort. Consistency of interests entails constantly showing interest and efforts, whereas perseverance of effort involves demonstrating heightened intensity of persistence even after experiencing concrete setbacks or failures. The authors argued that grit was conceptually distinct from theoretically relevant constructs, such as conscientiousness and resilience. This multiphase research has revealed that grit was associated with higher levels of educational attainment among adult participants in an online website, academic performance in undergraduate students, fulfillment of military training in a sample of freshmen cadets who enrolled in the US Military Academy, and advancement to more challenging stages of a national spelling quiz bee contest. Furthermore, grit accounts for ~1.4–6.3% of the variances in successful outcomes.

For the past several years, studies continued to adopt a trait-level conceptualization of grit emphasizing the relative stability of this construct regardless of situational conditions (Duckworth and Eskreis-Winkler, 2015). Even the existing measures on grit, such as the 12-item Original Grit Scale (Duckworth et al., 2007) and 8-item Short Grit Scale (Duckworth and Quinn, 2009) focused on assessing grit as an individual difference construct. Yet, although some studies have provided evidence about the incremental validity of grit over and beyond the effects of known predictors (i.e., conscientiousness and self-control) of achievement-related outcomes (Duckworth et al., 2007; Li et al., 2018c), there have been serious concerns on the psychometric validity of such grit scales (see Credé et al., 2017 and Datu et al., 2017b for reviews); more research is needed to understand the complex nature of grit.

Grit is also different from relevant psychological constructs (i.e., conscientiousness, need for achievement, and self-control). For instance, whereas conscientiousness is a Big Five personality trait characterized by diligence, achievement-orientation, and diligence (Soto et al., 2016), grit involves consistently working on a specific interest or endeavor and persisting over difficult tasks over a long period of time. In addition, while need for achievement (McClelland, 1961) involves strenuously spending effort and time on potentially “rewarding” activities, grit may not necessarily require incentives and feedback to boost desire for accomplishing long-term goals. Existing literature has also pointed out that grit was essentially distinct from self-control because the former appears to be more applicable to highly demanding contexts or situations, whereas the latter is more fitting for commonly faced day-to-day challenges (Duckworth and Gross, 2014; Eskreis-Winkler et al., 2016).

PERFORMANCE, PSYCHOLOGICAL, AND PHYSICAL BENEFITS OF GRIT

There has been a steady inflation in the number of studies documenting the advantageous role of grit in facilitating success and well-being outcomes. This section summarizes previous research on how grit and its dimensions relate to various

indicators of optimal performance, psychological well-being, and physical health.

Grit and Academic Outcomes

There has been a considerable body of literature showing how grit may relate to school-related performance and behaviors. Gritty students are more likely to have higher levels of general academic achievement among university students in the United States (Duckworth et al., 2007; Duckworth and Quinn, 2009; Akos and Kretchmar, 2017); high school students in mainland China (Li et al., 2018c), secondary education students in the United States (Cosgrove et al., 2018; Park et al., 2018), Germany (Schmidt et al., 2019), Austria (Dumfart and Neubauer, 2016), and Russia (Tovar-García, 2017); course-specific academic achievement among military cadet samples in the United States (Mayer and Skimmyhorn, 2017); literacy achievement among primary school students (O'Neal et al., 2018); academic achievement in science in secondary school students in Australia (Hagger and Hamilton, 2019); performance in a national spelling bee contest (Duckworth et al., 2010); retention in selected undergraduate students in the United States (Saunders-Scott et al., 2018); academic engagement in selected university and high school students in the Philippines (Datu et al., 2016, 2018b); academic self-efficacy among university students in the Philippines (Datu et al., 2017a) and the United States (Renshaw and Bolognino, 2016); generalized self-efficacy (Renshaw and Bolognino, 2016); intellectual self-concept among selected twin sample in the United States (Tucker-Drob et al., 2016); emotional engagement among dual language learners in the United States (O'Neal et al., 2018); school-related motivation among Filipino, American, and Mexican American students (Eskreis-Winkler et al., 2014; Yeager et al., 2014; Piña-Watson et al., 2015; Datu et al., 2018b); learning engagement in selected mainland Chinese adolescents (Lan and Moscardino, 2019); test motivation among twins in the United States (Tucker-Drob et al., 2016); deliberate practice in optional and required practice in specific sports domains among selected athletes mostly from the North American context (Tedesqui and Young, 2017); satisfaction with e-learning systems among university students in Portugal (Aparicio et al., 2017); college satisfaction (Bowman et al., 2015); leadership skills among military cadets (Mayer and Skimmyhorn, 2017); mastery orientation (Tucker-Drob et al., 2016); meaningfulness of academic activities (Yeager et al., 2014); and growth mindset (Tucker-Drob et al., 2016). Furthermore, domain-specific grit in the school context is linked to elevated levels of academic performance among high school students in Germany (Schmidt et al., 2019) and middle school students in the United States (Clark and Malecki, 2019).

Grit and Career Outcomes

Grit is associated with elevated levels of retention and teaching effectiveness among selected teachers in the United States (Robertson-Kraft and Duckworth, 2014) and career exploration self-efficacy in Filipino university students (Datu et al., 2017a), as well as fewer changes in career (Duckworth et al., 2007). Both perseverance and consistency are linked to higher work performance incentives in selected Chinese insurance employees

(Zhong et al., 2018). In the context of selected cadets in the Corps, both perseverance and consistency were not associated with decision to become officers in the US Military institute (Jordan et al., 2015). In the case of surgical residents in the United States, grit has been found to be a key risk factor for attrition in the residency program (Burkhart et al., 2014). Also, residents whose scores fell below the median value are likely to report dissatisfaction with their residency programs.

Grit and Work-Related Functioning

Gritty adults are more likely to demonstrate higher venture or business performance among entrepreneurs in the United States (Mueller et al., 2017), work engagement in Japanese adults (Suzuki et al., 2015), and positive leadership behaviors (Caza and Posner, 2019), as well as sports-related engagement in a sample of wheelchair basketball athletes in the United States (Martin et al., 2015) and selected male soccer athletes in Australia (Larkin et al., 2015). Conversely, grittier employees are less likely to experience work burnout and engage in counterproductive work behaviors (Ceschi et al., 2016). In a sample of surgical trainees in England, grit is related to lower levels of work burnout (Walker et al., 2016).

Grit, Well-Being, and Positive Psychological Outcomes

Researchers have offered evidence on the well-being benefits of grittiness in diverse contexts. Grit is linked to higher levels of life satisfaction among undergraduate students in the United States (Renshaw and Bolognino, 2016); adults in Switzerland (Samson et al., 2011); selected male adults in the United States (Hammer and Good, 2010); employees in mainland China (Li et al., 2018a); university and post-graduate students in Sweden (Vainio and Daukantaite, 2016), as well as adults in South Korea (Jin and Kim, 2017); meaning in life among university students in the United States (Kleiman et al., 2013); psychological well-being among selected surgical residents in the United States (Salles et al., 2014) and student populations in Sweden (Vainio and Daukantaite, 2016); adolescent well-being in Australian and American youth samples (Kern et al., 2016); self-esteem (Hammer and Good, 2010) and optimism and mental health in selected US military recruits (Lovering et al., 2015); well-being in a sample of undergraduate and post-graduate students in England (Kannangara et al., 2018); money-conserving actions among US university students (Maddi et al., 2013); gratitude in selected Swiss adults (Samson et al., 2011) and Filipino high school students (Valdez and Datu, 2020); sense of coherence (Vainio and Daukantaite, 2016); subjective happiness (Samson et al., 2011); action-oriented tendencies of Romanian adult sample (Constantin et al., 2011); and harmony in life (Vainio and Daukantaite, 2016). Also, grit positively predicts prosocial behaviors in older adults in the United States (Wenner and Randall, 2016), as well as good habits in selected US university students (Feldman and Freitas, 2016). Domain-specific grit (i.e., academic grit) is linked to life satisfaction and school satisfaction among middle school students in the United States (Clark and Malecki, 2019). Moreover, analysis of data involving Western

(e.g., United States, England, Russia, and Canada) and non-Western societies (e.g., Mexico, Malaysia, and China) shows that grit is positively correlated with both hedonic and eudemonic well-being (Disabato et al., 2016).

Individuals' passion and perseverance for long-term goals are also associated with various types of orientations to happiness (i.e., orientation toward pleasure, meaning, and engagement). Whereas, grit is positively correlated with orientations toward engagement and meaning among adults in the United States (Von Culin et al., 2014) and Japan (Suzuki et al., 2015), this construct is linked to lower levels of orientations to pleasure. These results indicate that grit may be linked to different types of orientations to happiness in Western and non-Western contexts.

Moreover, grit is associated with lower depression among undergraduate students in the United States (Anestis and Selby, 2015), adults in South Korea (Jin and Kim, 2017), military recruits in the United States (Lovering et al., 2015), and undergraduate students in Thailand (Musumari et al., 2018), as well as selected high school students in the Philippines (Datu et al., 2019); decreased levels of perceived stress in selected university and post-graduate students in England (Kannangara et al., 2018) and United States (Saunders-Scott et al., 2018); reduced chances of using alcohol and marijuana among Latino adolescents (Guerrero et al., 2016); decreased levels of anxiety (Musumari et al., 2018); lessened fear of being laughed at or gelatophobia (Samson et al., 2011); reduced anxiety sensitivity among young adults in the United States (Moshier et al., 2016); and lower suicidal ideation among US undergraduate students (Kleiman et al., 2013; White et al., 2017). Students with higher grit are also less likely to engage in problematic use of internet, as well as compulsive buying and gambling behaviors (Maddi et al., 2013).

Neural Correlates of Grit

Prior studies have generated findings that have implications for understanding the neurobiological bases of grit. Drawing from functional magnetic resonance imaging approaches, one of the important regions in the brain that has been linked to grit is the medial prefrontal cortex (Myers et al., 2016; Wang et al., 2017). Specifically, neural connections in the medial prefrontal and rostral anterior cingulate cortices were associated with increased perseverance (Myers et al., 2016). There was also a negative correlation between grit and regional fractional amplitude of low-frequency fluctuations, which has been implicated for setting goals, implementing plans, self-control, and capacity to adaptively interpret setbacks. Using a voxel-based morphometric design, Wang et al. (2018) have shown that regional gray matter volume in the right putamen is linked to increased levels of grit. In addition, an event-related potential study has demonstrated that undergraduate students with higher scores on perseverance of effort subscale tend to have lower reaction times in the Attention Network Task and lower mean difference in N1 amplitudes (Kalia et al., 2018), which suggest positive correlations between grit and task-related attention. Vlasova et al. (2018) have also revealed that "structural integrity in white matter pathways," which was

commonly implicated for emotion regulation and resilience, was positively correlated with grit among depressed adults.

Moderation Studies on Grit on Maladaptive Functioning

Another promising line of evidence on grit alludes to the buffering role of grit. For instance, a synergistic interplay between grit and gratitude diminishes suicidal ideation through boosting meaning in life in selected US undergraduate students (Kleiman et al., 2013). Also, grit moderates the association of negative life events on suicidal ideation such that for students who scored lower in grit, negative events can promote suicidal ideation among undergraduate students in the United States (Blalock et al., 2015). Yet, little is known on whether long-term exposure to undesirable environmental conditions or events can dampen the protective role of grit on well-being outcomes. In addition, rumination heightened suicidal ideation for undergraduate students who had lower scores on grit (White et al., 2017).

Grit also serves as a protective factor against the psychological hazards (i.e., suicidal ideation) of hopelessness in selected US military personnel (Pennings et al., 2015). Furthermore, in situations where students do not have positive relationships with teachers, demonstrating grit is linked to elevated levels of school engagement and satisfaction with school (Lan and Moscardino, 2019). Lastly, for individuals with average and low scores on expressive suppression (an emotion regulation strategy that involves intentionally hiding or reducing one's emotional states; Gross and Levenson, 1997), showing elevated levels of consistency of interests may not result in maladaptive eating attitude and actions (Knauff et al., 2019).

Grit and Physical Health

Contemporary investigations have also explored the link of grit to various indices of optimal physical health. Research suggests that grittier individuals are more likely to have a habitual exercise routine (Reed et al., 2013) and decreased chances of experiencing food insecurity (Nikolaus et al., 2019). In the case of adolescents and young adults who are facing long-term medical illnesses, grit is linked to lower levels of depression and anxiety, as well as emotional well-being (Sharkey et al., 2017). Composite grit scores are also negatively correlated with deficits in executive functioning, cognitive failures, and symptom severity among selected diagnosed undergraduate students with attention-deficit/hyperactivity disorder (ADHD) in Canada (Gray et al., 2015). Similarly, demonstrating increased perseverance of effort is associated with optimal neurocognitive functioning in a sample of people living with human immunodeficiency virus in the United States (Moore et al., 2018).

Although results from previous studies generally suggest that overall grit can facilitate success and well-being in various domains of functioning, it may be challenging to delineate what aspects of grittiness may promote desirable outcomes. In the succeeding section, I summarized studies demonstrating how each dimension of grit differentially relates to various domains of optimal performance, psychological health, and physical well-being.

GRIT DIMENSIONS AS DIFFERENTIAL PREDICTORS OF OPTIMAL FUNCTIONING

Previous research has offered robust evidence on the importance of perseverance of effort in fostering positive performance, psychological, and well-being outcomes. Perseverance is associated with higher levels of academic achievement among undergraduate students in the United States (Chang, 2014; Wolters and Hussain, 2015; Muenks et al., 2017), adolescent twins in the United Kingdom (Rimfeld et al., 2016), secondary school students in Germany (Steinmayr et al., 2018), adolescent students in Finland (Tang et al., 2019), associate degree students in Hong Kong (Lee, 2017), and selected high school students (Li et al., 2018c) and primary school students (Jiang et al., 2019) in mainland China; subjective academic performance in selected undergraduate students in Australia (Hodge et al., 2018); academic adjustment in the United States (Bowman et al., 2015); academic self-efficacy in US university students (Wolters and Hussain, 2015) and Filipino undergraduate students (Datu et al., 2017a); all achievement goal orientations (i.e., mastery–approach, mastery–avoidance, performance–approach, and performance–avoidance goals) among selected university students in the United States and mainland China (Chen et al., 2018); generalized self-efficacy in a sample of selected cadets in the United States (Jordan et al., 2015); entrepreneurial success in selected entrepreneurs in Australia (Mooradian et al., 2016); and academic self-regulation strategies, such as cognitive, metacognitive, motivational, and time and environment strategies among undergraduate students in the United States (Wolters and Hussain, 2015). This dimension of grit is also linked to higher levels of job satisfaction in a sample of employed students in the United States (Meriac et al., 2015), orientations to engagement among Japanese adults (Suzuki et al., 2015), general self-esteem among university students in the United States (Weisskirch, 2018), and mindfulness in selected Thai and New Zealand university students (Raphiphattana et al., 2019). In a sample of adults in the United States, compared to consistency of interests, which is associated with weaker indications of sympathetic activity, perseverance of effort is related to increased activation of autonomic nervous system (Silvia et al., 2013).

Consistent with the arguments on the performance and well-being benefits of perseverance, studies show that this facet of grit is negatively correlated with turnover intentions (Meriac et al., 2015), academic maladjustment (Hwang et al., 2018), perceived stress (Meriac et al., 2015; Lee, 2017; Mullen and Crowe, 2018; Zhong et al., 2018), burnout (Mullen and Crowe, 2018; Zhong et al., 2018), and academic procrastination among selected undergraduate students in Italy (Pierro et al., 2011). School-specific perseverance is also positively correlated with academic achievement (Schmidt et al., 2019).

On the other hand, research indicates that consistency of interests is not related to academic performance (Chang, 2014; Wolters and Hussain, 2015; Rimfeld et al., 2016; Lee, 2017; Hodge et al., 2018; Jiang et al., 2019; Tang et al., 2019), academic maladjustment (Hwang et al., 2018), most academic self-regulation approaches except time and

environment management strategies (Wolters and Hussain, 2015), job satisfaction (Meriac et al., 2015), and turnover intent (Meriac et al., 2015). Few researches provide insights regarding the benefits of consistency by showing how this facet of grit may be linked to higher academic performance (Li et al., 2018c), elevated self-esteem and adaptive learning strategies (Weisskirch, 2018), lower likelihood of shifting to another major or vocational tracks (Bowman et al., 2015), reduced performance–avoidance goals (Chen et al., 2018), decreased bulimia and body satisfaction among selected adults from eating disorder treatment facilities (Knauff et al., 2019), reduced perceived stress (Meriac et al., 2015; Lee, 2017; Mullen and Crowe, 2018), decreased levels of academic procrastination (Pierro et al., 2011), and lower levels of burnout (Mullen and Crowe, 2018; Zhong et al., 2018).

WHY DOES GRIT PREDICT POSITIVE OUTCOMES?

As grit and its dimensions have linked to increased achievement in various domains of performance and well-being, past studies have identified precise mechanisms underscoring the positive impacts of grit on desirable outcomes. Based on the results from previous investigations, this review proposes the optimal performance and health (OPAH) model of grit (**Figure 1**), which summarizes processes involved in the anticipated benefits of grittiness, as well as intrinsic (i.e., personality) and extrinsic (e.g., life events) factors that moderate the link of grit to positive outcomes.

The first path of the diagram demonstrates why grit can optimize elevated levels of achievement in specific domains of performance. It is likely that persevering for long-term goals can predict achievement because existing studies have shown actual effort invested in specific activities mediated the link of grit to positive academic outcomes (Duckworth et al., 2010; Hagger and Hamilton, 2019). Grittier students, for instance, advanced to more complicated rounds in a national spelling bee because they have spent more effort and time in keenly preparing for the said competition (Duckworth et al., 2010). In the same way, the capacity of perseverance to boost effort in accomplishing science-related tasks explains why this facet of grit predicts increased achievement in Science (Hagger and Hamilton, 2019). Moreover, perseverance is related to increased time and environment management academic regulation strategies (Wolters and Hussain, 2015) and active participation in school-related tasks (Datu et al., 2016). Thus, “behavioral effort” is operationalized as one the psychological processes underpinning the effects of grit on achievement outcomes.

Moreover, results from past studies point to the role that “adaptive motivation” plays in grit–success relationship. This type of process variable encompasses one’s drive or desire to achieve optimal levels of performance. Corroborating this perspective, grit is positively linked to mastery–approach goals, mastery–avoidance goals, performance–approach goals, and performance–avoidance in selected undergraduate students in the United States and mainland China (Chen et al., 2018), as well as autonomous motivation among Filipino high school students

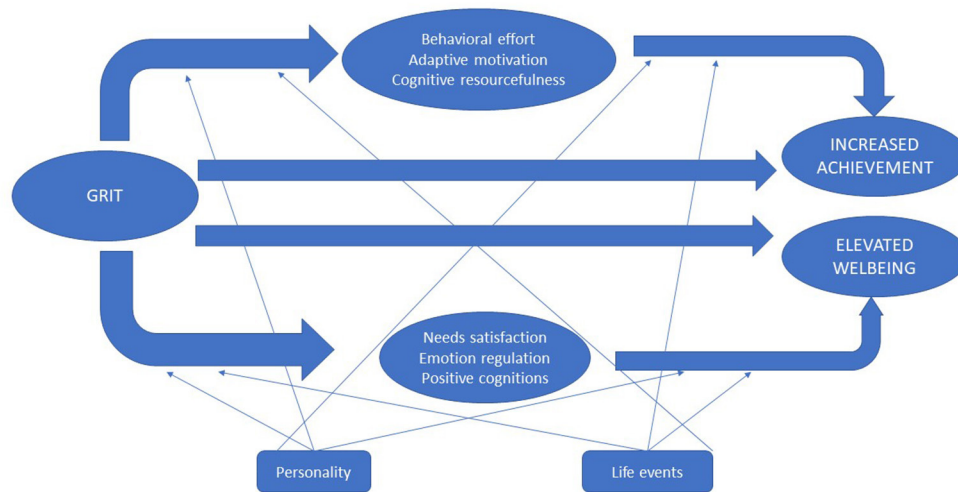


FIGURE 1 | The optimal performance and health (OPAH) model of grit.

(Datu et al., 2018b). Research also demonstrates that autonomous motivation mediates the positive associations of grit with agentic, behavioral, cognitive, and emotional engagement (Datu et al., 2018b).

“Cognitive resourcefulness” characterizes another type of variable serving as a mechanism that explains why grit may be linked to appealing performance outcomes. It covers any construct that necessitates usage of cognitive resources to successfully accomplish a wide range of tasks in various settings. For instance, research shows that perseverance is linked to increased entrepreneurial success due to the mediating role of innovativeness (Mooradian et al., 2016). In addition, perseverance of effort is related to higher levels of cognitive and metacognitive study strategies (Wolters and Hussain, 2015) and elevated cognitive engagement (Datu et al., 2018a,b). Moreover, grit enhances subsequent desirable changes in goal attainment among samples from different societies (Sheldon et al., 2015).

The second path in the diagram illustrates how grit can foster different well-being outcomes through concrete psychological processes. One of the mechanisms underlying the complex link of grit to well-being involves “needs satisfaction.” This type of process variable refers to fulfillment of basic psychological needs (c.f., autonomy, relatedness, and competence; Ryan, 1995). It is reasonable to expect that satisfaction of needs can mediate the association of grit with well-being because self-determination theory has pointed out that satisfying psychological needs can serve as a route to achieve intrinsic motivation, well-being, and optimal psychological functioning (Ryan, 1995; Deci and Ryan, 2000; Ryan and Deci, 2000). Research dovetails with this prediction as satisfaction of basic needs for autonomy and competence mediate the positive influence of grit on well-being (Jin and Kim, 2017).

Another psychological process that can elucidate why grit may increase well-being outcomes is “emotion regulation.” This category of mediating variables pertains to one’s ability to

manage emotions in different situations, such as (a) cognitive reappraisal, which involves modifying the interpretation of a specific situation to change its emotional consequences; and (b) expressive suppression, which entails decreasing or hiding one’s true emotional states (Gross and Levenson, 1997). Consistent with this premise, perseverance of effort and consistency of interests are linked to higher levels of cognitive reappraisal (Knauff et al., 2019; Valdez and Datu, 2020). Yet, consistency is related to lower levels of expressive suppression. Also, cognitive reappraisal mediates the association of grit with psychological flourishing (Valdez and Datu, 2020).

The third classification of process variables underpinning the linkage of grit to well-being outcomes is “positive cognitions.” This type of variable encompasses one’s capability to espouse positive thoughts about self, others, and environment. Echoing this prediction, research demonstrates how constructs belonging to this category of mediating variable mediate the association of grit on well-being outcomes, such as meaning in life (Kleiman et al., 2013), mindfulness (Li et al., 2018b), and self-esteem (Li et al., 2018a). Moreover, authenticity (perceived feelings of being connected to one’s self; Wood et al., 2008) and sense of coherence (degree to which one’s self and the world are sensible, meaningful, and controllable; Antonovsky and Sagy, 1986) mediate the association of grit with subjective and psychological well-being outcomes (Vainio and Daukantaite, 2016). For adolescents and young adults with long-term medical conditions, grit is associated with well-being (i.e., higher emotional well-being and lower depression, as well as anxiety) because this construct is linked to reduced perceptions that illnesses can disrupt their daily activities (Sharkey et al., 2017).

Aside from pinpointing specific psychological mechanisms that can underscore the benefits of grit on well-being, existing studies indicate how dispositional and contextual variables may strengthen or attenuate the effects of grit on various outcomes. It is likely that personality traits can moderate the anticipated

impacts of grit on psychological functioning. For instance, a synergistic interaction between gratitude and grit increases meaning in life, which in turn decreases suicidal ideation (Kleiman et al., 2013). Furthermore, life events can also interact with grit to yield differential effects on well-being outcomes. Supporting this prediction, research reveals that negative life events can lead to suicidal ideation for individuals with lower inclination to show passion and perseverance for long-term goals (Blalock et al., 2015).

In general, **Figure 1** recapitulates concrete cognitive, emotional, motivational, and behavioral processes that elucidate how and why grit cultivates optimal levels of performance outcomes and psychological health. Although this diagram offers a brief overview of precise psychological mechanisms linking grit to meaningful outcomes, note that this model is generated from past investigations that relied on the original two-factor model of grit (Duckworth et al., 2007), which attracted numerous conceptual and methodological criticisms on the grit construct.

DEMOGRAPHIC, PSYCHOLOGICAL, AND SOCIAL FACTORS ASSOCIATED WITH GRIT

Prior studies have demonstrated different demographic and psychological predictors of grit. In terms of demographic factors that relate to grit, there is evidence showing that age and length of work experience are associated with increased levels of grit over time (Duckworth et al., 2007; Camp et al., 2018). However, Usher et al. (2019) have shown that older students and those with low socioeconomic status tend to report low levels of grit. These findings indicate that the role of specific factors, such as age on grit is inconclusive.

Previous investigations have also shown specific psychological factors that may be linked to grit. For example, positive affect and purpose commitment have been associated with higher levels of grit in selected American and Canadian students (Hill et al., 2014). In a sample of Latina/o students, higher levels of hope positively predicted grit, whereas higher levels of search for meaning in life negatively predicted grit (Vela et al., 2015). Further, mindfulness positively predicted grit (Raphiphatthana et al., 2018, 2019; Vela et al., 2018). There is also evidence showing that whereas experiencing fitness-related pride attributed to one's own effort (i.e., authentic fitness-related pride) was found to predict grit, fitness-related success attributed to one's innate ability or superiority (i.e., hubristic fitness-related pride) negatively predicted persistence and interest toward goal attainment (Gilchrist et al., 2018). Belief in free will has been also associated with increased perseverance in selected Chinese adolescents (Li et al., 2018d).

Further, Armstrong et al. (2018) have demonstrated six self-regulation strategies, such as temporal perspective, perpetual evaluation, motivational orientation, strength and resource gathering, system thinking, and framing, were linked to higher levels of grit. In a national sample of American college students, Sriram et al. (2018) have shown that others-focused purpose, success-focused purpose, time spent in socializing, time spent in

academic activities, and religious beliefs positively predict grit. Spirituality has also shown direct and positive effects on grit via the mediating role of employment hope among underemployed urban African Americans (Hodge et al., 2019).

There are studies showcasing the link of social factors to grit in different contexts. Whereas, excessively controlling parenting behaviors negatively predicted grit, parental involvement positively predicted grit (Howard et al., 2019). Grit also mediates the link of parenting-related behaviors to academic success (Howard et al., 2019). Relatedness to different social agents (i.e., parents, peers, and teachers) has different pattern of associations with grit and its dimensions with relatedness to teachers positively predicting perseverance, consistency, and overall grit, while relatedness to parents positively predicting consistency and overall grit (Datu, 2017).

WHAT'S WRONG WITH THE EXISTING GRIT THEORY?

The considerable fund of empirical evidences showcasing the performance, well-being, and psychological advantages of fostering grit does not come without substantial controversies. This section summarizes results from previous studies highlighting major flaws in the extant theorizing and measurement of grit. Specifically, this is divided into four subsections, namely, measurement issues, theoretical validity, cultural bias in grit, and consistency or adaptability.

Measurement Issues

The existing grit framework (Duckworth et al., 2007) is continuously plagued by cumulative number of investigations indicating major problems in measuring the grit construct. Studies reveal psychometric issues on the items belonging to the consistency of interests dimension of grit in non-Western societies, such as Japan (Yoshitsu and Nishikawa, 2013; Datu et al., 2020) and the Philippines (Datu et al., 2016, 2017a, 2018a). Specific items ("My interests change from year to year" and "I have difficulty maintaining my focus on projects that take more than a few months to complete") on consistency, for instance, were omitted in the investigation of Suzuki et al. (2015) because these items did not load onto the consistency dimension of grit in a preceding study (Yoshitsu and Nishikawa, 2013). Similarly, in an investigation conducted among selected Romanian adults, correlating two error terms (indicating issues in the wording of items) resulted in an acceptable measurement model of grit (Ion et al., 2017). In a sample of school-based counselors in the United States by Mullen and Crowe (2018), one item in the perseverance of effort dimension ("Setbacks don't discourage me.") had a poor factor loading (0.15). Including this item in examining the internal consistency of perseverance of effort facet of grit resulted in a low Cronbach α coefficient ($\alpha = 0.57$). Moreover, the two-factor model of grit generated from the 12-item original grit scale was not confirmed in a sample of athletes in North America (Tedesqui and Young, 2017). There is also evidence showing that the consistency subscale had poor

reliability coefficients in non-Western and collectivist settings (Disabato et al., 2019).

When the hierarchical model of grit underpinned by perseverance and consistency as first-order latent factors was tested in selected Filipino university and high school student samples (Datu et al., 2016), results have shown that the scores from the said measurement model did not achieve an adequate fit. The factor structure of original grit model also differs among secondary school and undergraduate student samples (Muenks et al., 2017). Analyses of grit scales (e.g., Short Grit and Original Grit Scales) using item response theory (IRT) approaches also showed mixed evidence regarding the dimensionality of grit with one research demonstrating its unidimensionality (Areepattamannil and Khine, 2018), while other studies demonstrating its multidimensionality (Tyumeneva et al., 2019; Gonzalez et al., 2020). Furthermore, existing measure of grit is plagued by social desirability bias (DiMenichi and Richmond, 2015). Much like what other studies have consistently noted (Datu et al., 2016, 2018a; Datu and McInerney, 2017; Muenks et al., 2017), there is a need to improve existing measures of grit.

Adopting an extension procedures of confirmatory factor analysis (CFA) that enabled a more nuanced account on how dimensions of grit relate to conscientiousness while taking into consideration the hierarchical and lower-level factors of both constructs across German student and adult samples, Schmidt et al. (2018) have shown that perseverance exhibited strong association with common factors (95% shared variance) indicating this dimension of grit could be subsumed under the proactive aspect of conscientiousness (Roberts et al., 2005). Perseverance was also strongly linked to the industriousness facet of conscientiousness. Furthermore, consistency demonstrated a high relationship to the common factors of conscientiousness but more specifically related to the self-discipline facet of conscientiousness. Another research also demonstrated that the grit construct overlapped with self-control (Gonzalez et al., 2020). These findings further offer additional evidence on the conceptual resemblance of grit with conscientiousness and self-control.

Contrary to the fundamental tenets of original grit theory, previous research alludes to the possibility that consistency of interests does not belong to the higher-order grit latent construct (Abuhassan and Bates, 2015). There is a significant but weak correlation between perseverance and consistency (Constantin et al., 2011; Jordan et al., 2015; Meriac et al., 2015; Wolters and Hussain, 2015; Tedesqui and Young, 2017). Indeed, measurement issues raised in the aforementioned studies reinforces the theoretical value of perseverance but not consistency in understanding the nature of grit.

Taken together, prior studies suggest considerable issues not only with its specific items but also with the entire consistency subscale of existing grit measures (i.e., Grit-O and Grit-S). There are different reasons that might account for psychometric problems on the consistency subscale. For example, whereas the consistency of interests has been conceptualized as one's tendency to constantly stick to interests that enable fulfillment of long-term ambitions (Duckworth et al., 2007), items in the

extant grit scales tap into one's capacity to maintain focus on ideas or projects, which may not necessarily capture activities or endeavors that individuals consider meaningful. As previous investigations (Carlson et al., 2011; Zhang et al., 2016; Lee and Duckworth, 2018) have shown that scales with negatively worded or reverse-scored items are likely to yield undesirable impact on the overall psychometric validity of such measures, it is possible that the nature of wording in the consistency subscale in existing grit measures contributes to the fundamental problems in assessing grit.

Theoretical Validity

The existing two-factor model of grit has a few considerable flaws. One of the major shortcomings of theory includes the inability of consistency of interests to predict success and other meaningful outcomes. Dovetailing with this argument, previous investigations have found that consistency of interests does not relate to optimal functioning, such as academic achievement (Akos and Kretchmar, 2017; Muenks et al., 2017; Jiang et al., 2019), academic engagement (Datu et al., 2016, 2018a), and generalized self-efficacy (Jordan et al., 2015). Consistency is negatively correlated with an adaptive orientation to happiness (i.e., orientation to engagement; Suzuki et al., 2015). Overall grit score was not significantly correlated with achievement scores (Chang, 2014) and life satisfaction (Martin et al., 2015).

Moreover, although grit is positively correlated with in-role performance and organizational citizenship behaviors, it has limited predictive validity relative to Big Five personality factors on work-related (i.e., in-role performance, organizational citizenship behaviors, and counterproductive work behaviors) and well-being outcomes among selected Romanian adults (Ion et al., 2017). Although perseverance positively predicts academic performance, academic engagement and self-regulation were more strongly linked to achievement outcomes (Muenks et al., 2017). Conscientiousness also emerged as the strongest correlate of achievement when grit, intelligence, Big Five personality factors, self-efficacy, motivation, and test anxiety were entered as predictors of such outcome (Dumfart and Neubauer, 2016). Compared with grit, conscientiousness served as a stronger predictor of military cadets' academic and non-academic outcomes (Mayer and Skimmyhorn, 2017). After controlling the effects of extraversion, neuroticism, agreeableness, and openness, composite grit score did not predict academic achievement, academic recognition, honors, and rule-violating actions (Ivcevic and Brackett, 2014). Compared to grit, hardiness has been found to be a robust negative predictor of maladaptive internet usage and compulsive behaviors (Maddi et al., 2013). Similarly, only the perseverance dimension of grit predicted academic performance after controlling for the influence of conscientiousness (Rimfeld et al., 2016; Credé et al., 2017). Further, a recent study (Usher et al., 2019) demonstrated that grit did not predict academic achievement when relevant demographic covariates, such as gender, year level, and socioeconomic status were added as covariates among elementary and middle school students in the United States.

Vazsonyi et al. (2019) have offered evidence on the (a) unidimensionality of grit construct with latent method factors

to characterize positively and negatively worded items and (b) substantial overlap between grit and self-control. Moreover, contrary to the theoretical predictions of Duckworth and Gross (2014) about the differential roles of both constructs on desirable performance outcomes (e.g., possessing high grit and low self-control will be strongly linked to approach outcomes, whereas having high self-control and low self-control will strongly relate to avoidance outcomes), there was no difference on how grit and self-control relate to various outcomes, such as approach or avoidance temperament, present goals, and past goals. Yet, as the study used cross-sectional research design and self-reported measures in exploring the internal, discriminant, and construct validity of existing grit scales, results may provide myopic evidence on the measurement problems associated with grit along with its conceptual similarity with self-control.

Cultural Bias in Grit

Aside from budding line of empirical evidences magnifying the theoretical shortcomings of the original grit framework, another critical problem in the existing grit literature is the excessive quantity of published articles that examined the nature, antecedents, and consequences of grit in countries regarded by previous researchers (Henrich et al., 2010) as WEIRD (Western, educated, industrialized, rich, and democratic) societies. Given that citizens in non-Western cultures comprises more than 60% of the world's population, it is imprecise and deceptive to automatically generalize that findings from previous research might apply to individuals from non-WEIRD contexts. Despite the relative significance of advancing grit literature in non-Western cultures, there is still marked paucity of studies investigating the role of grit's facets in collectivist countries.

To date, studies on grit have focused on exploring the role that grit plays in optimizing optimal academic, work-related, and well-being outcomes in some non-Western societies, such as Japan (Suzuki et al., 2015), China (Li et al., 2018a,b,c), Hong Kong (Lee, 2017; Datu and Fong, 2018), mainland China (Chen et al., 2018), Philippines (Datu et al., 2016, 2017a, 2018a,b, 2019, 2020), South Korea (Jin and Kim, 2017), and Thailand (Raphiphatthana et al., 2019), among others. Without additional investigations on the antecedents and consequences of grit in non-WEIRD settings, it may be challenging to offer convincing insights on how grit dimensions may differentially relate to performance and positive psychological outcomes in various societies. Moreover, few studies (Chen et al., 2018), thus far, have adopted a cross-cultural design in exploring how grit relates to academic and well-being outcomes (Chen et al., 2018; Disabato et al., 2019; Raphiphatthana et al., 2019; Datu et al., 2020).

Consistency or Adaptability

As serious issues are raised on the heuristic value of consistency of interests in the validity of grit construct (e.g., Credé et al., 2017; Schmidt et al., 2018; Datu et al., 2020), it is important to discuss how and why consistency may not necessarily contribute to successful accomplishment of long-term goals. This subsection draws from diverse perspectives to elaborate the mechanisms underscoring the non-significant role of consistency in catalyzing achievement and well-being in various contexts.

First, as it is likely that individuals can face many demanding situations in the pursuit of long-term goals, shifting from one interest to another and even relaxing difficult goals can serve as equally beneficial approaches to achieve optimal performance (Kashdan and Rottenberg, 2010; Dreisbach and Fröber, 2019). In situations where failure is inevitable, showing passion and persistence may not eventually pay off. Instead of achieving visible indicators success, persevering in face of failure might even result in irreparable damages or losses. Blind persistence (Baumeister et al., 2003) therefore is not an ideal strategy when one is facing tasks that could not be realistically completed. Studies have underscored the practical importance of knowing when to jettison life goals that are bound to fail (Baumeister et al., 2003; Lucas et al., 2015). Other research has emphasized the equally appealing value of dropping originally identified long-term goals in lieu of more realistic aspirations (Wolters and Hussain, 2015; Datu and McInerney, 2017; Datu et al., 2018a).

Second, individuals who espouse higher interdependent self-construal are inclined to exhibit self-variability, a tendency to engage in behaviors based on situational demands or cues (Suh, 2007; Vignoles et al., 2016). Salience of self-variability can potentially account for why consistency of interests is not linked to well-being in many collectivist societies (Disabato et al., 2019). Instead, adaptability is linked to higher levels of self-efficacy, academic engagement, motivation, and well-being in Filipino high school students (Datu et al., 2017a,b). These findings underscore the importance of calibrating interests, behaviors, and goals contingent on one's context or situation.

Third, from the vantage point of psychosocial theory of development (Erikson, 1982), human beings go through distinct developmental stages requiring various sets of psychological and interpersonal competencies. If one consistently sticks to specific interests or goals that may not facilitate successful resolution of a psychosocial crisis (e.g., identity vs. role confusion), he or she may end up losing trail of succeeding more advance developmental stages, which is detrimental to psychological health. For example, an adolescent who is constantly showing excessive interests in playing online computer games but aspiring to become a medical doctor may face difficulties in achieving better academic performance. This, in turn, can cause a serious toll on his vocational identity (thus leading to inability to achieve a sense of identity) as it may be challenging to be admitted in good university degree programs with mediocre performance. Consistent with this perspective, research indicates that in the case of older adults, it is likely that grit may yield desirable effects on prosocial behaviors because espousing this trait expands their opportunity to achieve their developmental tasks (Wenner and Randall, 2016). To the extent that grit afford adults with concrete prospects of being productive members of communities, this trait can optimize successful resolution of psychosocial developmental stage, such as generativity vs. stagnation (Erikson, 1982).

Fourth, whereas the original grit theory (Duckworth et al., 2007) highlighted the role of consistency, existing studies indirectly point to the benefits of adaptability (e.g., calibrating one's interests or goals based on situational demands) in achieving long-term aspirations. Dovetailing with this prediction, research suggests that grit may have state-like

features (DiMenichi and Richmond, 2015) and is more strongly associated with the openness to experience compared to conscientiousness in Japanese adults (Suzuki et al., 2015). Furthermore, a study has shown that compared to other grit profiles (i.e., high perseverance and high consistency as well as low perseverance and high consistency), students belonging to a profile characterized by high perseverance and low consistency had significantly higher scores on hope and lower scores on anxiety and shame (Datu and Fong, 2018).

Indeed, the aforementioned theoretical premises indicate that consistency may have limited predictive power in shaping meaningful outcomes. Instead, it is reasonable to propose that adaptability can facilitate successful fulfillment of long-term goals. However, more research is needed to understand how replacing consistency with adaptability can improve the theoretical validity of grit construct.

MOVING FORWARD WITH THE SCIENCE OF GRIT

The identified controversies on the theorizing and measurement of grit open considerable spaces for refining the existing grit framework. Evidences clearly suggest that improving the two-factor model of grit can advance our understanding on the nature, and antecedents, and consequences of grittiness in various contexts (Credé et al., 2017; Datu et al., 2017b).

Designing Alternative Conceptualizations and Measures of Grit

One of the recent attempts to improve grit framework involves development of the triarchic model of grit (Datu et al., 2017a, 2018a), which conceptualizes grit as a disposition to show passion, perseverance, and adaptability for long-term goals. Like the original grit model (Duckworth et al., 2007), this model of grit has emphasized the importance of perseverance of effort and consistency of interests in achieving very challenging distal goals. However, the revised model highlights the theoretical value of incorporating adaptability to situations, defined as capacity to constantly calibrate one's interests and actions depending on situational and contextual factors. Triarchic Model of Grit Scale (TMGS; Datu et al., 2017a) was developed based on the items under the perseverance and consistency dimension of the Short Grit Scale (Duckworth and Quinn, 2009) and newly formulated items on adaptability. Research has provided preliminary evidence regarding the validity, reliability, and gender invariance of TMGS among Filipino undergraduate and high school student samples (Datu et al., 2017a, 2018b).

Triarchic model of grit dimensions has been found to be differentially linked to positive academic, psychological, and well-being outcomes. For instance, whereas perseverance and adaptability are associated with higher levels of self-efficacy in various domains of performance (i.e., academic, career exploration, and talent development self-efficacy), consistency was not (Datu et al., 2017a). Similarly, while adaptability and perseverance are linked to optimal school functioning,

such as autonomous motivation, controlled motivation, and all components of academic engagement (i.e., agentic, behavioral, cognitive, and emotional engagement), consistency was linked only to behavioral engagement (Datu et al., 2018b). Although all dimensions of grit are positively correlated with life satisfaction, only perseverance and adaptability are associated with well-being outcomes (Datu et al., 2018b; Datu and Restubog, 2020). Datu and Restubog (2020) have shown that these TMG dimensions were linked to increased positive emotions due to the intermediate variable—social emotional learning. Both perseverance and adaptability are also related to increased well-being not just in the context of Filipino students but also in selected Japanese and Polish undergraduate students (Datu et al., 2020).

Although there is a reason to argue that triarchic model of grit (Datu et al., 2017a, 2018a) may potentially address theoretical and methodological issues raised in the existing two-factor model of grit (Duckworth et al., 2007), this program of research remains to be at the embryonic phase. For example, to what extent does this revised model of grit incrementally predict performance outcomes beyond and above the effects of relevant personality factors, such as openness to experience and conscientiousness? Can triarchic model of grit predict overall and domain-specific academic achievement beyond the influence of theoretically related constructs, such as academic self-regulation, academic self-efficacy, motivation, and engagement? Do consistency, perseverance, and adaptability serve as differential predictors of success and well-being? What psychological processes underpin the hypothesized educational benefits of this grit model? In what ways do different grit profiles relate to achievement and well-being outcomes?

Furthermore, a more recent approach involves polishing the consistency (a.k.a. passion) dimension of grit. Jachimowicz et al. (2018) refined the passion facet of grit through redefining this dimension as “as a strong feeling toward a personally important value/preference that motivates intentions and behaviors to express that value/preference” (p. 9980). The study demonstrates that combining perseverance and passion is linked to higher levels of work-related and academic performance. However, recent research has pointed out theoretical and measurement issues on the validity of the total score generated by their scale measuring perseverance of effort and passion, to assess perseverance (Credé, 2019).

Despite the potential benefits of “redefining” the consistency dimension of grit, future research is necessary to strengthen the evidence on the validity of this modified grit framework. For instance, how does the consistency facet of grit differ from the harmonious passion conceptualized in the dualistic model of passion (Vallerand et al., 2003)? Will this modified grit model incrementally predict achievement and optimal psychological outcomes beyond the contributions of different types of passion (e.g., obsessive and harmonious passion), Big Five personality factors, domain-specific motivation, and self-regulation? In what ways do the recently conceptualized passion facet and perseverance relate to various forms of well-being (i.e., subjective well-being, psychological well-being, psychological flourishing, and physical health)? Clearly, more

studies are needed to understand the nature of grit given the growing body of evidence raising criticisms on the original two-factor model (Duckworth et al., 2007) and recently conceptualized models, such as the triarchic model of grit (Datu et al., 2017a, 2018a) and perseverance + passion model of grit (Jachimowicz et al., 2018).

Additional investigations are warranted to explore how domain-specific forms of grit may contribute to objective and subjective performance indicators. Past research has also underpinned the significance of assessing domain specificity of grit (Duckworth et al., 2007; Duckworth and Quinn, 2009; Wolters and Hussain, 2015; Clark and Malecki, 2019; Cormier et al., 2019). For instance, Clark and Malecki (2019) have shown that academic grit had incremental validity over domain-general grit scores in predicting academic performance and well-being outcomes (i.e., life and school satisfaction). Similarly, school-specific grit incrementally predicts academic achievement beyond the influence of domain-general grit and gender (Cormier et al., 2019). Other researchers have developed and validated domain-specific grit scales for foreign language learning (Ebadi et al., 2018). Yet, it is evident that except for the study of Ebadi et al. (2018), existing studies primarily focused on the consequences of domain-specific grit in Western societies (e.g., United States). Addressing this methodological grit entails exploring the role of domain-specific grit in non-Western and collectivist contexts to provide evidence about the cross-cultural applicability of grit in various cultural settings.

On top of refining extant grit scales, future studies can adopt alternative approaches in assessing grittiness. Duckworth and Yeager (2015), for instance, have enumerated teacher-report measures and performance task assessment as potential tools to evaluate non-cognitive abilities in school contexts. Biographical evidence of long-term commitments can also serve as a complementary approach to assess individuals' determination to accomplish challenging longstanding aspirations (Robertson-Kraft and Duckworth, 2014). Other researchers (Bowman et al.) have recommended the use of personal statements and documents indicating academic and extracurricular engagements of individuals to assess individuals' grittiness.

Moreover, it is also essential to continuously examine the validity of grit measures based on alternative statistical approaches, such as an extended procedure of CFA conducted in the investigation of Schmidt et al. (2018) and IRT analyses. To date, there were few studies that adopted IRT-based approaches to investigate the psychometric properties of existing grit scales (Areepattamannil and Khine, 2018; Tyumenewa et al., 2019; Gonzalez et al., 2020). Further, these studies primarily concentrated on providing psychometric information about Grit-O and Grit-S, so findings have limited implications for evaluating the validity of other grit scales, such as TMGS (Datu et al., 2017a) and Academic Grit Scale (Clark and Malecki, 2019). Adopting more sophisticated analytic procedures (e.g., polytomous IRT modeling techniques and extended versions of CFA) can generate stronger evidence on the psychometric validity of existing grit measures.

Strengthening Evidence on the Incremental Validity of Grit

Given the empirical evidences dampening the incremental validity of grit above and beyond the effects of theoretically related constructs, such as conscientiousness (Maddi et al., 2013; Ivcevic and Brackett, 2014; Rimfeld et al., 2016; Credé et al., 2017; Muenks et al., 2017) and academic variables, such as motivation and engagement (Steinmayr et al., 2018), there is a need to conduct additional studies on how refined models of grit can uniquely contribute to desirable performance outcomes beyond and above the effects of theoretically relevant constructs (i.e., Big Five personality factors, self-control, self-efficacy, and motivation). In addition, it is equally important to the unique predictive power of grit on psychological and physical health after controlling for pertinent covariates (e.g., neuroticism, self-discipline, and eating behaviors).

Furthermore, although other studies have shown that the original model of grit can predict retention beyond the influence of traditional variables that relate to admission in college programs (e.g., high school GPA and college GPA) in selected undergraduate students in the United States (Saunders-Scott et al., 2018) and cadets in West Point (Duckworth et al., 2007), not so much is known on how alternative models of grit predict retention outcomes in non-WEIRD societies. It is therefore essential to carry out investigations on the incremental validity of triarchic model of grit (Datu et al., 2017a, 2018a) and revised model of grit (Jachimowicz et al., 2018) on retention outcomes in different domains of performance (e.g., sports, post-graduate degree, extracurricular activities, and artistic activities).

Future research can also generate stronger evidence on the construct validity of grit through exploring how grit and its dimensions may relate to specific neurocognitive and physiological processes. For instance, research shows that perseverance of effort is associated with smaller mean difference in N1 amplitude for double cue trials, which suggest higher levels of sustained attention (Kalia et al., 2018) and neural activities in the medial prefrontal cortex (Myers et al., 2016). Moreover, future research can explore the connection of grit to objective indicators of optimal physical health, such as frequency of visits to physicians, regulation of antibody genes, and actual blood pressure. Studies of these kinds can provide more rigorous and convincing insights about the predictive power of grit in various domains of performance and well-being.

Adopting Alternative Methodological Approaches

Except for a few investigations that used longitudinal (O'Neal, 2018; O'Neal et al., 2018; Park et al., 2018; Jiang et al., 2019; Datu et al., 2020) and experimental (Lucas et al., 2015) research approaches, previous studies mainly relied on cross-sectional research designs in examining the role of grit in performance, optimal psychological, and well-being outcomes. Given that cross-sectional designs are prone to common method bias that can delimit the validity of such studies (Podsakoff et al., 2003), future investigations are encouraged to adopt

longitudinal designs (e.g., cross-lagged panel and latent growth curve modeling approaches) to offer stronger evidence about the complex association of grit with desirable performance and well-being. Furthermore, the extant grit literature may profit from conducting person-oriented approaches to explore how various profiles of grit may relate to optimal levels of achievement in different domains of performance. The use of experimental research design is needed to provide cause evidence on the effects of grit to achievement and well-being outcomes.

As majority of published studies on grit examined the benefits of grit in student populations, future research can also explore how grit may foster meaningful outcomes in clinical populations. Past investigations have already initiated exciting avenues for unpacking the appealing values of grittiness in specialized populations, such as college students with ADHD (Gray et al., 2015) and patients with substance dependence (Griffin et al., 2016). Consistent with this point of contention, previous research (Griffin et al., 2016) points out that integrating grit in motivating clients to achieve optimal recovery can complement existing clinical psychological interventions. Hence, it is a promising research initiative to investigate the effects of grit on the lives of clients with diverse medical conditions.

Identifying Antecedents of Grit

There is a need to explore how specific social and contextual factors relate to grit. Recognizing the importance of interpersonal factors on passion and perseverance for long-term goals, research demonstrates that relationship with peers (Lan and Moscardino, 2019) and school connectedness (Renshaw and Bolognino, 2016) are linked to higher levels of grit. Even classroom-level variables, such as classroom peer grit (O'Neal, 2018) and perceived mastery-approach and the capacity of classroom to promote mastery-approach goals (Park et al., 2018) are linked to increased grit in student populations. In fact, classroom peer grit has stronger influence than individual-level grit on subsequent literacy achievement even after controlling for previous literacy achievement and relevant demographic covariates, such as age, gender, and home language (O'Neal, 2018). However, in the context of Latino undergraduate students, perceived family support did not contribute to grit (Vela et al., 2015). Moreover, there is no evidence yet that report how specific academic and non-academic policies or programs in school contribute to development of grit in academic settings. Indeed, more studies are desired to explore how different social factors catalyze grit, as well as precise psychological mechanisms linking, such as social, contextual, and interpersonal variables to grit construct.

Exploring the “Dark Side” of Grit

Existing investigations indirectly point to the caveats of embodying a sustained interest and perseverance to achieve goals even in the face of failures. Consistent with this perspective, a series of experiments carried out by Lucas et al. (2015) has shown that grittier individuals exerted more effort than their less gritty counterparts when finding solutions to unsolvable

tasks at the expense of accomplishing fewer duties (Study 1) and when losing a game (Study 2). Moreover, when grittier participants were given an opportunity to quit, they showed greater persistence and stayed in a losing game. Indeed, these results indicate that there are potentially damaging psychological costs associated with espousing grit especially in contexts where failure is bound to happen. Similarly, espousing higher grit and tendency to give up on difficult or boring activities (i.e., perseverance dimension of impulsivity) has been linked to more incidence of suicidal attempts (Anestis and Selby, 2015). This evidence points to the potential maladaptive effects of grit on well-being outcomes. Future investigations, therefore, are needed to explore the adverse “side effects” of grittiness and specific contextual conditions that may amplify the “dark side” of grit in various domains of performance and psychological functioning.

Addressing Cultural Biases in Grit

Many issues revolving around the “cultural biasness” of grit remain unresolved. One of the most controversial problems points to grit as a “racist” construct that characterized motivational intensity for distal goals for individuals belonging to families with high socioeconomic status (Herold, 2015). In a similar vein, McGee and Stovall (2015) have criticized extant grit theory for being a “racist” construct that fails to capture unique mental health needs of Black students in predominantly White educational institutions. Future researchers can eventually address these conceptual speculations on the cultural insensitivity of grit construct through exploring the invariance of specific grit models across individuals from diverse economic and racial backgrounds, as well as examining the moderating role of socioeconomic status and racial backgrounds on the hypothesized link of grit to positive performance and well-being outcomes in different settings. Because the present grit literature is dominated by studies carried out in WEIRD societies, more investigations are necessary to explore how grit operates in non-WEIRD contexts, which, in turn, generate solid evidence regarding the cross-cultural generalizability of grit.

THEORETICAL IMPLICATIONS

Before discussing the anticipated theoretical contributions of this review, it is important to note its limitations. Given that studies included in this review were not done in a systematic manner, it is likely that this review might be prone to selection bias. Future reviews can address this methodological shortcoming through conducting systematic reviews that involve organized and careful selection of studies based on a specific range of inclusion criteria. In addition, the qualitative nature of this review precludes concrete insights on the magnitude of relationship between grit and well-being or other positive health outcomes. Future researchers can fill this gap through carrying out meta-analyses in order to quantitatively summarize the effects sizes between grit and a wide range of optimal outcomes. In order to generate more robust and comprehensive evidence regarding the mental health, physical, and neural correlates of grit, future research

may integrate the methodological strengths of qualitative (e.g., systematic) and quantitative (e.g., meta-analyses) reviews through performing a systematic and meta-analytic review. Further, given the limited evidence about the incremental validity of alternative models of grit (e.g., triarchic model of grit) above and beyond the effects of relevant psychological constructs, such as conscientiousness and self-control, caution should be observed when interpreting conclusions about the educational and psychological payoffs associated with these frameworks of grit.

This integrative review has implications for advancing research programs about the generalizability, measurement, antecedents, and consequences of grit. First, although prior reviews (Credé et al., 2017; Datu et al., 2017a,b; Credé, 2018; Lam and Zhou, 2019) primarily concentrated on summarizing the link of grit to academic performance and relevant outcomes, this review offers a more holistic overview about the correlates of grit through providing substantive summary on how grit and its dimensions predict optimal psychological, mental health, and physiological outcomes. Drawing from previous scientific findings about the consequences and correlates of grit, this review also organizes cognitive, affective, behavioral, and social mechanisms underscoring the educational, organizational, and mental health benefits of grit into the optimal performance and health (OPAH) model of grit. Second, unlike previous reviews on grit that offered broad insights on how to address conceptual and measurement issues on grit, this review outlines a few specific recommendations on how to address existing conceptual and psychometric issues in the grit construct. Future researchers may consider such suggestions in order to design more culturally nuanced grit scales that can capture individual difference in persistence toward accomplishing long-term ambitions in various cultural contexts. Third, while past review articles focused on summarizing studies about the benefits of grit (Datu et al., 2017b; Lam and Zhou, 2019), these reviews provide scant insights about the importance of exploring maladaptive impacts of staying gritty. This review addresses this limitation through briefly rationalizing the significance of pinpointing the disadvantages associated with grittiness as a future scholarly initiative.

PRACTICAL IMPLICATIONS

This review carries valuable implications for educational and mental health practitioners in various contexts. Given the mixed evidence regarding the psychometric validity and construct validity of the Grit-S and Grit-O (Muenks et al., 2017; Areepattamannil and Khine, 2018; Tyumeneva et al., 2019), educational policy makers and administrators (e.g., principals, vice principals, admission office director, and subject area coordinators) should practice caution when integrating these questionnaires as assessment tools in high-stake academic activities and career placements. Further, as most studies appear to indicate that only perseverance of effort serves as a consistent predictor of many key educational outcomes, such as academic

achievement (Chang, 2014; Wolters and Hussain, 2015; Muenks et al., 2017; Steinmayr et al., 2018), motivation (Eskreis-Winkler et al., 2014; Datu et al., 2018b), engagement (Datu et al., 2016), and achievement goal orientation (Chen et al., 2018), schools are encouraged to invest in psychological programs that aim to cultivate persistence among typically developing and at-risk students. To date, there have been a number of educational interventions (see Alan et al., 2020) that provided promising evidence about the effects of these initiatives on key learning outcomes.

School-based and community mental health practitioners are also likely to benefit from the findings of this review. As prior studies have demonstrated the mental health benefits of grit's dimensions such as perseverance (Pierro et al., 2011; Lee, 2017; Hwang et al., 2018) and adaptability (Datu et al., 2018b, 2020; Datu and Restubog, 2020; Datu and Zhang, 2020), school psychologists and guidance counselors are recommended to consider designing school-wide psychoeducational interventions that aim to promote these personal qualities in student populations. The extant literature on the association of grit with optimal neural activities (Myers et al., 2016; Kalia et al., 2018; Wang et al., 2018) points to the potential benefits of initiating interdisciplinary collaborations between neuroscientists and educational practitioners (e.g., teachers and subject area coordinators) in order to build grit interventions that can optimize effective learning and psychological health.

CONCLUSIONS

There is an ongoing debate on the theoretical validity and benefits of fostering grit in various contexts. This integrative review contributes to extant grit literature through (a) discussing concrete issues on the measurement, validity, and correlates of grit; (b) reviewing alternative models of grit; and (c) discussing how these alternative models of grit can address existing issues on the generalizability and measurement of grit. Much like other valuable psychological constructs, better theorizing, measurement, and methodological approaches can address skepticisms raised against grit. Indeed, understanding the complex nature of grit goes beyond investigating the roles of passion and perseverance in pursuing long-term goals.

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Introducing the Concept of Consonance-Disconsonance of Best Practice: A Focus on the Development of ‘Student Profiling’

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The present study, using a non-experimental approach, investigated a theoretical concept of best practice, which we recently introduced – namely: a ‘state of consonance’ and a ‘state of disconsonance’ of best practice. *Consonance of best practice* posits that different levels of best practice (e.g., low level of best practice *versus* optimal level of best practice), as well as other comparable psychological constructs (e.g., motivation towards learning) would cluster or ‘group’ together. *Disconsonance of best practice*, in contrast, would indicate non-overlapping of contrasting levels of best practice (i.e., low level of best practice *versus* optimal level of best practice). Taiwanese undergraduates ($N = 831$) from five private universities in Taipei City and New Taipei City, Taiwan took part in the study by responding to a suite of Likert-scale questionnaires (e.g., Best Practice Questionnaires, Motivation towards Learning Questionnaire), which took approximately 30–35 min to complete. Cluster analysis, commonly known as *CIA*, was used to analyze the data and seek theoretical understanding into the nature of the consonance of best practice. Results, overall, showed support for our proposition, resulting in four distinct profiles: ‘a Balanced Profile,’ ‘an Intrinsic Motivation Profile,’ ‘a Current Best Practice + Interest Profile,’ and ‘a Current Best Practice + Motivation Profile.’ This evidence, helping to advance further research development, has a number of practical implications for consideration. For example, how could we use the Balanced Profile to develop learning objectives and/or pedagogical practices that would encourage students to enjoy their learning experiences?

Keywords: consonance, disconsonance, optimal best, student profile, optimization, positive psychology, flourishing, motivation

INTRODUCING THE CONCEPT OF BEST PRACTICE: THE IMPORTANCE OF ‘STUDENT PROFILING’

What is ‘student profiling’ or, alternatively, what does a student’s academic profile actually entail? An academic profile, in a general term, may indicate a *specific pattern in cognition, motivation, and/or behavior that a student may exhibit* (Phan et al., 2018a). Moreover, an academic profile may reflect a student’s historical background (e.g., his previous failures in mathematics), intellectual curiosity, personal interest, career pathway, and state of engagement or disengagement.

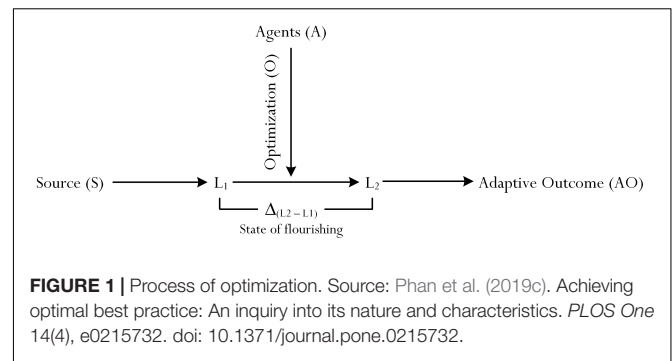
For example, within the context of secondary school learning in Physics, say, a student's 'motivational profile' may indicate a number of key characteristics and qualities (e.g., the student's inclination to go beyond of what is expected of him, academically, in Physics) that would define and reflect his state of motivation. At the same time, according to Phan et al. (2018a), a student's academic profile may portray his/her expectations, philosophical beliefs, and self-beliefs for learning. From the perspective of education, an academic profile may serve to advise a teacher on the use of appropriate resources and pedagogical practices, which could encourage, foster, and promote an enriching academic profile. From our point of view, we contend that an academic profile may exist on a demarcated spectrum: a positive profile *versus* a negative profile.

In their recent research, Phan et al. (2018a) situated the concept of student academic profile within the context of 'optimal best practice' (Fraillon, 2004; Martin, 2006; Phan et al., 2016; Phan et al., 2018b). Specifically, the focus of inquiry delved into a student's specific pattern of current best practice, as well as his/her optimal best practice in a subject matter. The term 'best practice,' according to Ngu et al. (2019), is defined as "a person's accomplishment of three distinctive areas of personal agency: *acquired knowledge*, *personal experience*, and *personal functioning*." In terms of academia, for example, the term best practice may relate to a student's acquired knowledge of Economics 101 (e.g., minimum level of knowledge that he/she would attain), and/or his/her personal enjoyment of Psychology. From this understanding, optimal best practice is therefore concerned with the *maximization* of a person's acquired knowledge, experience, and/or personal state of flourishing (e.g., feeling good about himself/herself).

In terms of its technical, underlying structure, best practice may differentiate into two distinct levels – namely:

- (i) A level of *current best practice*, denoted as L_1 , according to Fraillon (2004) and Phan et al. (2017, 2019a), is defined as a person's perceived level of functioning at the present time – for example, "what is it that I am capable of at present in Algebra?" (e.g., I am able to solve equations with one unknown, x , at present).
- (ii) A level of *optimal best practice*, denoted as L_2 , in contrast, is defined as a person's perceived maximum level of functioning that could be fulfilled and/or accomplished (Fraillon, 2004; Phan et al., 2017, 2019a) – for example, "I perceive and believe that I am capable of accomplishing. ... in Algebra" (e.g., I am capable of solving equations with three unknowns, x , y , and z . This accomplishment is my maximum capability).

The relationship between L_1 and L_2 , in its simplistic term, according to Phan et al.'s (2019c) recent study is shown in **Figure 1**. The uniqueness of **Figure 1** lies in the concise representation of the *process of optimization* (Phan et al., 2017, 2019a), which would act to account for a state of flourishing – in this case, defined as a difference between L_1 and L_2 [i.e., $\Delta(L_1 - L_2)$]. According to Phan et al. (2019a), the achievement of L_2 from L_1 requires some form of optimization, involving



the activation and enactment of different types of *educational* (e.g., an appropriate instructional design: Ngu et al., 2018), *psychological* (e.g., belief of personal efficacy: Bandura, 1997), and/or *psychosocial* (e.g., the impact of the home environment: McCartney et al., 2007) agencies. For example, the activation and enactment of self-efficacy (Bandura, 1997) would act to energize specific cognitive processes (e.g., the buoyancy of effort expenditure) and, in turn, helping to optimize a student's academic learning experience in a subject matter (Phan et al., 2019a, 2020).

Student profiling, from our point of view, may help to explain the $L_1 - L_2$ relationship. From our rationalization and focus of inquiry, as shown in **Figure 1**, testament of student profiling (i.e., a student's exhibition of her profile in English composition) may coincide with and complement the theory of optimization (Phan et al., 2017, 2019a) by explaining the interrelatedness between L_1 and L_2 . The relationship between $L_1 - L_2$ can be explained from the context of academic learning. For example, as shown in **Figure 1**, a secondary school student's L_1 in mathematics learning may consist of her ability to solve equations with one unknown, x (e.g., I am capable of solving simple one-unknown equations, for example: $x + 20 = -4$), which then would influence the accomplishment of L_2 (e.g., the student's indication in ability to solve equations with two unknowns, x and y). This theorization contends that, aside of L_1 being a determinant of L_2 , the quantitative and/or qualitative difference between L_1 and L_2 , in part, depends on the student's cognitive level of L_1 (Phan et al., 2020) – that is, how much does the student know? There are a few empirical research undertakings, which have yielded consistent evidence to support the $L_1 - L_2$ relationship. For example, in a recent study that involved secondary school students, Phan and Ngu (2021) found that L_1 exerted a positive effect on L_2 ($\beta = 0.33$, $p < 0.001$).

The Significance of Student Profiling

The study of best practice has substantial daily relevance for students and educators, alike (Phan et al., 2019c, 2020). One notable emphasis for consideration relates to reflective thoughts, articulations, and considered measures, which could help improve a person's L_2 . To advance this development, we propose an interesting line of inquiry for examination – namely, the extent to which a student's academic profile could elucidate the relationship between current best practice (L_1)

and optimal best practice (L_2) in a subject matter. Testament of an academic profile may, in this case, assist in the organization of resources, the design of effective pedagogical practices, and/or the development of policies and/or programs for implementation, in turn facilitating students' motivational beliefs and learning experiences. To this end, effort has been made recently by Phan et al. (2018a) to study the nature of the concept of academic profile. According to the authors, there are four potential profiles that students may attest and manifest:

- (i) The *Exceptional Profile*: 'High Current Best Practice, High Optimal Best Practice,' wherein a student reports a high level of current best practice and a high level of optimal best practice. This profile, from our point of view, is healthy, proactive, and motivational.
- (ii) The *Realistic Profile*: 'High Current Best Practice, Low Optimal Best Practice,' wherein a student reports a high level of current best practice but a low level of optimal best practice. This profile, from our point of view, suggests a student's conservative sense of self-awareness of his/her capability.
- (iii) The *Pessimistic Profile*: 'Low Current Best Practice, Low Optimal Best Practice,' wherein a student reports a low level of current best practice and a low level of optimal best practice. This profile, of the four profiles, is pessimistic and negative and may reflect a student's low level of motivation, helplessness, and uncertainty.
- (iv) The *Un-Realistic Profile*: 'Low Current Best Practice, High Optimal Best Practice,' wherein a student reports a low level of current best practice and a high level of optimal best practice. This profile, of the four profiles, is positive and optimistic and may reflect a student's optimism and confidence to succeed in life.

The above description, as summarized visually in **Figure 2**, connotes that each profile would exhibit a set of specific characteristics and qualities. The characteristics of the four profiles, as detailed in **Table 1**, offer distinct insights into students' learning and motivational patterns. Moreover, we speculate that educators could use a particular profile (e.g., the Exceptional Profile) as a diagnostic tool to gauge into a student's learning patterns, motivational beliefs, aspirations, and future outlooks. For example, a student who exhibits the 'Pessimistic Profile' may possess a high level of helplessness and a low level of motivation, which would require some form of remediation, personal counseling, etc. A different student, in contrast, may exhibit the 'Exceptional Profile,' indicating characteristics of motivation, inspiration, hardworking, etc. Indeed, the uniqueness of 'academic profiling,' in accordance with Phan et al.'s (2018a) theorization, lies in its distinct characteristics, helping to identify and discern students' similarities and differences. From a practical point of view, the use of profiling is advantageous, especially in terms of diagnosis, identification, and the framing of learning objectives and the development of programs and/or policies that could encourage the adoption of the Exceptional Profile.

Introducing the Theoretical Concept of Consonance-Disconsonance of Best Practice: Proposition for Consideration

We seek to advance the study of best practice (Fraillon, 2004; Liem et al., 2012; Phan et al., 2016) and, in particular, the inquiry pertaining to the notion of academic profile (Phan et al., 2018a) by focusing on a conceptualization, which we have developed and termed as the 'consonance and disconsonance of best practice' (**Figure 3**). We define the *consonance of best practice* (**Figure 3A**) as "a 'closeness' or the close proximity between a student's L_1 and his/her L_2 ." Moreover, referring to our previous discussion, consonance of best practice is similar to the Exceptional Profile (i.e., High Current Best Practice and High Optimal Best Practice) and the Pessimistic Profile (i.e., Low Best Practice and Low Optimal Best Practice) (Phan et al., 2018a). The *disconsonance of best practice* (**Figure 3B**), in contrast, is defined as "the 'farness' between a student's L_1 and his/her L_2 ." A state of disconsonance of best practice, in this case, is similar to the Realistic Profile (i.e., High Current Best Practice and Low Optimal Best Practice) and the Un-Realistic Profile (i.e., Low Current Best Practice and High Optimal Best Practice) (Phan et al., 2018a).

Our proposition contends that the dynamic 'separation' or 'movement' between L_1 and L_2 (e.g., compare **Figure 3A** and **Figure 3B**) actually distinguishes the consonance of best practice from the disconsonance of best practice and, likewise, the disconsonance of best practice from the consonance of best practice. In accordance with **Figure 3A**, when both L_1 and L_2 are moving towards each other, there would be a large overlap, indicating a state of consonance. In relation to **Figure 3B**, in contrast, when both L_1 and L_2 are moving away from each other, there would be a small overlap, indicating a state of disconsonance. This distinction, overall, purports that the two states of best practice (i.e., consonance and disconsonance of best practice) are dynamic and differ in terms of intensity. In the context of schooling, for example, at any moment in time, a student's level of L_2 could vary in 'distance' from his/her level of L_1 . The distance, or quantitative difference, between L_1 and L_2 , equating to a state of flourishing (Phan and Ngu, 2017; Phan et al., 2019a), we contend, would reflect a state of consonance of best practice or a state of disconsonance of best practice.

A state of consonance of best practice or a state of disconsonance of best practice is an interesting line inquiry for consideration, especially in terms of educational and non-educational practices for engagement – for example, what educational program could teachers develop, which would encourage a state of consonance of best practice in mathematics learning? By the same token, in terms of sound pedagogical practices, learning objectives, etc., how does an educator determine that a quantitative difference between L_1 and L_2 is, in fact, evidence of consonance and not that of disconsonance? Deciding whether a student's learning experience is one of consonance or disconsonance is subjective and, in part, may depend on his/her *perception of cognitive complexity* (van Merriënboer et al., 2003; van Merriënboer and Sweller, 2005). How difficult is the learning task? Am I able to solve this task? Do I need to put in a lot of effort? Does the task give me mental stress?

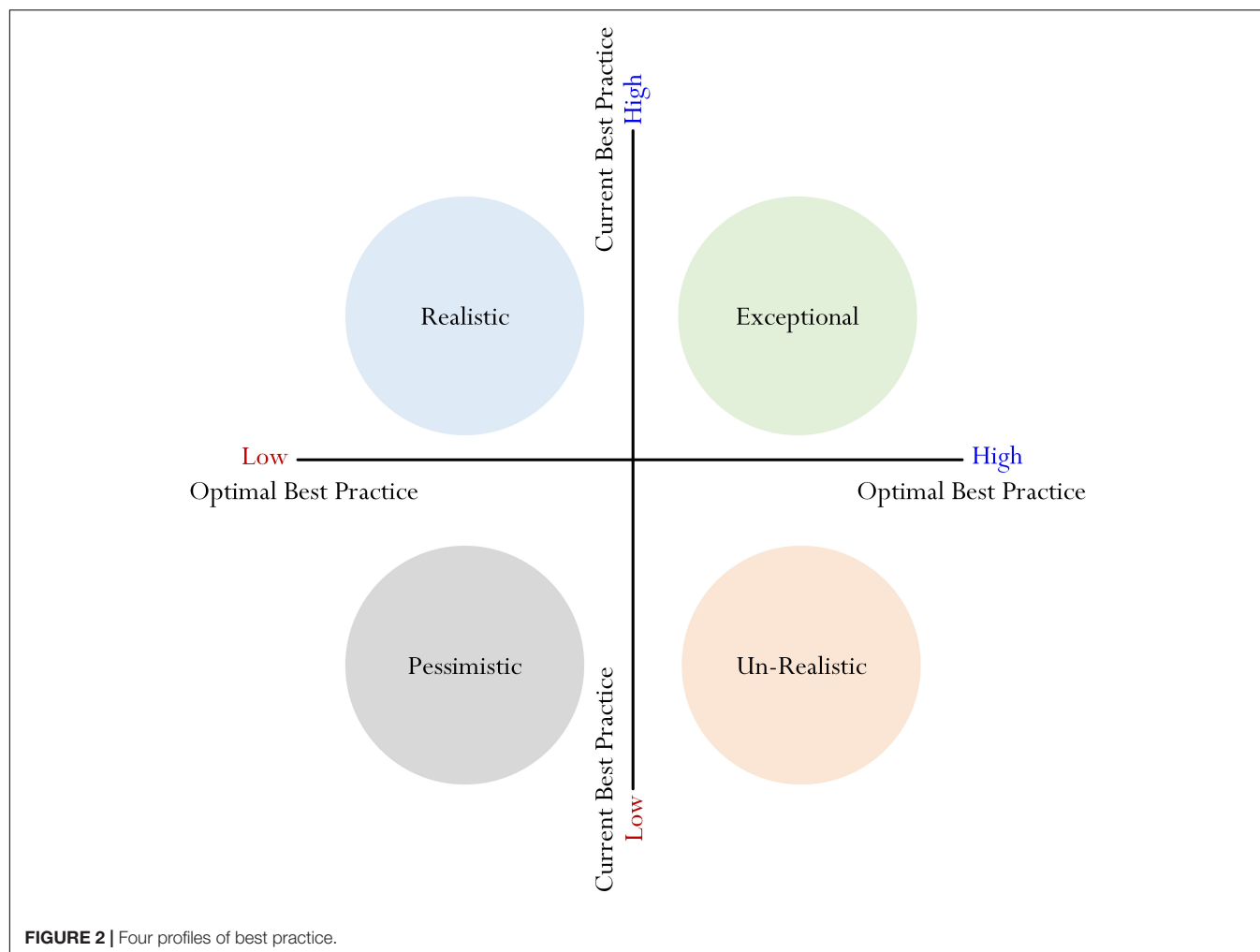


TABLE 1 | A summary of different profiles.

Profiles	Current best practice	Optimal best practice	Potential characteristics
<i>Exceptional</i>	High	High	Healthy, proactive, high level of motivation, positive, inspirational, hardworking, high level of confidence, high level of effort
<i>Realistic</i>	High	Low	Tempered, self-awareness, confident, hardworking, modest level of confidence, modest level of effort
<i>Pessimistic</i>	Low	Low	Pessimistic, low level of motivation, high level of helplessness, uncertainty, negativity, low level of confidence, low level of effort
<i>Un-Realistic</i>	Low	High	Optimistic, high level of confidence, low level of effort, unrealistic, ignorance, complacency

We theorize that there is a dynamic movement (i.e., **Figure 3A** versus **Figure 3B**) as one progresses from a state of disconsonance to that of consonance, or vice versa. The perceived consonance-disconsonance movement contends that there are two possibilities. The ‘zone of cognitive comfort,’ as possibility 1, depicts that the difference between L_1 and L_2 for Scenario 1 (**Figure 3A**), denoted as $\Delta-C$, is greater than the difference between L_1 and L_2 for Scenario 2 (**Figure 3B**), denoted as $\Delta-D$ (i.e., $\Delta-C > \Delta-D$). The ‘zone of cognitive discomfort,’ as possibility 2, in contrast, considers that the difference between L_1 and L_2 for Scenario 2 is

greater than the difference between L_1 and L_2 for Scenario 1 (i.e., $\Delta-D > \Delta-C$). This theoretical contention posits that a person’s perception of cognitive complexity could, in effect, associate with and/or explain whether there is ‘evidence’ of cognitive comfort or cognitive discomfort. Importantly, from this conceptualization, we argue that evidence of cognitive comfort would result in a student’s report of low mental stress and/or perceived difficulty in his/her learning experiences. Cognitive discomfort, in contrast, would result in a student’s report of high mental stress and/or perceived difficulty in learning experiences.



From the preceding section, we surmise that distinguishing a state of consonance from a state of dissonance, or vice versa, is insightful as this encouraging feat would help to elucidate theoretical understanding into a person's perceived cognitive comfort as opposed to that of cognitive discomfort. An inspection of both **Figures 3A,B** indicates that a shift from cognitive discomfort (i.e., a student's negative experience) to that of cognitive comfort (i.e., student's positive experience) would, correspondingly, reflect a shift from a state of dissonance of best practice to that of a state of consonance of best practice. A shift from cognitive comfort to that of cognitive discomfort, in contrast, would associate with a shift from a state of consonance of best practice to that of a state of dissonance of best practice. An issue that is of interest for consideration relates, in this case, to comparable psychological and/or educational variables that could closely align with a state of consonance and, by the same token, psychological and/or educational variables that could associate with a state of dissonance of best practice.

THE PRESENT STUDY: A FOCUS ON THE CONSONANCE OF BEST PRACTICE

The preceding section, we contend, has established grounding for us to advance further into the study of academic profiling. Our proposed inquiry, in this analysis, considers the potentiality

for a state of consonance of best practice to make a meaningful impact on the teaching and learning processes. As a recap, a state of consonance considers a close proximity between L_1 and L_2 . We propose, however, that aside from this closeness (i.e., a state of consonance), both L_1 and L_2 may also associate with other psychological processes and/or outcomes that have similar attributes and characteristics. For example, it is plausible to consider a state of consonance of best practice and a state of positive emotions (e.g., happiness) as being comparable and/or interrelated. Previous research inquiries have, likewise, yielded evidence that illustrates in this instance a 'consonance' between anxiety and low academic performance (Pajares and Kranzler, 1995; Pajares and Johnson, 1996; Segool et al., 2013). It is evident, by contrast, that we would not expect to find a state of consonance between a student's junk food eating habits and his/her engagement of mastery in mathematics learning.

In the context of the present study, we postulate three psychological variables that could closely associate with the consonance of best practice: (i) *motivation towards learning* (Van Damme et al., 2002; Van Landeghem et al., 2002; Van De Gaer et al., 2007, 2009a), (ii) *personal interest in learning* (De Fraine et al., 2005; Van De Gaer et al., 2007, 2009b; Belfi et al., 2012), and (iii) *positive emotions* (Fredrickson, 2000; Tugade and Fredrickson, 2007; Villavicencio and Bernardo, 2013, 2016). It is acknowledged that motivation towards learning, personal interest in learning, and positive emotions (e.g., happiness)

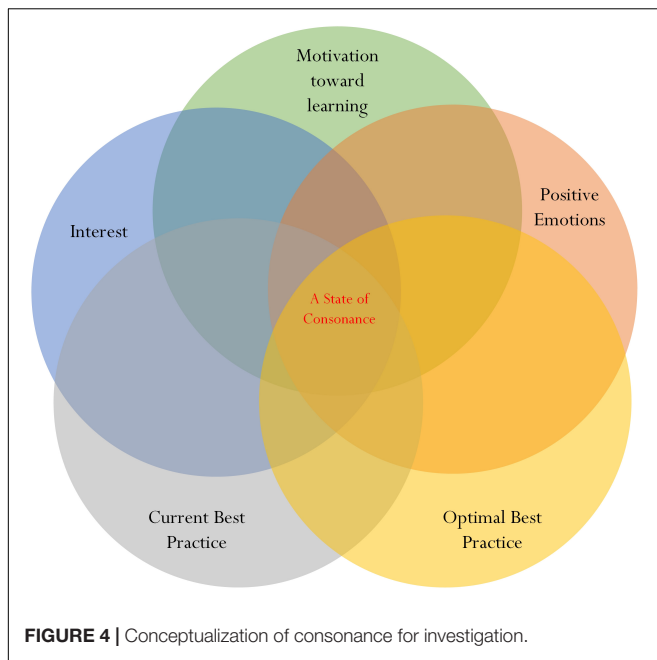


FIGURE 4 | Conceptualization of consonance for investigation.

are positive in terms of their characteristics, and that they may predict, improve, and/or enhance learning experiences and performance outcomes. Over the past few years, our research interest has led to a number of undertakings, which focused on the study of psychological variables that could explain and predict the achievement of optimal best (Phan et al., 2019c; Phan and Ngu, 2020, 2021). For example, non-experimentally via means of correlational analyses, we note that motivation towards learning positively influences both L_1 and L_2 .

Other motivational research, likewise, has yielded consistent findings, which emphasize the interrelatedness between comparable variables. In one of the earlier studies that used latent growth modeling (LGM) techniques (McArdle and Nesselroade, 2003; Bollen and Curran, 2006), for example, Van De Gaer et al. (2009a) found a positive association between motivation towards learning and academic self-concept. This inquiry is somewhat different from the study of optimal best practice, but it does provide some empirical insights into the operational nature of motivation towards learning. In a similar vein, other studies have noted the interrelatedness between positive emotions, personal interest, and other related motivational constructs (Tugade and Fredrickson, 2007; Zhu et al., 2009; Villavicencio and Bernardo, 2013, 2016; Phan et al., 2019b). What is of relevance, from our point of view, is that existing evidence supports our conceptualization, which connotes an 'overlap' between L_1 , L_2 , motivation towards learning, personal interest in learning tasks, and positive emotions.

An 'overlap' between comparable educational (e.g., L_1 and L_2) and psychological (e.g., motivation towards learning and personal interest in learning) variables, shown in **Figure 4**, is labeled as 'A State of Consonance.' A state of consonance is positive and posits that comparable variables are 'in tune' with each other in terms of characteristics, qualities, and

understanding. For example, within the context of schooling and academic learning, we would expect to find shared commonalities between a student's level of L_2 and his/her indication of motivation towards learning, positive emotions, and/or personal interest in learning. In a similar vein, of course, we would to find a non-overlapping or, alternatively, a state of disconsonance between the student's level of L_2 and his/her anxiety.

Conceptualization of Study

Our conceptualization, overall, is innovative for its proposed investigation into the issue of overlapping and non-overlapping of comparable educational and psychological variables: L_1 , L_2 , motivation towards learning (denoted as MTL), personal interest in learning (denoted as PIL), and positive emotions (denoted as PE). This inquiry may yield a number of valuable outcomes, educationally and non-educationally, and may advance theoretical understanding into the nature of profiling. A state of consonance, for example, may reflect a positive profile and serve as an ideal profile for promotion and cultivation. A state of disconsonance, in contrast, could act as a diagnostic tool, helping educators to develop different preventive measures for the purpose of improvement. At the same time, identified state of consonance and state of disconsonance are insightful, offering potential information into a student's 'cognitive profile' in a subject matter.

In summary, from our conceptualization, we propose that a particular 'grouping' would indicate comparable levels of L_1 , L_2 , MTL, PIL, and PE. With reference to the four main profiles that have been cited (Phan et al., 2018a) (e.g., **Figure 2**), we contend that the Exceptional Profile would indicate some form of overlapping between L_1 , L_2 , MTL, PIL, and PE. In this sense, for the Exceptional Profile, we would expect to find comparable high levels of L_1 , L_2 , MTL, PIL, and PE. By the same token, however, we also expect to find some form of overlapping, but rather relatively low comparable levels of L_1 , L_2 , MTL, PIL, and PE for the Pessimistic Profile. On this basis, as a point of comparison, we could consider two different possibilities. Firstly, a student who is motivated is more likely to be confident, resulting in his/her indication of high L_1 and L_2 in a subject matter. At the same time, the motivated student is more inclined to exhibit a corresponding high level of interest in learning and positive emotions because of his/her state of confidence and accomplishment (e.g., the student's conveyed message of situational and/or dispositional happiness). Secondly, a student who lacks motivation towards learning may indicate low L_1 and L_2 in a subject matter. A low level of motivation, in this case, is likely to associate with a low level of interest. At the same time, of course, we consider a student who exhibits a low state of functioning (e.g., L_1 and L_2) and motivation to also express an analogous level of negative emotions (e.g., anxiety).

The present study may also yield a number of benefits for institutions, organizations, government officials, etc. One notable benefit, for example, relates to information gathering and data recording for the purpose of policy development, allocation of financial resources, and design and structure of subject contents, courses, and degree programs. Knowing about individual learning and motivational profiles, interestingly, may

help an institution's framing of its entry requirements into different programs. In a similar vein, an institution may provide initial, or foundation, support, which could assist first-year students with their academic adjustment. Finally, we contend, our research inquiry is noteworthy for its empirical contribution and advanced theoretical understanding of academic profiling.

MATERIALS AND METHODS

Sample and Procedure

Eight hundred and forty-eight university students from five private universities in Taiwan ($N = 527$ women, 321 men) took part in the present study. The study reported in this manuscript was approved by our university's Research Ethics Committee, Approved Number: HE13-025. Educational research in university and school settings is somewhat difficult to undertake nowadays, consequently as a result of time constraint, logistic and resource limitations, institution's unwillingness to take part (for various reasons), etc. Many researchers would concur that it is a 'blessing' nowadays to have a school or a university agreed to take part in an experimental or a non-experimental project. Even still, with consented participation, a 35–40 min duration is manageable but anything longer would impose and pose difficulties. The data collected for this study, somewhat limited, were convenient in terms of sampling – that is, we know of Taiwanese scholars, who are also colleagues, who in turn knew other colleagues who could and were willing to assist with data collection. Ideally of course, with more than 150 colleges and universities available in Taiwan, we would have preferred to have a random sampling (Cohen et al., 2003; Babbie, 2014), which then could offer a more robust representation of the general population.

The dataset was collected during the last week of October, 2018, which took approximately 2 weeks to complete (i.e., last week in October with two of the five universities, and first week in November with the other three universities). The participants were briefed early in October, 2018 that a study was undertaken and that a 'survey' would be administered in late October. Coordination of the data collection process across the five universities, located in Taipei City and New Taipei City, was assisted by a Taiwanese colleague who also, at the time of this article, worked in one of the universities.

We chose to use the traditional face-to-face, hard-copy methodological approach rather than an online approach, given that the former would ensure a better response rate. Likert-scale measures, which took approximately 30–35 min to complete, were administered by volunteered lecturers in both lectures and tutorial classes. Participants were given 5 min at the end of the data collection process to ask questions, seek clarification, etc. A few postgraduate students, likewise, assisted in the data entry of the Likert-scale responses, using Excel databases. The Excel databases were eventually merged into one Excel database for statistical analyses, which we described next. A frequency analysis showed 12 different academic subjects that students enrolled in: Pure Mathematics (62 students), Mindfulness: A Focus on Breath (62 students), Chinese (Mandarin) Language

(188 students), Mindfulness: A Focus on Zen Philosophy (64 students), Mindfulness: Practice of Enlightenment (38 students), Industrial Engineering (121 students), English Literature (78 students), Financial Mathematics (74 students), Movie Critique (48 students), Chinese Philosophy (21 students), Reflection (15 students), and Essay Writing (60 students).

Finally, we verbally sought permission and informed any participant who did not wish to participate to let us know at the onset. This method of verbally seeking participatory consent without formal written approval from legal guardians and/or parents was logistically convenient and appropriate given the ages of the participants. We also followed our university's protocols and informed participants at the onset of administration of the Likert-scale questionnaires that participation was voluntary, and that their responses were confidential and only seen for the purpose of data analyses. Aside from voluntary participation and anonymity, no incentive was given to any participant for his/her engagement. With the affordability of time, we asked the participants to spend time to reflect and to consider their responses to the posed questions, and to ask questions for clarification if required.

Instruments

We adapted three Likert-scale questionnaires (Rating: 1 [Always False] to 5 [Always True]) for usage with Taiwanese university students. The original version of the questionnaires, in English (E), was translated to Chinese Mandarin (CM) using a three-step approach, which existing research has discussed elsewhere: (i) Step 1 involved the translation of the original questionnaires from English to Chinese Mandarin (i.e., $E \rightarrow CM$), (ii) Step 2 involved the translation of the translated questionnaires in Chinese Mandarin back to English (i.e., $CM \rightarrow E$), and (iii) Step 3 involved comparison of the original English version of the questionnaires (i.e., Step 1) with the translated version of the questionnaires (i.e., Step 2).

Motivational research has emphasized and stipulated the importance of *contextualization* and *specificity* of individuals' responses (Pajares, 1996; Bandura, 1997). This focus contends that questionnaires posed for answering are meaningful only when their contents are situated within specific contexts – for example, "I have confidence in my ability to do well..." is a general statement that has less predictive power than a more specific statement such as this – "I have confidence in my ability to do well at university in the subjects that I study." For this study, we focused on five major aspects:

- (i) *Current Best Practice*, L_1 , with eight items (Phan et al., 2016), for example: "I am content with what I have accomplished so far for my academic subjects at university" and "I can academically achieve what is being asked of me at university." The reliability estimate for this subscale is 0.73. A one-factor CFA analysis of the L_1 subscale (Bollen, 1989; Kline, 2011) showed a moderate goodness-of-fit model [e.g., CFI = 0.98, TLI = 0.95, RMSEA 0.087 (Lo90 = 0.059, Hi90 = 0.118), $p < 0.05$, SRMR = 0.025] with factor loadings from the items to the single latent factor ranging from 0.52 to 0.77 ($Mn = 0.66$, $SD = 0.09$).

- (ii) *Optimal Best Practice*, L_2 , with eight items (Phan et al., 2016), for example: “I can achieve much more for the different subjects than what I have indicated through my work so far” and “I want to learn and do more at university.” The reliability estimate for this subscale is 0.74. A one-factor CFA analysis of the L_2 subscale (Bollen, 1989; Kline, 2011) showed a sound goodness-of-fit model [e.g., CFI = 0.99, TLI = 0.97, RMSEA 0.067 (Lo90 = 0.035, Hi90 = 0.104), $p > 0.05$, SRMR = 0.016] with factor loadings from the items to the single latent factor ranging from 0.51 to 0.75 ($Mn = 0.62$, $SD = 0.09$).
- (iii) *Personal Interest in Learning Tasks*, PIL, with eight items (Van Damme et al., 2002), for example: “I really enjoy learning the different academic subjects at university” and “I believe many things we learn at university are not important at all” (–ve item). The reliability estimate for this subscale is 0.89. A one-factor CFA analysis of the PIL subscale (Bollen, 1989; Kline, 2011) showed a sound goodness-of-fit model [e.g., CFI = 0.99, TLI = 0.97, RMSEA 0.059 (Lo90 = 0.044, Hi90 = 0.076), $p > 0.05$, SRMR = 0.022] with factor loadings from the items to the single latent factor ranging from 0.59 to 0.77 ($Mn = 0.68$, $SD = 0.07$).
- (iv) *Motivation towards Learning*, MTL, with five items (Van Damme et al., 2002), for example: “I really work hard for all academic subjects at university to get good results” and “There are few academic subjects at university for which I really do my best” (–ve item). The reliability estimate for this subscale is 0.79. A one-factor CFA analysis of the MTL subscale (Bollen, 1989; Kline, 2011) showed a sound goodness-of-fit model [e.g., CFI = 0.99, TLI = 0.97, RMSEA 0.066 (Lo90 = 0.034, Hi90 = 0.103), $p > 0.05$, SRMR = 0.016] with factor loadings from the items to the single latent factor ranging from 0.55 to 0.83 ($Mn = 0.69$, $SD = 0.11$).
- (v) *Positive emotions*, PE, with five items, for example: “I am always happy at university” and “I often feel negative with life at university.” The reliability estimate for this subscale is 0.73. A one-factor CFA analysis of the PE subscale (Bollen, 1989; Kline, 2011) showed a moderate goodness-of-fit model [e.g., CFI = 0.98, TLI = 0.92, RMSEA 0.10 (Lo90 = 0.062, Hi90 = 0.144), $p < 0.05$, SRMR = 0.027] with factor loadings from the items to the single latent factor ranging from 0.50 to 0.93 ($Mn = 0.60$, $SD = 0.18$).

Psychometric properties (e.g., factorial validity and reliability estimates) for the five mentioned subscales have been explored in detail and reported elsewhere (e.g., see the following: Van Damme et al., 2002; Van De Gaer et al., 2007; Phan et al., 2019b,c). Our recent research undertakings using structural equation modeling (SEM) techniques (Schumacker and Lomax, 2004; Kline, 2011) yielded consistent reliability estimates for some of the mentioned subscales (e.g., L_1 and L_2), and that items loaded onto respective latent factors (e.g., Phan et al., 2019c; Phan and Ngu, 2020, 2021). For example, in a study that involved secondary school students, we found sound factorial structures for the two subscales of best practice (e.g., 0.81–0.95 for L_1 and 0.75–0.93 for L_2) (Phan

and Ngu, 2021). In an earlier study that focused on university students, we observed similar factorial structures, wherein items loaded onto the two respective latent factors (i.e., 0.54–0.76 for L_1 and 0.50–0.74 for L_2) (Phan et al., 2019c).

DATA ANALYSIS

We used SPSS 25 to assist us with our data analysis. There are different models of cluster, for example: connectivity models (e.g., hierarchical clustering), centroids models (e.g., k -means algorithm), and distribution models (e.g., expectation-maximization algorithm). Cluster analysis, commonly known as CIA and introduced in Tryon (1939), is a popular statistical technique that has often been used in educational and psychological research (e.g., Shavelson, 1979; Egan, 1984; Meece and Holt, 1993; Hwang et al., 2019). One notable aspect of CIA is it enables researchers to locate clusters within a set of responses that have a tendency to be homogeneous. From this understanding, it is likely that we would find high homogeneity within each group (i.e., intra-cluster), and high heterogeneity between two or so groups (i.e., inter-clusters).

The K -means algorithm enables educators and researchers to simplify large datasets into smaller and simple datasets (Likas et al., 2003; Jain, 2010; Li and Wu, 2012). The K -means algorithm is appropriate for the present study as it provides a statistical basis to help us ‘group’ distinct patterns of student responses into specific groups (e.g., four profiles of levels of best practice, MTL, PIL, and PE). The K -means algorithm, as Jain (2010) describes, is still popular despite its introduction more than 50 years ago (Ball and Hall, 1965; MacQueen, 1967; Bock, 2007). In particular, when compared to other algorithms, the K -means algorithm is effective for its “ease implementation, simplicity, efficiency, and empirical success” (Jain, 2010). For the purpose of simplicity and not to compound difficulties in terms of readability, we have not delved into the complexity of the K -means algorithm approach – we recommend readers to consider some theoretical overviews such as those from MacQueen (1967), Jain (2010), and Li and Wu (2012).

K-Means Cluster Analysis

Before proceeding onto with the formal cluster analysis, we performed an initial data screening analysis to identify for unusual kurtosis and skewness values, extreme outliers for deletion, and missing data responses. At the same time, we conducted a frequency test to ensure that all responses were within the expected range – for example: 1–5. There was no error in terms of incorrect data entry (e.g., the entry of ‘55’ instead of 5 for a response). We noted that this initial data screening test (e.g., stem-and-leaf plots and boxplots) indicated two extreme outliers, which we subsequently deleted. The Mahalanobis distance exceeded the critical χ^2 for $df = 3$, $p < 0.001$ of 20.25 for 11 cases for deletion. The final sample that we used for our subsequent analyses consisted of 831 students ($N = 519$ women, 312 men).

One limitation of the K -means algorithm is that a researcher has to specify the number of clusters at the onset of the analysis.

TABLE 2 | ANOVA results for two clusters.

	Cluster		Error		<i>F</i>	Sig.
	Mean square	df	Mean square	df		
L ₁	76.318	1	0.161	829	472.579	0.000
L ₂	73.077	1	0.144	829	508.795	0.000
Motivation towards learning	89.316	1	0.135	829	662.754	0.000
Interest in learning tasks	91.214	1	0.167	829	546.825	0.000
Positive emotions	30.831	1	0.149	829	206.730	0.000

TABLE 3 | ANOVA for eight-cluster.

	Cluster		Error		<i>F</i>	Sig.
	Mean square	df	Mean square	df		
L ₁	20.555	7	0.081	823	255.119	0.000
L ₂	13.920	7	0.115	823	120.960	0.000
Motivation towards learning	20.530	7	0.070	823	294.742	0.000
Interest in learning tasks	23.439	7	0.079	823	294.872	0.000
Positive emotions	9.493	7	0.107	823	88.767	0.000

Jain and Dubes (1988), in particular, have noted that the main steps of *K*-means algorithm entail the following: (i) select an initial partition with *K* clusters, (ii) generate a new partition by assignment each pattern to its closest cluster center, and (iii) compute new cluster centers. Steps 2 and 3 are repeated until cluster membership stabilizes (Jain, 2010). From SPSS, we started off with two clusters (i.e., we considered students, in general, to cluster into two opposite groupings: the ‘High L₁, High L₂, and high levels of MTL, PIL, and PE’ students *versus* the ‘Low L₁, Low L₂, and low levels of MTL, PIL, and PE’ students) by which we then progressed onto different clusters to include eight clusters (i.e., we considered students, in general, to cluster into eight groupings: the ‘High L₁, High L₂, and high levels of MTL, PIL, and PE’ students, the ‘Low L₁, Low L₂, and high levels of MTL, PIL, and PE’ students, the ‘High L₁, Low L₂, and high levels of MTL, PIL, and PE’ students, the ‘Low L₁, High L₂, and high levels of MTL, PIL, and PE’ students, the ‘High L₁, High L₂, and low levels of MTL, PIL, and PE’ students, the ‘Low L₁, Low L₂, and low levels of MTL, PIL, and PE’ students, the ‘High L₁, Low L₂, and low levels of MTL, PIL, and PE’ students, and the ‘Low L₁, High L₂, and low levels of MTL, PIL, and PE’ students).

The main question then, of course, is related to which cluster (e.g., two clusters *versus* eight clusters) is optimal for discussion purposes. On first inspection, for example, we noted that all seven cluster models were ‘appropriate’ for consideration – in this case, the ANOVA results showed statistically significance for the five constructs under examination. **Table 2** shows the ANOVA test result for the two-cluster analysis, whereas the result for the eight-cluster analysis is presented in **Table 3**. A two-cluster model, we contend, is relatively simple in terms of its profile – the two clusters, for example, differed in scores between 3.15 – 3.46 (Cluster 1: 471 cases) and 3.58 – 4.07 (Cluster 2: 360 cases).

An eight-cluster model, in contrast, is extremely complex despite our previous proposition. In this case, the eight clusters

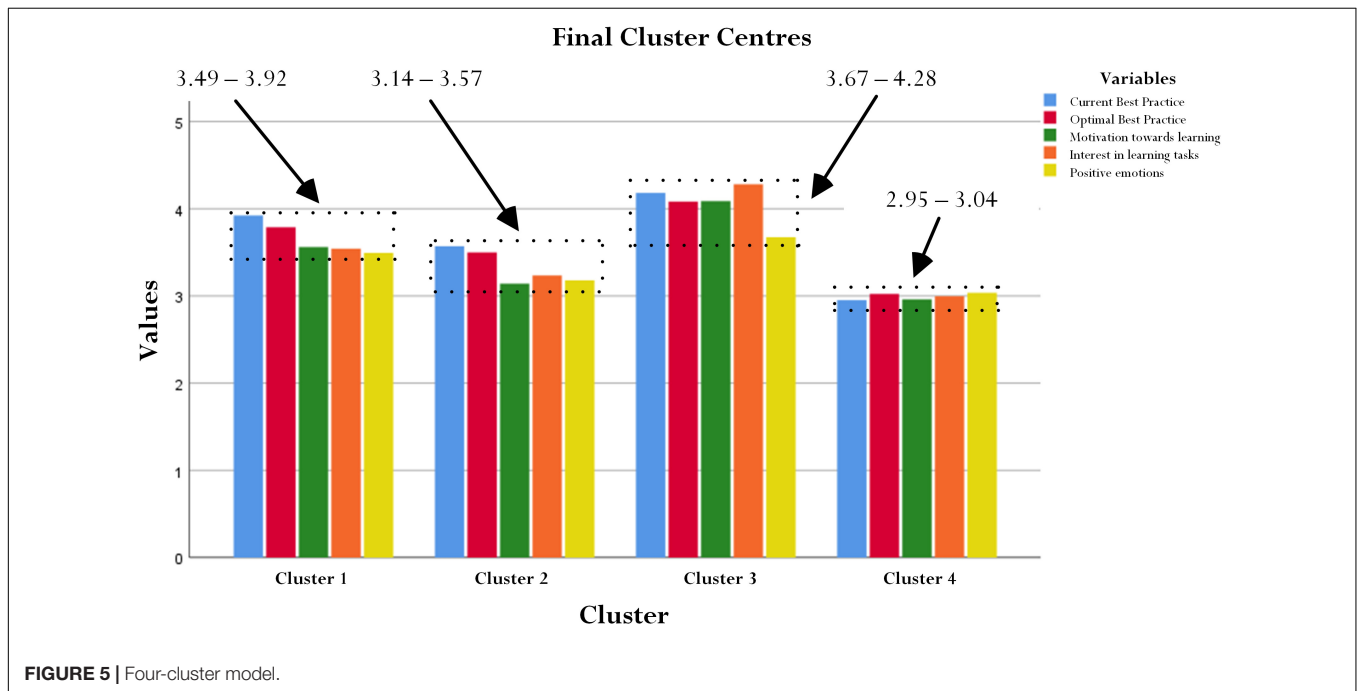
ranged in scores from 2.86 – 2.96 (Cluster 3: 84 cases) to 3.87 – 4.54 (Cluster 4: 57 cases). *Post hoc* tests using the Bonferroni correction, however, showed that some differences for the five variables between the eight clusters were not statistically significant – for example, the L₁ score in Cluster 2 and the L₁ score in Cluster 6 ($\Delta_{Mn} = 0.064$, $p > 0.05$). By randomization, we performed a five-cluster model and, likewise, the *post hoc* tests using the Bonferroni correction produced a few non-statistically significance (e.g., the PIL scores in Cluster 1 and in Cluster 5, $\Delta_{Mn} = 0.063$, $p > 0.05$).

A four-cluster model, drawing the limitation of the five-cluster model, was performed and the results for ANOVA are shown in **Table 4**. In this case, as shown in **Figure 5**, the four clusters are quite interesting in terms of their scores for the five variables. *Post hoc* tests using the Bonferroni correction, likewise, showed statistically significance ($p < 0.01$ and $p < 0.001$) for the five variables between the four clusters (**Table 5**). From **Figure 5**, let us provide a detailed summary of the results in an ascending order: (i) Cluster 4 (119 cases) with scores ranging from 2.95 to 3.04, (ii) Cluster 2 (262 cases) with scores ranging from 3.14 to 3.57, (iii) Cluster 1 (294 cases) with scores ranging from 3.49 to 3.92, and (iv) Cluster 3 (156 cases) with scores ranging from 3.67 to 4.28. The scores of the five variables in each cluster are presented in **Table 6**. To assist us in our formulation of four distinctive profiles, we computed the difference between two adjacent variables for each cluster – for example, from **Table 6**, consider Cluster 1 and its respective scores: L₁ = 3.92, L₂ = 3.79, MTL = 3.56, PIL = 3.54, and PE = 3.49. On this basis, differences included: L₁ – L₂ = 0.13, MTL – L₂ = 0.23, PIL – MTL = 0.02, and PE – PIL = 0.05. The results for this computation are shown visually in **Figure 6**.

The solution shown in **Table 6** and in **Figures 5, 6** is interesting for its potential distinction of four comparable clusters. How do

TABLE 4 | ANOVA results for four clusters.

	Cluster		Error		<i>F</i>	Sig.
	Mean square	df	Mean square	df		
<i>L</i> ₁	40.447	3	0.107	827	376.462	0.000
<i>L</i> ₂	29.206	3	0.126	827	231.071	0.000
Motivation towards learning	40.226	3	0.097	827	413.976	0.000
Interest in learning tasks	47.994	3	0.103	827	464.143	0.000
Positive emotions	13.906	3	0.136	827	102.000	0.000

**FIGURE 5 |** Four-cluster model.

we derive and formulate different clusters given that the results, in general, exhibit similar patterns? Inspecting the results, we note the following clusters:

Cluster 4 = 'A Balanced Profile'

Students for this profile express positive emotions and are quite optimal in their level of best practice. Overall, however, there is a balance in the five variables whereby they do not differ that much in their 'score differences.' This profile reflects a measured judgment in terms of a student's positioning regarding his/her academic studies – for example, the difference between PE (3.04), the highest score, and *L*₁ (2.95), the lowest score, is only 0.09. This profile is predominated by a student's emphasis on positive emotions. The values of *L*₁, *L*₂, MTL, PIL, and PE are somewhat 'smaller' than the values of variables for the other three clusters.

Cluster 3 = 'An Intrinsic Motivation Profile'

Students for this profile place emphasis foremost on personal interest and an inner desire to achieve their learning. The students' positioning, in this case, is governed by personal interest, which is then followed by their current best practice.

When compared to the other three clusters, this cluster as a collective whole is 'higher' in values. The difference between PI (4.28) and PE (3.67) is 0.61, which again is higher than the difference between the top value and the bottom value of the other three clusters. Interestingly, unlike the other three clusters, this cluster shows the closeness of four variables – PE, in this case, is somewhat 'separated' from PI, *L*₁, MTL, and *L*₂ (e.g., the difference between *L*₂ and PE is 0.41).

Cluster 2 = 'Current Best Practice + Interest Profile'

Students for this profile are realistic in their judgment and perception of best practice. Importantly, this profile emphasizes a student's realistic measure of his/her ability and, likewise, is governed by PI. What is interesting too, however, is that both *L*₁ and *L*₂ are consonant with each other in terms of values [i.e., difference in scores between *L*₁ (3.57) and *L*₂ (3.50) is 0.07]. PI, PE, and MTL, in contrast, are 'grouped' together given their distribution of scores, which are similar to each other – for example, the difference between PI (3.24) and MTL (3.14) is 0.10. The difference between *L*₂ and PI, 0.26, in this case is larger than 0.10.

TABLE 5 | Post-hoc tests.

Multiple comparisons							
Dependent variable			Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
						Lower bound	Upper bound
L ₁	1	2	0.352*	0.028	0.000	0.278	0.426
		3	−0.258*	0.032	0.000	−0.344	−0.172
		4	0.971*	0.036	0.000	0.877	1.066
	2	1	−0.352*	0.028	0.000	−0.426	−0.278
		3	−0.610*	0.033	0.000	−0.698	−0.522
		4	0.619*	0.036	0.000	0.524	0.715
	3	1	0.258*	0.032	0.000	0.172	0.344
		2	0.610*	0.033	0.000	0.522	0.698
		4	1.229*	0.040	0.000	1.124	1.335
	4	1	−0.971*	0.036	0.000	−1.066	−0.877
		2	−0.619*	0.036	0.000	−0.715	−0.524
		3	−1.229*	0.040	0.000	−1.335	−1.124
L ₂	1	2	0.289*	0.030	0.000	0.209	0.369
		3	−0.294*	0.035	0.000	−0.387	−0.201
		4	0.766*	0.039	0.000	0.664	0.868
	2	1	−0.289*	0.030	0.000	−0.369	−0.209
		3	−0.583*	0.036	0.000	−0.678	−0.488
		4	0.477*	0.039	0.000	0.374	0.581
	3	1	0.294*	0.035	0.000	0.201	0.387
		2	0.583*	0.036	0.000	0.488	0.678
		4	1.060*	0.043	0.000	0.946	1.175
	4	1	−0.766*	0.039	0.000	−0.868	−0.664
		2	−0.477*	0.039	0.000	−0.581	−0.374
		3	−1.060*	0.043	0.000	−1.175	−0.946
Motivation towards learning	1	2	0.420*	0.026	0.000	0.350	0.490
		3	−0.528*	0.031	0.000	−0.610	−0.446
		4	0.600*	0.034	0.000	0.510	0.690
	2	1	−0.420*	0.026	0.000	−0.490	−0.350
		3	−0.948*	0.032	0.000	−1.031	−0.864
		4	0.180*	0.034	0.000	0.089	0.271
	3	1	0.528*	0.031	0.000	0.446	0.610
		2	0.948*	0.032	0.000	0.864	1.031
		4	1.128*	0.038	0.000	1.028	1.228
	4	1	−0.600*	0.034	0.000	−0.690	−0.510
		2	−0.180*	0.034	0.000	−0.271	−0.089
		3	−1.128*	0.038	0.000	−1.228	−1.028
Interest in learning tasks	1	2	0.308*	0.027	0.000	0.235	0.380
		3	−0.738*	0.032	0.000	−0.822	−0.653
		4	0.545*	0.035	0.000	0.453	0.638
	2	1	−0.308*	0.027	0.000	−0.380	−0.235
		3	−1.045*	0.033	0.000	−1.131	−0.959
		4	0.238*	0.036	0.000	0.144	0.332
	3	1	0.738*	0.032	0.000	0.653	0.822
		2	1.045*	0.033	0.000	0.959	1.131
		4	1.283*	0.039	0.000	1.180	1.387
	4	1	−0.545*	0.035	0.000	−0.638	−0.453
		2	−0.238*	0.036	0.000	−0.332	−0.144
		3	−1.283*	0.039	0.000	−1.387	−1.180

(Continued)

TABLE 5 | Continued

			Multiple comparisons				
Dependent variable			Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
						Lower bound	Upper bound
Positive emotions	1	2	0.315*	0.031	0.000	0.232	0.398
		3	-0.180*	0.037	0.000	-0.277	-0.084
		4	0.458*	0.040	0.000	0.352	0.564
	2	1	-0.315*	0.031	0.000	-0.398	-0.232
		3	-0.495*	0.037	0.000	-0.594	-0.396
		4	0.143*	0.041	0.003	0.035	0.251
	3	1	0.180*	0.037	0.000	0.084	0.277
		2	0.495*	0.037	0.000	0.396	0.594
		4	0.638*	0.045	0.000	0.519	0.757
	4	1	-0.458*	0.040	0.000	-0.564	-0.352
		2	-0.143*	0.041	0.003	-0.251	-0.035
		3	-0.638*	0.045	0.000	-0.757	-0.519

*The mean difference is significant at the 0.05 level.

TABLE 6 | Summary of results.

Cluster			
Current Best + motivation (Cluster 1)	Current best + interest (Cluster 2)	Intrinsic motivation (Cluster 3)	Balanced (Cluster 4)
(1) L ₁ (score = 3.92)	(1) L ₁ (score = 3.57)	(1) Personal interest (score = 4.28)	(1) Positive emotion (score = 3.04)
(2) L ₂ (score = 3.79)	(2) L ₂ (score = 3.50)	(2) L ₁ (score = 4.18)	(2) L ₂ (score = 3.02)
(3) Motivation (score = 3.56)	(3) Personal interest (score = 3.24)	(3) Motivation (score = 4.09)	(3) Personal interest (score = 3.00)
(4) Personal interest (score = 3.54)	(4) Positive emotion (score = 3.18)	(4) L ₂ (score = 4.08)	(4) Motivation (score = 2.96)
(5) Positive emotion (score = 3.49)	(5) Motivation (score = 3.14)	(5) Positive emotion (score = 3.67)	(5) L ₁ (score = 2.95)

Cluster 1 = 'Current Best Practice + Motivation Profile'

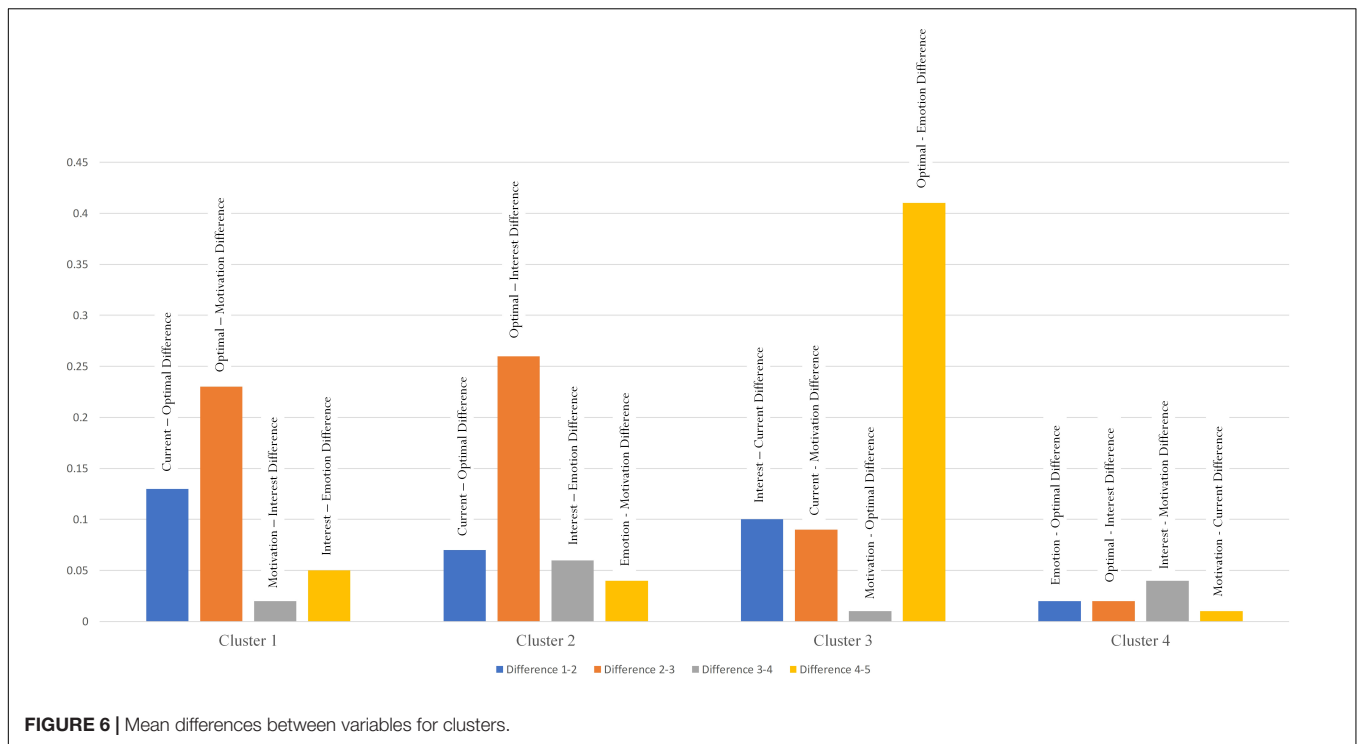
Students for this profile, like that of Cluster 2, are realistic in their judgment and perception of best practice. This profile emphasizes a student's realistic measure of his/her ability and, likewise, is governed by MTL. What is interesting too, however, is that both L₁ and L₂ are consonant with each other in terms of values [i.e., difference in scores between L₁ (3.92) and L₂ (3.79) is 0.13]. MTL, PI, and PE, in contrast, are 'grouped' together given their distribution of scores, which are similar to each other – for example, the difference between MTL (3.56) and PE (3.49) is 0.07. The difference between L₂ and MTL, 0.23, in this case is larger than 0.07.

DISCUSSION

The present study is the first, or one of the very few, that sought to explore the topic of 'profiling.' Academic profiling is advantageous and may, specifically, inform an educator of how and what a student is thinking at the onset of and/or during the course of his/her learning experience. As a point of reiteration, we proposed a theoretical concept, which we termed as a state of consonance and disconsonance of best practice.

A state of consonance considers a close proximity between the two levels of best practice, L₁ and L₂, and other comparable psychological variables. Moreover, a state of consonance would depict a closeness or grouping between comparable variables (e.g., L₂ and intrinsic motivation) whereas, in contrast, a state of disconsonance connotes misalignment or a separation between contrasting variables (e.g., L₂ and anxiety). As a point of summation, evidence of consonance and/or disconsonance of educational and psychological variables would, to some extent, explain, account, and depict a student's academic profile.

Our focus of inquiry into the proposition of a state of consonance of best practice, coinciding with an earlier study (Phan et al., 2018a) is insightful, providing potential information into the comparable and comparative profiles of students' motivational patterns, philosophical beliefs, expectations, etc. As we discuss in this section of the article, the results that we have obtained make both theoretical and empirical contributions, detailing the potency, relevance, and applicability of the consonance-disconsonance framework. A state of consonance of best practice is desirable as it reflects a closeness in association between current best practice, optimal best practice, and other positive-related constructs. A state of disconsonance of best practice, in contrast, is detrimental and may reflect a perceived sense of helplessness and pessimism, as well as a high level



of overconfidence. This consideration into the effectiveness of a state of consonance of best practice, aside from practicality, has potential research development for advancement, which we explore in the latter section of this article.

Theoretical Contribution: The Importance of Student Profiles

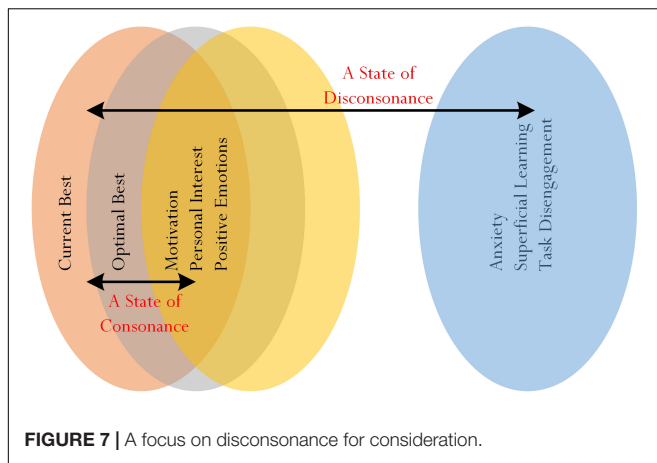
University learning is a relatively complex affair as it often entails, for many students, a balance between part-time work and full-time studies (or full-time work and part-time studies). Aside from this personal commitment, students may also have to concurrently enroll in different subject disciplines at any moment in time – for example, a student may have to enroll in an Educational Psychology unit, a Mathematics Education unit, an Asian Philosophy and Cultural Studies unit, etc. Time constraint, domain-specific interest (e.g., a student prefers to study and learn about Asian Philosophy and Cultural Studies unit and not, say, Mathematics Education), and the nature of subject content (Becher, 1987, 1989) may consequently result in different learning experiences and successes and failures. It is not always possible, from this mentioning, for a student to remain ‘optimal’ across all different subject areas.

To seek understanding into university students’ motivational states and learning experiences, a recent inquiry was made, which delved into a concept termed as profiling (Phan et al., 2018a). Our own emphasis in this matter relates to a proposition, similar to that of profiling, that we refer to as a state of consonance and a state of disconsonance of best practice. Using a non-experimental methodological approach, we obtained interesting evidence from university students’ responses that showcased four comparable profiles: a *Balanced Profile*, an *Intrinsic Motivation*

Profile, a *Current Best Practice + Interest Profile*, and a *Current Best Practice + Motivation Profile*. Each profile or cluster, from our analysis, consisted of a number of educational and psychological variables that shared similar characteristics. As shown in **Figures 5, 6** as well as **Table 6**, there is proximity between L_1 and L_2 for the four clusters – in this analysis, difference in scores between the two levels of best practice (i.e., $L_1 - L_2$) are 0.13 (Current Best Practice + Motivation Cluster), 0.07 (Current Best Practice + Interest Cluster), 0.10 (Intrinsic Motivation Cluster), and -0.07 (Balanced Cluster). The four differences ranging from 0.07 to 0.13 are relatively minute and, hence, this testament reflects the closeness of L_1 and L_2 .

Aside from the proximity between the two levels of best practice, we note that both L_1 and L_2 also closely associated with the other three variables. For example, from **Figure 5** and **Table 6**, it is interesting to note that the difference is 0.23 between L_2 and MTL (i.e., between the red bar and the green bar) for the Current Best Practice + Motivation Cluster, 0.26 between L_2 and PI (i.e., between the red bar and the orange bar) for the Current Best Practice + Interest Cluster, 0.09 between L_1 and MTL (i.e., between the blue bar and the green bar) for the Intrinsic Motivation Cluster, and 0.02 between L_2 and PI (i.e., between the red bar and the orange bar) for the Balanced Cluster. The minute values in differences for the four clusters support our emphasis of the consonance of best practice. Importantly, of course, aside from affirming our proposition of consonance of best practice, the four clusters reflect a collective emphasis – namely, a profile of intrinsic motivation and positive emotions for current and optimal best practice.

Although not included, and a possible inquiry for consideration, we speculate that contrasting educational



and/or psychological variables would not cluster together – and hence, testament of a state of disconsonance. A state of consonance, in contrast, would indicate favorable and positive profiles for promotion and development. Indeed, from the preceding section, we contend that there are four comparable profiles, which could encourage learning and promote enjoyment and interest (e.g., an Intrinsic Motivation Profile). Moreover, what is of significance from our research inquiry is that it is plausible to categorize students into different groupings or profiles. Each grouping or profile depicts a suite of characteristics and qualities that a student would attest to. This testament of comparable groupings or profiles, we contend, is similar to an earlier study (Phan et al., 2018a), which also showed four distinct profiles (e.g., the Exceptional Profile *versus* the Pessimistic Profile).

In summary, a specific profile may be evident from a person's testament of his/her experience of a state of consonance. Speculatively, in this sense, we theorize that a specific profile could associate with performance of different types of adaptive outcomes. For example, from the preceding sections, we contend that a student exhibiting the Intrinsic Motivation Profile would likely attest to his/her inclination towards mastery and engagement in deep, meaningful learning. This consideration, in this analysis, may reflect a state of consonance or a close proximity between the Intrinsic Motivation Profile and mastery and engagement in deep, meaningful learning (e.g., see Figure 7 for guidance). By the same token, however, we would expect to find a state of disconsonance between the Intrinsic Motivation Profile and a student's disinterest in a subject matter. Indeed, we theorize that profiling may help to categorize a person's behaviors, thought patterns, and motivational states into distinct clusters, which then could predict his/her future performance in a subject matter.

Practical Contributions for Consideration

Significantly, aside from theoretical and empirical contributions, the nature of profiling also has a number of potential educational and non-educational implications for consideration. It would be advantageous at the national level, for instance, to collect data and gather information into the academic profiles of students

as they enter primary school, secondary school, or university. This national dataset is valuable in terms of assisting institutions with their policy and curriculum development, course offerings, expectations, the allocation of financial resources, etc. For example, a cohort of first-year students who lack the Intrinsic Motivation Profile may require educators to consider pedagogical strategies, programs, on-campus activities, etc., which could help encourage and promote the adoption of the Intrinsic Motivation Profile. In a similar vein, perpetual datasets available may allow institutions, stakeholders, educators, etc. to explore and identify specific longitudinal trajectories of differing profiles (e.g., 65% of first-year students exhibited the Balanced Profile over the past 3 years).

At the institution level, a focus on profiling is effective for its potential impact on the creation and promotion of a positive on-campus climate and culture for learning. The study of positive psychology (Seligman et al., 2009; Seligman, 2010; Kern et al., 2019), recently emerged as an important focus for research development, is valuable, helping to facilitate the proactivity of human agency. For example, one application of the tenets of positive psychology is closely aligned with the promotion of positive emotions, such as a person's state of happiness (e.g., Chan, 2013; Hasnain et al., 2014; Donaldson et al., 2015; Tabbodi et al., 2015). Feeling good about oneself, academically and/or non-academically, likewise, also reflects the significance of positive psychology. A positive learning climate and/or a proactive on-campus culture (e.g., availability of opportunities for daily, weekly, and/or monthly extracurricular activities), in this sense, would instill and foster positivity. The question then, from this consideration, is whether and to what extent positive academic profiles would help cultivate and sustain a proactive on-campus and culture for learning. Evidence of an institution's attempt to promote and cultivate positive academic profiles, via means of policies, course offerings, etc. would, in this case, instill perception of care, understanding, and compassion.

At the individual level, we contend that the study of profiling is noteworthy for its diagnostic possibility – that is, knowing about a student's specific profile may assist educators to develop personal measures, tools, etc. that could counter or encourage the continuation of such profile. An undesirable profile, which consists of negative characteristics (e.g., a student's tendency towards pessimistic thoughts), for example, would require some form of remedy and prevention. What can a student do to negate such tendency and/or adoption of an undesirable profile? Research in the early 1980s, interestingly, focused on the use verbal discourse (e.g., encouraging feedback) to encourage and motivate positivity (e.g., Schunk, 1982, 1983, 1984). More recently, however, researchers have focused on usage of pedagogical strategies that could facilitate effective learning and deep, meaningful understanding of subject matters (Ngu and Yeung, 2012, 2013; Walkington, 2013; Ngu et al., 2014, 2015). At the same time, however, we strongly believe that desirable profiles for learning (e.g., the Intrinsic Motivation Profile) could operate as sources of positive psychology (Seligman et al., 2009; Seligman, 2010; Kern et al., 2019) and motivation for learning. In this analysis, desirable academic profile (e.g., the Intrinsic Motivation Profile or the Exceptional Profile: Phan et al., 2018a) are perceived

as being positive and motivational, unlike undesirable profiles, which are negative and detrimental.

Research Caveats for Future Research Development

Aside from theoretical and practical contributions, our research investigation has also identified a number of caveats that may assist in the continuation of this line of inquiry into the study of optimal best. Foremost, from the preceding sections, our focus of inquiry into profiling and the importance of a state of consonance of best practice was 'positive,' and consisted of the deliberate choosing of psychological variables that are positive, in nature. As such, it was somewhat difficult for us to establish disparate and/or contrasting patterns of both L_1 and L_2 with other variables (e.g., a state of disconsonance between L_1 and, say, anxiety). An earlier study, in contrast, was able to identify different patterns of both L_1 and L_2 (e.g., low L_1 and high L_2) (Phan et al., 2018a). In this sense, an inspection of our conceptualization and subsequent results suggests one notable caveat, which namely consisted of our exclusion of maladaptive outcomes and/or negative life experiences.

For clarity and holistically, it would be of interest in future research to explore a state of disconsonance and how this state could potentially explain and/or account for different types of negative life experiences. A state of disconsonance of best practice (e.g., **Figure 3**) would, in this case, involve examination of educational and/or psychological variables that are non-compatible or dissimilar in terms of their characteristics and qualities. From existing research, we know that personal self-efficacy for academic learning (Bandura, 1986, 1997) is inversely associated with a state of apprehension or anxiety (Pajares and Kranzler, 1995; Jain and Dowson, 2009; Villavicencio and Bernardo, 2016). Anxiety, superficial learning, and/or task disengagement, likewise, are variables that share similar negative characteristics with each other, and may closely associate with different types of detrimental outcomes (e.g., underachievement in a subject matter). A state of disconsonance, in this case, would indicate a distance proximity and/or a misalignment between a high level of L_1 and a high level of L_2 and anxiety, superficial learning, and/or task disengagement.

Our recommendation for research development, as shown in **Figure 7**, depicts a state of disconsonance between different types of 'non-related' or 'misaligned' variables within a system of change (e.g., L_2 and superficial learning). Importantly, from this proposition, we speculate two distinct groupings: one positive grouping (e.g., Group 1), consisting of L_1 , L_2 , MTL, PIL, and PE, and one negative grouping (e.g., Group 2), consisting of, say, anxiety, superficial learning, and task disengagement (Note: other variables may include pessimism, a perceived sense of helplessness, and confusion). For investigation, we posit that *low levels* of L_1 , L_2 , MTL, PIL, and PE (i.e., Group 1) would closely associate with *high levels* of anxiety, task disengagement, and other maladaptive processes and/or outcomes (i.e., Group 2) (i.e., a state of consonance). In contrast, however, we consider a state of disconsonance as being the relationship (or the farness in proximity) between *high levels* of L_1 , L_2 , MTL, PIL, and

PE and *high levels* of anxiety, task disengagement, and other maladaptive processes and/or outcomes. On this basis, it would be of interest, theoretically, for researchers to explore and validate different states of disconsonance for different educational and psychological variables (e.g., a high level of L_2 and a high level of anxiety *versus* a high level of L_2 and a low level of anxiety). Testament of a state of disconsonance may, in this case, assist educators to localize psychosocial factors and/or psychological variables, which could negate students' confidence, beliefs, and perceptions of their abilities.

Another focus of inquiry that we recommend relates to a student's academic profile that may situate within the context of his/her sociocultural backgrounds. There is acknowledgment that historical upbringing and sociocultural factors, encompassing collective values, customary practices, philosophical beliefs, and expectations may influence students' motivational states and learning experiences. Taiwanese, in general, strongly align themselves with collective thinking (Triandis et al., 1988; Markus and Kitayama, 1991) and the notion of *filial piety* (Chow and Chu, 2007; Hui et al., 2011; Chen, 2016), which emphasizes dutiful behaviors, obligation to parents and elders, respect, and the importance in family values. Taiwanese students work hard academically so that their achievements and successes are celebrated and shared by immediate and distant family members. Continuing mediocre performances and/or failures, in contrast, would bring shame and dishonor to the family, resulting in the perception that one has not been dutiful. Given this understanding, we query whether established patterns of consonance of best practice (e.g., **Figure 5**) in our study could have been different (or similar) for students of other sociocultural backgrounds? This question places emphasis on theoretical understanding and self-awareness of different cultures.

Finally, referring back to our earlier discussion, the sample used for this study was convenient in nature and consequently, on this basis, evidence obtained from our analyses is somewhat limited in terms of generalization. Indeed, rather limited in nature, our study involved the use of a convenient sample, which was biased and limited the subsequent analyses and findings for discussion. Ideally, in this sense, we would have preferred to use a larger dataset that could, likewise, depict multiple 'systems' within the context of education – for example: public and private universities that are located in metropolitan and regional cities. In Taiwan, there two types of university: public *versus* private. Public universities are seen and perceived as being more prestigious, making it extremely competitive in terms of entry into both undergraduate and postgraduate degree programs. In general, families prefer their children to go to public universities as this attendance would bring prestige, pride, and perceived success. As such, students who attend public universities are perceived as being top-tier, more 'intelligent,' academically-minded, and motivated. Second-tier students who are not able to gain entry into public universities instead attend private universities, which are less esteemed and require personal financial funding from families (i.e., families have to fund their children). Logistic limitations, time constraint, and institutions' unwillingness to take part made it somewhat difficult for us to collect a larger randomized sample.

Ideally, of course, it would have been a favorable endeavor for us to use randomized sampling and, on this basis, to be able to generalize our results to the wider population in terms of differing manifestations of learning and motivational profiles. We urge researchers to perhaps engage in multiple-institutional collaborations, which could help address the limitation of our sampling and/or to improve the sample sizes. By all account, it is plausible that the sample used in the present study is unique, cross-culturally, giving rise to the established results. It is also a possibility, of course, that the sample used in our study is comparable with samples found elsewhere, indicating that what we have found is common.

CONCLUSION

The present research investigation, overall, enabled us to advance the study of best practice, which in this case inquired into the concept of profiling. Academic profiling may indicate a student's learning pattern and, possibly, his/her state of motivation. Our results, non-experimentally, provided support for an important concept, which we termed as the consonance-disconsonance of best practice. Consonance of best practice posits that different levels of best practice (e.g., low level of best practice *versus* optimal level of best practice), as well as other positive psychological constructs (e.g., motivation towards learning) would 'group' together. Disconsonance of best practice, in contrast, would indicate non-overlapping of contrasting levels of best practice (i.e., low level of best practice *versus* optimal level of best practice). From this testament, we were able to identify four comparable profiles that emphasize the importance of consonance and disconsonance of best

practice: Balanced Profile, an Intrinsic Motivation Profile, a Current Best Practice + Interest Profile, and a Current Best Practice + Motivation Profile. This seminal evidence is insightful and may, we hope, provide empirical grounding for further development into the topic of profiling.

DATA AVAILABILITY STATEMENT

The data analyzed in this study is subject to the following licenses/restrictions: the universities involved do not allow the sharing of this dataset. Requests to access these datasets should be directed to HP, hpha7292@yahoo.com.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of New England Research Ethics Committee. We verbally sought permission and informed any participant who did not wish to participate to let us know at the onset. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

HP was responsible for data collection, articulation of conceptualization, and write-up of the manuscript. BN was responsible for articulation of conceptualization, data analyses, and write-up of the manuscript. Both authors contributed to the article and approved the submitted version.

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Psychological Capital Mediates the Relationship Between Problematic Smartphone Use and Learning Burnout in Chinese Medical Undergraduates and Postgraduates: A Cross-Sectional Study

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Learning burnout is a pressing issue among Chinese medical undergraduates and Postgraduates and has drawn continuous attention worldwide. Studies have found that problematic smartphone use could affect learning burnout, but more research is needed in this direction. Furthermore, few studies focused on the mediating effect of psychological capital on the relationship between problematic smartphone use and learning burnout. The present study was a cross-sectional survey that recruited 1,800 participants from a medical university in Chongqing, China. A questionnaire based on the Mobile Phone Addiction Tendency Scale, Psychological Capital Questionnaire, Learning Burnout Scale, and demographic variables were administered to these students, and 1,475 provided valid responses (81.94%). 771 were undergraduates (52.3%) and 704 were postgraduates (47.7%). Hierarchical regression and the bootstrap method were used to examine the mediating effect of psychological capital. After controlling for demographic variables, problematic smartphone use positively predicted learning burnout in undergraduates ($\beta = 0.328$, $p < 0.01$) and in postgraduates ($\beta = 0.342$, $p < 0.01$). The partial mediating effect of psychological capital was 0.068 in undergraduates and 0.074 in postgraduates, accounting for 20.67 and 21.64%, respectively, of the total effect of problematic smartphone use on learning burnout. All the 95% confidence intervals (CI) did not contain 0. Problematic smartphone use can directly predict learning burnout and their relationship was mediated by psychological capital in Chinese medical undergraduates and postgraduates. Strategies to alleviating problematic smartphone use and enhance psychological capital in medical undergraduates and postgraduates may provide useful suggestions for future interventions on dealing with learning burnout in Chinese medical undergraduates and postgraduates.

Keywords: learning burnout, mobile phone addiction, psychological capital, mediating effect, medical students

INTRODUCTION

The outbreak of COVID-19 at the end of 2019 demonstrated that medical workers are indispensable. China, the most populous country in the world, experienced a lack of doctors leading to a gap between health service demand and healthcare supply (Zhang et al., 2020). The doctor-patient ratio was 2.77 doctors for 1,000 patients in 2020 in China (National Bureau of Statistics of China, 2020), immensely lower than that in some developed countries (Wan et al., 2018). Over the past 10 years, the attrition rate of medical graduates and physicians in China has been high (Lien et al., 2016). Therefore, Chinese medical students have drawn continuous attention worldwide. Learning burnout is an urgent problem among Chinese medical students, with an incidence of about 50% (Jinghua et al., 2014) and a high-risk rate of up to 10% (Liu et al., 2018).

Doctors are required to be highly specialized, therefore medical students need to spend more time and energy acquiring the necessary professional knowledge and skills (Margaret et al., 2010); they are under more academic pressure than students in other majors (Bond et al., 2013; Zeng et al., 2019). Learning burnout is a phenomenon that refers to energy depletion and negative attitudes toward learning (Zhang et al., 2007). The enthusiasm for learning gradually fades away, and attitudes toward classmates become increasingly cold and alienated due to prolonged academic pressure (Wang et al., 2020). Learning burnout, also called student burnout or academic burnout syndrome, involves emotional exhaustion, depersonalization, and a low sense of achievement (Lin and Huang, 2012). Studies have found that learning burnout strongly affects the academic performance (Fiorilli et al., 2017), concentration (Xie et al., 2019), and physical and mental health of medical students; for example, learning burnout is associated with sleep disorders, anxiety, depression (Njim et al., 2019), loneliness, and interpersonal problems; and can even lead to suicide and withdrawal from school (Stockman, 2010). Therefore, for future interventions, it is important to investigate the variables related to learning burnout.

Problematic smartphone use, with an incidence of more than 35%, is another pressing matter among Chinese medical students (Jing et al., 2016). It's a phenomenon that physical and mental health, and social functions are remarkably impaired because of obsession with mobile phones (Yen et al., 2009). Problematic smartphone use, also have been called mobile phone addiction, is an addiction behavior (Zou et al., 2017), indicating poor self-control skills, studies found that these behaviors were associated with learning burnout (Love et al., 2020). Indeed, it confirmed that problematic smartphone use risk was positively related to perceived stress and negatively related to academic performance (Samaha and Hawi, 2016), which may lead learning burnout of students. Few studies have attempted to explore the relationship between problematic smartphone use and learning burnout among Chinese college students, and it found that problematic smartphone use can positively predict learning burnout of college students (Sijia and Cancan, 2018), but more research is needed to explore the

mechanism between this relationship, especially among Chinese medical students.

Psychological capital represents the development of positive psychology of people, resulting positive organizational behaviors and demonstrates performance (Costa and Neves, 2017); and it includes four dimensions: self-efficacy, hope, optimism, and resilience (Luthans et al., 2007a). Psychological capital is related to the achievements and well-being of individuals (Margaça et al., 2020), and it can be exploited like social resources (Luthans et al., 2006). Several studies have indicated that internet addiction is negatively correlated with psychological capital (Simsek and Sali, 2014). Problematic smartphone use also belongs to addiction behaviors (Zou et al., 2017), which also go against positive organizational behaviors and demonstrates performance. Study confirmed problematic smartphone use was positively associated with psychological factors, such as depression, anxiety, and loneliness (Darcin et al., 2015), and also associated with poor mental health (Contractor et al., 2017); psychological capital has a theoretical intervention model (Luthans et al., 2005), but mental health does not have, and mental health involves many factors, which is not conducive to follow-up targeted intervention aimed at learning burnout, so we assumed psychological capital rather than mental health as a mediating variable based on the exploitation of psychological capital. Mental health is positively correlated with psychological capital. Therefore, students with problematic smartphone use are more likely to develop poor psychological capital. However, according to existing literatures, psychological capital may have an effect on learning burnout. Previous studies confirmed that psychological capital could affect performance (Luthans et al., 2005) and well-beings (Avey et al., 2010) and reduces burnout (Ding et al., 2015) among employees, such as nurses and bank clerks (Li et al., 2015). As positive psychological resources, psychological capital is highly likely to reduce burnout among Chinese medical students; also, poor psychological capital is highly likely to lead to bad academic performance, resulting learning burnout (Fiorilli et al., 2017).

According to the above mentioned, and also according to the conditions for the establishment of the mediation model, namely, the independent variable must significantly affect both the dependent variable and mediating variables, and the mediating variable must have a significant effect on the dependent variable (Wen et al., 2004), we proposed the following hypotheses, namely, problematic smartphone use can directly predict learning burnout, and their relationship was mediated by psychological capital. The theoretical mediation model we hypothesized was shown in **Figure 1**.

This study aimed to analyze the relationship between problematic smartphone use and learning burnout, as well as the mediating effect of psychological capital in this relationship of Chinese medical students. Everyone has psychological resources at various levels, therefore, if the mediating effect of psychological capital once be confirmed, interventions might be conducted in the future to deal with learning burnout based on the exploitation of psychological capital. We hope that this study will contribute to providing clues for future interventions on dealing with learning burnout among Chinese medical student.

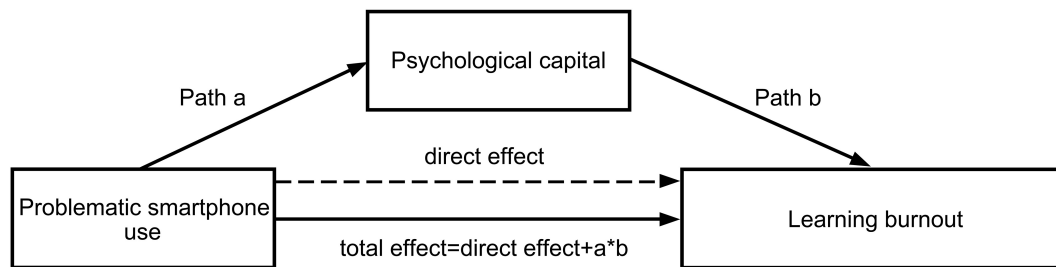


FIGURE 1 | The hypothetical theoretical model; note: $a*b$, indirect effect as well as the mediating effect of psychological capital in this relationship.

MATERIALS AND METHODS

Participants

The study participants were undergraduate and postgraduate medical students, 771 were undergraduates (52.3%) and 704 were postgraduates (47.7%). The demographics of undergraduates are as follows: the average age was 19.87 ± 1.187 ; males (36.4%) and females (63.6%); students from countryside (35.5%) and 497 city (64.5%); only child (43.1%) and non-only child (56.9%). The demographics of postgraduates are as follows: the average age was 24.68 ± 2.45 ; males (27.7%) and females (72.3%); students from countryside (45.3%) and 497 city (54.7%); only child (47.9%) and non-only child (52.1%). The protocol and data collection procedure of the study were approved by the Chongqing Medical University (Reference number 2018015).

Instruments

Mobile Phone Addiction Tendency Scale

The Mobile Phone Addiction Tendency Scale, developed by Jie (Jie et al., 2012) was used to measure mobile phone addiction or problematic smartphone use among Chinese college students. It has 16 items with four dimensions: withdrawal symptoms (six items; e.g., “Mobile phones are a part of my life. I feel like I’ve lost something once I will have to limit the time I spend on my mobile phone”), salience (four items; e.g., “I often have the illusion that ‘my cell phone rings or vibrates’”), social comfort [three items; e.g., “I feel more confident to communicate with others using my mobile phone (than to talk face to face)”, and mood changes (three items; e.g., “When the phone is not connected to the line or receives no signals, I will become anxious and get angry”). All 16 items are rated on a five-point scale ranging from 1 (very inconsistent) to 5 (very consistent). Items were summed to create a composite score for each participant. A higher score indicates a greater tendency for mobile phone addiction. The total scores ranges from 16 to 80. In this study, Cronbach’s alpha was 0.900.

Psychological Capital Questionnaire

The Psychological Capital Questionnaire was created by Luthans et al. (2007b), translated and revised by Wen and Qi for Chinese individuals (Wen and Qi, 2009). The questionnaire consists of four dimensions, with six items each (24 items total): hope (e.g., “If I should find myself in a jam, I could think of many ways to get out of it”), resilience (e.g., “I usually manage difficulties one way

or another during training”), optimism (e.g., “I always look on the bright side of things”), and self-efficacy (e.g., “I feel confident analyzing a long-term problem to find a solution”). Each item is rated on a six-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Items were summed to create a composite score for each participant, with higher scores indicating a higher level of psychological capital. The total score ranges from 24 to 144. A score of 100 or more indicates a good level of psychological capital. In this study, Cronbach’s alpha was 0.943.

Learning Burnout Questionnaire

The Learning Burnout Questionnaire was developed by Lian et al. (2005) and it was widely used to measure the learning burnout of Chinese college students. The questionnaire consists of 20 items including three dimensions: depression (eight items; e.g., “I feel exhausted after studying all day. I’m tired of studying”), improper behavior (six items; e.g., “I seldom study after class”), and low personal accomplishment (six items; e.g., “It is easy for me to master professional knowledge”). All 20 items are rated on a 5-point scale ranging from 1 (very inconsistent) to 5 (very consistent). The total score ranges from 20 to 100, and the mid-range is 60. Items were summed to create a composite score for each participant. A higher score indicates a greater perceived tendency to learning burnout. In this study, Cronbach’s alpha for the scale was 0.876.

Procedure

A cross-sectional survey was conducted in the only one medical university in Chongqing, one of the biggest cities in China. Convenience sampling was used to generate the sample. After the researchers obtained informed consent from all participants, the latter completed a traditional paper-and-pencil questionnaire in a classroom with the guidance of well-trained researchers; averagely, it took about 30 min for participants to complete the anonymous questionnaire.

Data Analyses

In this study, we analyzed undergraduate and postgraduate students separately because of their different psychosocial development stages. Descriptive analysis was used to describe the demographic characteristics of the participants. Enumeration data were described as percentages. Normally distributed continuous data were described as mean \pm standard deviation. A *t*-test or one-way analysis of variance was used to analyze

the differences in learning burnout (depression, improper behavior, and low personal accomplishment) among groups. The Pearson correlation coefficient was used to evaluate the corrections among the research variables. Hierarchical regression was used to explore the mediating effect of psychological capital on the relationship between problematic smartphone use and learning burnout (Zimet et al., 1990; Yang et al., 2020). The variance inflation factor (VIF) values were less than 10, and there was no multicollinearity in this study. In the hierarchical regression analysis, learning burnout and its three dimensions were taken as dependent variables, respectively; in step 1, variables in univariate analysis ($p < 0.05$) were entered, in other words, these variables where learning burnout and its three dimensions were differences in t -test or one-way analysis were entered in step 1 to control their influences on the dependent variable, because our ultimate goal was to analyze the mediating effect of psychological capital; In step 2, the independent variable, problematic smartphone use, was entered, this step was to analyze its impact, and also to control its impact on the dependent variable for the next step. In step 3, psychological capital was entered as a mediating variable, this step was to analyze the effect of psychological capital on the dependent variable. We also set psychological capital as the dependent variable to analyze the effect of problematic smartphone use on it; then, we calculated the mediating effect value. Bootstrap method was used to examine the significance of the mediating effect of psychological capital. We bootstrapped 5,000 samples from the data, and calculated the 95% bootstrap confidence intervals (CI). If the CI did not contain 0, the mediating effect was considered significant (Wang et al., 2020). SPSS20.0 statistical software was used for statistical analysis, and the level of statistical significance was two-tailed $p < 0.05$.

RESULTS

Demographic Data and the Analysis of Differences in Learning Burnout Among Variables

In undergraduates, the mean total score of the learning burnout was 56.42 ± 10.62 , lower than the middle level; but 36.4% undergraduates had a score higher than the mid-value (60), indicating that they had a high level of learning burnout; there were significant differences in undergraduates' total scores for learning burnout by gender ($t = 2.446$; $p < 0.05$), exercise per week ($F = 11.466$; $p < 0.01$) and attitude to majors ($F = 68.111$, $p < 0.01$). In postgraduates, the mean total score of the learning burnout was 53.92 ± 10.25 ; 27.6% undergraduates had a score higher than the mid-value (60), indicating that they had a high level of learning burnout; there were significant differences in undergraduates' total scores for learning burnout by gender ($t = -1.980$; $p < 0.05$), exercise per week ($F = 19.240$; $p < 0.01$) and attitude to majors ($F = 78.914$; $p < 0.01$). There also had a significant difference in the mean total score of learning burnout between undergraduates and

postgraduates ($t = -4.591$; $p < 0.01$). Detailed results are shown in Table 1.

Correlation Among Psychological Capital, Problematic Smartphone Use, and Learning Burnout

The results showed that there were a moderate positive correlation between problematic smartphone use and learning burnout ($r = 0.356$; $p < 0.01$), a moderate negative correlation between problematic smartphone use and psychological capital ($r = -0.205$; $p < 0.01$), a moderate negative correlation between psychological capital and learning burnout ($r = -0.532$; $p < 0.01$) in undergraduates. In postgraduates, a moderate positive correlation between problematic smartphone use and learning burnout ($r = 0.405$; $p < 0.01$), a moderate negative correlation between problematic smartphone use and psychological capital ($r = -0.219$; $p < 0.01$), a moderate negative correlation between psychological capital and learning burnout ($r = -0.594$; $p < 0.01$) also existed. Detailed results are shown in Table 2.

Problematic Smartphone Use and Psychological Capital Are Independent Factors of Learning Burnout

The results of hierarchical regression analysis showed that after controlling for significant variables in the univariate analysis in step 1, for undergraduates, problematic smartphone use positively explained 9.3% of the variance of in learning burnout, for postgraduates, it was 11.5%; then, problematic smartphone use was controlled in step 2, for undergraduates, psychological capital negatively explained 13.7 of the variance in learning burnout, for postgraduates, it was 17.1. Besides, Problematic smartphone use was negatively predicted psychological capital by explaining 2.6% of its variance in undergraduates, and 2.0% in postgraduates. Detailed results are shown in Table 3. The analysis results of the three dimensions of learning burnout are consistent with that of learning burnout, detailed results are shown in Table 4.

Mediating Effect of Psychological Capital

As shown in Tables 3, 4, in undergraduates, the effect (β) of problematic smartphone use on learning burnout (depression, improper behavior, and low personal accomplishment) in step 3 (0.261, 0.151, 0.076, and 0.034) were smaller than that in step 2 (0.328, 0.173, 0.097, and 0.058); in postgraduates, the effect (β) of problematic smartphone use on learning burnout (depression, improper behavior, low personal accomplishment) in step 3 (0.268, 0.155, 0.087, and 0.087) were also smaller than that in step 2 (0.342, 0.182, 0.110, and 0.110); indicating psychological capital mediated this relationship in both undergraduates and postgraduates.

The bootstrap method was used to examine the significance of the mediating effect of psychological capital. As shown in Table 5, all the 95%bootCI did not contain 0. Therefore, the mediating effects of psychological capital between problematic smartphone use and learning burnout (depression, improper behavior, and low personal accomplishment) in both undergraduates

TABLE 1 | Demographic characteristics and comparisons on learning burnout and its three dimensions among undergraduates and postgraduates.

Education background	Variables	<i>n</i> (%)	Learning burnout (Mean ± SD)	Depression (Mean ± SD)	Improper behavior (Mean ± SD)	Low personal accomplishment (Mean ± SD)
Undergraduates		771 (100)	56.42 ± 10.62 ^a	22.19 ± 5.18	17.61 ± 4.03	16.61 ± 3.63
	Gender					
	Male	281 (36.4)	57.65 ± 10.96	22.83 ± 5.34	18.35 ± 4.31	16.47 ± 3.88
	Female	490 (63.6)	55.71 ± 10.36	21.83 ± 5.06	17.19 ± 3.80	16.69 ± 3.49
	<i>t</i>		2.446	2.598	3.754	−0.837
	<i>P</i>		0.015*	0.010*	0.000**	0.403
	Residence					
	Countryside	274 (35.5)	57.08 ± 10.80	22.28 ± 5.14	17.78 ± 4.27	17.03 ± 3.69
	City	497 (64.5)	56.05 ± 10.51	22.15 ± 5.22	17.52 ± 3.89	16.38 ± 3.59
	<i>t</i>		1.289	0.329	0.851	2.359
	<i>P</i>		0.198	0.741	0.395	0.019*
	Only child					
	Yes	332 (43.1)	55.94 ± 10.53	22.20 ± 5.29	17.37 ± 4.03	16.37 ± 3.69
	No	439 (56.9)	56.79 ± 10.68	22.19 ± 5.11	17.80 ± 4.02	16.79 ± 3.59
	<i>t</i>		−1.100	0.006	−1.465	−1.599
	<i>P</i>		0.272	0.995	0.143	0.110
	Exercise per week					
	0	227 (29.4)	59.13 ± 10.63	23.24 ± 5.19	18.72 ± 3.97	17.17 ± 3.84
	1~3	461 (59.8)	55.51 ± 10.33	21.85 ± 5.02	17.21 ± 3.95	16.44 ± 3.46
	≥3	83 (10.8)	54.05 ± 10.88	21.23 ± 5.69	16.81 ± 4.08	16.01 ± 3.84
	<i>F</i>		11.466	7.194	12.908	4.306
	<i>P</i>		0.000**	0.001**	0.000**	0.014*
	Attitude to majors					
	Dislike	51 (6.6)	64.43 ± 10.51	25.73 ± 5.37	19.57 ± 4.19	19.14 ± 4.05
	Medium	438 (56.8)	58.78 ± 9.54	23.19 ± 4.64	18.21 ± 3.75	17.37 ± 3.27
	Like	282 (36.6)	51.31 ± 10.06	20.00 ± 5.13	16.34 ± 4.07	14.97 ± 3.44
	<i>F</i>		68.111	51.026	26.630	58.362
	<i>P</i>		0.000**	0.000**	0.000**	0.000**
Postgraduates		704 (100)	53.92 ± 10.25 ^a	21.74 ± 5.16	16.64 ± 3.69	15.54 ± 3.15
	Gender					
	Male	195 (27.7)	52.69 ± 10.92	21.22 ± 5.32	16.56 ± 4.01	14.90 ± 3.23
	Female	509 (72.3)	54.39 ± 9.95	21.94 ± 5.09	16.67 ± 3.56	15.78 ± 3.09
	<i>t</i>		−1.980	−1.664	−0.347	−3.319
	<i>P</i>		0.048*	0.097	0.729	0.001**
	Residence					
	Countryside	319 (45.3)	53.71 ± 9.91	21.47 ± 5.04	16.71 ± 3.45	15.53 ± 3.08
	City	385 (54.7)	54.10 ± 10.53	21.97 ± 5.26	16.59 ± 3.87	15.54 ± 3.22
	<i>t</i>		−0.499	−1.261	0.414	−0.044
	<i>P</i>		0.618	0.208	0.679	0.965
	Only child					
	Yes	337 (47.9)	54.54 ± 10.99	22.05 ± 5.38	16.84 ± 3.90	15.65 ± 3.45
	No	367 (52.1)	53.35 ± 9.50	21.46 ± 4.95	16.46 ± 3.48	15.43 ± 2.97
	<i>t</i>		1.529	1.501	1.385	0.992
	<i>P</i>		0.127	0.134	0.167	0.357
	Exercise per week					
	0	299 (42.5)	55.78 ± 9.94	22.51 ± 4.99	17.25 ± 3.64	16.02 ± 3.06
	1~3	306 (43.5)	52.68 ± 9.67	21.29 ± 5.04	16.30 ± 3.50	15.09 ± 3.04
	≥3	99 (14.1)	52.14 ± 11.99	20.85 ± 5.76	15.86 ± 4.13	15.43 ± 3.15
	<i>F</i>		19.240	6.018	7.696	6.779
	<i>P</i>		0.000**	0.003**	0.000**	0.001**
	Attitude to majors					
	Dislike	26 (3.7)	64.46 ± 9.53	26.50 ± 5.65	19.04 ± 3.30	18.92 ± 2.92
	Medium	363 (51.6)	57.20 ± 8.90	23.24 ± 4.64	17.44 ± 3.42	16.51 ± 2.86
	Like	315 (44.7)	49.28 ± 9.67	19.62 ± 4.83	15.52 ± 3.69	14.13 ± 2.85
	<i>F</i>		78.914	62.125	30.919	77.547
	<i>P</i>		0.000**	0.000**	0.000**	0.000**

^aWith the *t*-test, and there are significant differences between them (*t* = −4.591, *p* < 0.001); **p* < 0.05, ***p* < 0.01.

TABLE 2 | Correlation among psychological capital, problematic smartphone use, and learning burnout.

Education background	Variables	Mean \pm SD	1	2	3	4	5	6
Undergraduates	1. PSU	41.39 \pm 10.15	1					
	2. PC	98.79 \pm 14.58	−0.205**	1				
	3. Depression	22.19 \pm 5.18	0.382**	−0.405**	1			
	4. IB	17.61 \pm 4.03	0.280**	−0.414**	0.635**	1		
	5. LPA	16.61 \pm 3.63	0.210**	−0.516**	0.455**	0.436**	1	
	6. LB	56.42 \pm 10.62	0.356**	−0.532**	0.885**	0.939**	0.730**	1
Postgraduates	1. PSU	42.63 \pm 10.29	1					
	2. PC	101.24 \pm 16.50	−0.219**	1				
	3. Depression	21.74 \pm 5.16	0.417**	−0.474**	1			
	4. IB	16.64 \pm 3.69	0.346**	−0.474**	0.690**	1		
	5. LPA	15.54 \pm 3.15	0.230**	−0.598**	0.531**	0.486**	1	
	6. LB	53.92 \pm 10.25	0.405**	−0.594**	0.915**	0.857**	0.750**	1

PSU, problematic smartphone use; PC, psychological capital; IB, improper behavior; LPA, low personal accomplishment; LB, learning burnout. * $p < 0.05$, ** $p < 0.01$.

TABLE 3 | The effect of problematic smartphone use and psychological capital on learning burnout.

Education background	Variables	Psychological capital		Learning burnout		
		Block1 (β)	Block2 (β)	Block1 (β)	Block2 (β)	Block3 (β)
Undergraduates	Gender	0.287	0.204	−2.090**	−1.974**	−1.915**
	Exercise per week	2.504**	2.367**	−2.430**	−2.236**	−1.547**
	Attitude to majors	7.779**	7.264**	−6.663**	−5.934**	−3.820**
	Problematic smartphone use		−0.232**		0.328**	0.261**
	Psychological capital					−0.291**
	R^2	0.116	0.141	0.173	0.270	0.407
	F	33.386	31.464	53.511**	70.710**	104.979**
	Adjusted R^2	0.112	0.137	0.170	0.266	0.403
	ΔR^2	0.116	0.026	0.173	0.093	0.137
	Gender	−4.521**	−4.368**	0.733	0.535	−0.698
Postgraduates	Exercise per week	2.300**	2.220**	−1.529**	−1.425**	−0.799
	Attitude to majors	9.430**	8.689**	−7.596**	−6.633**	−4.183**
	Problematic smartphone use		−0.263**		0.342**	0.268**
	Psychological capital					−0.282**
	R^2	0.142	0.168	0.196	0.311	0.482
	F	38.608**	35.338**	56.922**	78.802**	130.036**
	Adjusted R^2	0.138	0.163	0.193	0.307	0.479
	ΔR^2	0.142	0.02	0.196	0.115	0.171
	Gender					
	Exercise per week					

* $p < 0.05$, ** $p < 0.01$.

and postgraduates were significant. The detailed models results are shown **Table 5**. We presented the main contents of **Table 5** in the form of figure. As shown in **Figures 2, 3**; for medical undergraduates, the direct effect and total effect of problematic smartphone use on learning burnout was 0.261 and 0.329, respectively, psychological capital partially mediated this relationship, and this indirect effect was 0.068, constituting 20.67% of the total effect; for medical postgraduates, the direct effect and total effect of problematic smartphone use on learning burnout was 0.268 and 0.342, respectively, psychological capital partially mediated this relationship, and this indirect effect was 0.074, constituting 21.64% of the total effect.

DISCUSSION

Problematic smartphone use (Jing et al., 2016) and learning burnout (Liu et al., 2018) are pressing issues among Chinese medical students. In this study, 36.4% undergraduates and 27.6% undergraduates had a score higher than the mid-value (60), indicating that they had a high level of learning burnout. The objective of this study was to further investigate the relationship between problematic smartphone use and learning burnout, as well as the mediating effect of psychological capital in this relationship. Meanwhile, researches confirmed that psychological capital could be exploited like social resources (Luthans et al., 2006), and everyone has psychological resources at various

TABLE 4 | The effect of problematic smartphone use and psychological capital on three dimensions of learning burnout.

Education background	Variables	Depression			Improper behavior			Low personal accomplishment		
		Block1 (β)	Block2 (β)	Block3 (β)	Block1 (β)	Block2 (β)	Block3 (β)	Block1 (β)	Block2 (β)	Block3 (β)
Un	Gender	-1.050**	-0.989**	-0.970**	-1.310**	-1.276**	-1.257**			
	Residence							-0.426	-0.426	-0.365
	Exercise per week	-0.952**	-0.850**	-0.624**	-1.127**	-1.069**	-0.858**	-0.394	-0.362	-0.113
	Attitude to majors	-2.880**	-2.496**	-1.804*	-1.569**	-1.354**	-0.706**	-2.170**	-2.040**	-1.272**
	Problematic smartphone use		0.173**	0.151**		0.097**	0.076**		0.058**	0.034**
	Psychological capital			-0.095**			-0.089**			0.106**
	R^2	0.135	0.247	0.309	0.108	0.167	0.256	0.138	0.164	0.320
	F	39.823**	62.890**	68.400**	31.022**	38.300**	52.710**	40.905**	37.531**	71.941**
	Adjusted R^2	0.131	0.243	0.304	0.105	0.162	0.251	0.135	0.160	0.315
	ΔR^2	0.135	0.112	0.062	0.108	0.058	0.090	0.138	0.026	0.156
Pos	Gender							-0.173	-0.236	-0.610*
	Exercise per week	-0.671**	-0.608*	-0.352	-0.626**	-0.588**	-0.378*	-0.638**	-0.605**	-0.415*
	Attitude to majors	-3.485**	-2.966**	-2.065**	-1.794**	-1.482**	-0.741**	-1.802**	-1.493**	-0.749**
	Problematic smartphone use		0.182**	0.155**		0.110**	0.087**		0.110**	0.087**
	Psychological capital			-0.101**			-0.083**			-0.086**
	R^2	0.159	0.287	0.376	0.095	0.182	0.303	0.095	0.187	0.309
	F	66.046**	93.877**	105.091**	36.678**	53.277**	76.114**	24.540**	40.114**	62.342**
	Adjusted R^2	0.156	0.284	0.372	0.092	0.182	0.299	0.091	0.182	0.304
	ΔR^2	0.159	0.128	0.089	0.095	0.091	0.118	0.095	0.092	0.122

Un, undergraduates; Pos, postgraduates. * $p < 0.05$, ** $p < 0.01$.

TABLE 5 | The significance of the mediating effect of psychological capital.

Education Background	Path	a	b	c	c'	a*b	95%boot CI
Undergraduates	PSU→PC→LB	-0.232**	-0.291**	0.329**	0.261**	0.068	0.036--0.094
	PSU→PC→Depression	-0.232**	-0.095**	0.172**	0.151**	0.022	0.023--0.068
	PSU→PC→IB	-0.232**	-0.089**	0.097**	0.076**	0.021	0.028--0.078
	PSU→PC→LPA	-0.232**	-0.106**	0.058**	0.034**	0.025	0.038--0.100
Postgraduates	PSU→PC→LB	-0.263**	-0.282**	0.342**	0.268**	0.074	0.039--0.110
	PSU→PC→Depression	-0.268**	-0.101**	0.182**	0.155**	0.027	0.028--0.082
	PSU→PC→IB	-0.268**	-0.083**	0.110**	0.097**	0.022	0.032--0.095
	PSU→PC→LPA	-0.263**	-0.094**	0.050**	0.025**	0.025	0.041--0.120

PSU, problematic smartphone use; PC, psychological capital; LB, learning burnout; IB, improper behavior; LPA, low personal accomplishment; a, the effect of problematic smartphone use on psychological capital; b, the effect of psychological capital on learning burnout and its three dimensions; c, total effect; c', direct effect; a*b, indirect effect as well as the mediating effect of psychological capital in this relationship.

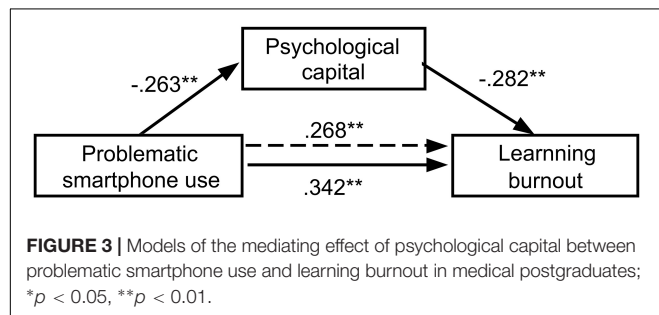
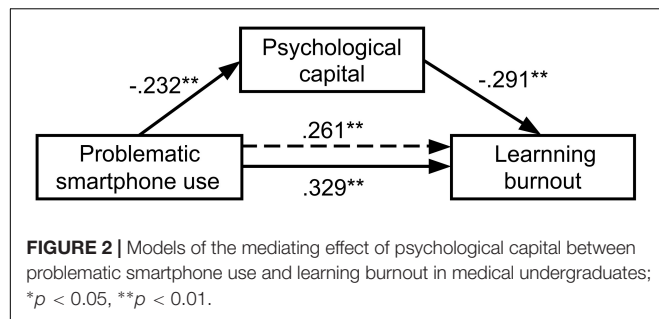
levels, which can be the basis for intervention on dealing with learning burnout among Chinese medical undergraduates and postgraduates in the future.

This study found that learning burnout had significant differences between Chinese medical undergraduates and postgraduates, the level of undergraduates' learning burnout was higher than that of postgraduates, consistent with previous studies (Erdogan et al., 2012). A positive shift toward deep and strategic learning existed among postgraduates, which was not found among the undergraduates (Samarakoon et al., 2013). Moreover, the psychological and academic stress of undergraduates was significantly higher than that among graduates (Liang et al., 2009). Therefore, the undergraduates were more prone to learning burnout than the graduates. We analyzed undergraduate

and postgraduate students separately because of their different psychosocial development stages.

Studies found that interest greatly influenced motivation and engagement (Renninger and Hidi, 2016); students who disliked their major would lose their motivation for study and would get burned out in the long run (Costa et al., 2012). Exercise was good for physical and mental health, which were more associated with the exhaustion component of burnout (Peterson et al., 2008) and also associated with a healthy mood and positive self-esteem (Barton et al., 2012), and these may help students reduce burnout (Wolf and Rosenstock, 2017). So we also controlled these factors in the analysis.

Then, this study confirmed the mediating effect of psychological capital between problematic smartphone use



and learning burnout in both Chinese medical undergraduates and postgraduates. The results showed that problematic smartphone use of medical students was positively associated with their learning burnout (Bian et al., 2018); this result finds consonance in the literature. Problematic smartphone use indicates frequent usage and much time consumption (Liu et al., 2016), indicating that students spent less time in studying, thus negatively affecting academic performance gradually. Many studies have also confirmed the negative impact of problematic smartphone use on academic performance (Hawi and Samaha, 2016; Samaha and Hawi, 2016); academic performance is closely related to and can be considered an antecedent for learning burnout. Besides, studies have found that problematic smartphone use has a negative effect on people's physical and mental health, such as headache, ear pain (Gao et al., 2017), sleep disorders (Liu et al., 2017), and suicidal ideation (Wang et al., 2014); these problems can consume so much energy of students that they can't devote themselves to learning. Students who with problematic smartphone use are hard to disengage from smartphones quickly when stopping the use of it; thus, medical students cannot concentrate on their studies, resulting learning burnout. And the results of this study also showed psychological capital mediated this relationship; reasons might be found in the literature. The results are discussed as follows.

Psychological capital includes four dimensions: self-efficacy, hope, optimism, and resilience (Luthans et al., 2007a). Problematic smartphone use is identified as an impulse control disorder (Leung, 2008); it can make someone uncontrollably anxious and irritable because of the prolonged absence of the mobile phone (Chóliz, 2010), which could affect their conviction (or self-confidence) in their ability to mobilize themselves. As such, self-efficacy is destroyed (Luthans et al., 2008). Moreover,

being addicted to mobile phones for prolonged periods can lead to mental health problems such as depression (Smetaniuk, 2014); this can have a negative impact on optimism and hope, which represent a "positive motivational state (Snyder et al., 1991)." Resilience represents relative protection for an individual against environmental stresses (Cadet, 2016). However, poor mental health such as depression and anxiety can be detrimental to resilience. Previous studies have shown that addiction behavior has an impact on resilience (Mak et al., 2018). Whereas resilience can protect one from Internet addiction (Robertson et al., 2018), self-efficacy may allow individuals to control themselves better (Luthans et al., 2008), and optimism and resilience are related to perseverance (Luthans et al., 2008). These positive psychological traits can lead to better self-control and prevent addiction behavior. In this study, problematic smartphone use of medical students had a negative impact on their psychological capital, but psychological capital worked as a protective factor against problematic smartphone use. Previous studies show that self-efficacy can compensate for increased learning burnout (Maricutoiu and Sulea, 2019). Students who had sufficient conviction and abilities to mobilize themselves would decrease improper behavior; resilience was associated with lower levels of learning burnout and emotional exhaustion (Rios-Risquez et al., 2016). Hope and self-efficacy may promote academic achievement (Feldman and Kubota, 2015), which is highly negatively correlated with learning burnout. Studies have also confirmed that psychological capital has a strong effect on burnout (Leon-Perez et al., 2016; Gong et al., 2019). This study demonstrated that psychological capital can mediate the relationship between problematic smartphone use and learning burnout, which is highly consistent with studies mentioned above. The results may have important implications in professional practice. Interventions for learning burnout can possibly conducted by exploiting the psychological capital of medical students in the future.

Nevertheless, the present study had some limitations. First, this was a cross-sectional study; any causal relationship based on the associations observed in our study should be inferred cautiously. Further research, such as cohort studies and intervention trials, is needed to increase its reliability. The researchers intend to elaborate further on the current findings in future research, for example, an intervention trial of learning burnout among medical students can be conducted by improving psychological capital. Second, the participants in this study were recruited from one city. This sample does not represent all medical students in China. However, Chongqing is known as a "miniature of China (National Bureau of Statistics of China, 2019)," and this is the only medical university in Chongqing. Future research is needed to show if these inferences can be applied to the medical students in other parts of China. Additionally, despite this study having a large sample covering almost all majors, the convenience cluster sampling method may have caused a selection bias and the external validation was not good enough. Third, the accuracy of self-reports is of concern and more measures must be taken to improve it in the future.

CONCLUSION

Problematic smartphone use can directly predict learning burnout and their relationship was mediated by psychological capital in Chinese medical undergraduates and postgraduates. Therefore, Strategies to alleviating problematic smartphone use and enhance psychological capital in medical undergraduates and postgraduates may provide useful suggestions for future interventions on dealing with learning burnout in Chinese medical undergraduates and postgraduates.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

This study was approved by the Ethics Committee of Chongqing Medical University (2018015). Participants were fully informed regarding the survey prior to the participation. Completing and submitting the questionnaire was considered a proxy consent to participate. In this study, all participants were voluntary and the questionnaire was anonymous, we also used non-identifying codes, ensuring the confidentiality of the information.

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AUTHOR CONTRIBUTIONS

CZ, XT, and FZ: conceptualization and methodology. CZ, GL, and ZF: data curation. CZ: formal analysis and writing – original draft. FZ: funding acquisition and writing – review and editing. CZ and ZF: investigation. CZ, GL, and FZ: project administration. GL, XT, and FZ: resources. GL: software. CZ and FZ: supervision. All authors contributed to the article and approved the submitted version.

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