



## Research article

# Predicting and enhancing students' positive emotions: An empirical study from a Taiwanese sociocultural context



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## ABSTRACT

Predicting and enhancing positive emotions, reflecting the tenets of positive psychology, is of considerable importance for educators. Positive emotions may consist of a person's indication of happiness, joy, and love. In school and university settings, as research has shown, positive emotions play a pivotal role in helping students adjust, make friends, and engage in proactive social relationships with others. It is imperative for us to consider the design and development of educational programs that could assist in the facilitation of positive emotions. The present study involved examination of an inquiry into the prediction of positive emotion of university students, via means of data drawn from Taiwan. The main question for consideration is to determine the extent to which both *social* (e.g., the social milieu) and *personal* (e.g., personal resolve) influences could predict positive emotions. Structural equation modelling yielded support for our proposed *a priori* model: (a) the direct predictive effects of the social milieu, personal resolve, relating to others, and academic liking experience, and (b) the potential mediating roles of relating to others, and academic liking experience. Overall, the concept of emotions plays a central role and is accounted for by different types of personal and social contextual influences.

## 1. Introduction

The study of *positive emotions*, situational and dispositional in nature, may account for improvement in different types of educational and adaptive outcomes, via both cognitive and motivational processes (Spice, 2011; Tabbodi et al., 2015; Valiente et al., 2012; Villavicencio, 2011; Villavicencio & Bernardo, 2013, 2016). We propose the testing of a conceptual model, as shown in Fig. 1, which depicts two potential antecedents of positive emotions: *psychological* (e.g., the potential influence from the concept of 'effective functioning') and *psychosocial* (e.g., the potential influence from the concept of 'relating to others') variables.

### 1.1. A conceptual model of optimal emotions for examination

From an educational perspective, positive emotions (e.g., a state of happiness) could help improve a student's state of resilience (Tugade and Fredrickson, 2007), and serve as a determinant of his/her psychological

need satisfaction (Howell et al., 2011) and psychological well-being (Hasnain et al., 2014). In contrast, negative situational and dispositional emotions (e.g., a state of anxiety before a test) are deficit and have been shown to produce a number of maladaptive practices and outcomes for students, such as a decline in academic performance (e.g., Febrilia and Warokka, 2011; Gumora and Arsenio, 2002; Valiente et al., 2012; Villavicencio, 2011). Students who are unhappy at school, for example, may disengage and, consequently, feel more inclined to participate in different types of anti-social behaviors.

As educators, we have a duty of care to ensure that students, regardless of their historical and sociocultural backgrounds, experience positive emotions where possible. On this basis, it is important for educators to consider pedagogical strategies (e.g., a teaching method), educational programs (e.g., pastoral care after school), and/or pathways (e.g., scholarship offerings) that could encourage and foster positive emotions. The *paradigm of positive psychology* (Seligman and Csikszentmihályi, 2000; Seligman et al., 2009) has provided guidance into the

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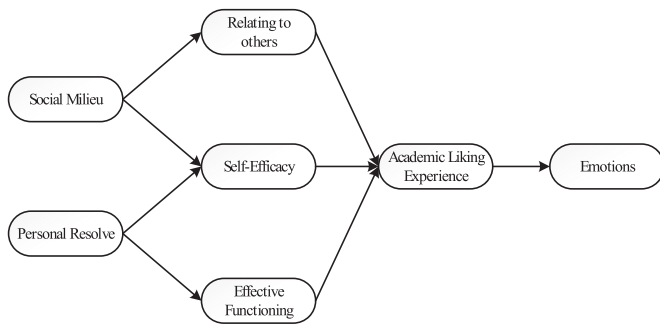


Fig. 1. Conceptual model for investigation.

study of *optimal best practice* for different domains of functioning. Frailon's (2004) preliminary discussion paper of subjective well-being, interestingly, described an underlying process, known as *optimization*, which could help explain the flourishing of human behavior. Optimization, in brief, is concerned with the 'activation and enactment' of different types of *psychological* (e.g., self-efficacy: Bandura, 1997), *educational* (e.g., an appropriate instructional design: Rittle-Johnson et al., 2017), and/or *psychosocial* (e.g., the impact of the home environment: Daulta, 2008) agencies ('A') that could 'optimize' a person's internal state of functioning (e.g., cognitive functioning) (Phan et al., 2017). This definition has led Phan et al. (2018a,b) to recently propose an alternative theoretical model of optimization of optimal best practice and positive outcomes, which we present here in Fig. 2.

The operational mechanism of optimization (e.g., the activation and enactment of a psychological agent) is denoted as '↓', which Phan et al. (2017) argue would optimize a person's state of functioning (i.e.,  $L_1 \rightarrow L_2$ ). This intricate relationship between ↓ and  $\Delta_{(L_1-L_2)}$  is somewhat difficult to validate and, according to Phan et al. (2018a,b), would require the development of some complex, but appropriate methodological design. In the absence of an appropriate methodological design or designs, Phan et al. (2018a,b) have recommended a correlational approach to consider this understanding of  $\Delta_{(L_1 - L_2)}$ . In brief, the authors proposed 'sources' of information (i.e., denoted as 'S') that could operate to facilitate a person's progress from his/her *realistic achievement best* level, denoted as 'L<sub>1</sub>' (e.g., current level of happiness at T<sub>1</sub>), to an *optimal achievement best* level, denoted as 'L<sub>2</sub>' (e.g., optimal level of happiness at T<sub>2</sub>). The positive difference between L<sub>1</sub> and L<sub>2</sub>, denoted as  $+\Delta_{(L_1-L_2)}$ , would reflect the 'optimization' of happiness. A negative difference between L<sub>1</sub> and L<sub>2</sub>, in contrast, would indicate the 'sub-optimization' of happiness – in other words, evidence perhaps of an increasing state of unhappiness.

It is plausible for us to situate Phan et al. (2018a,b) theoretical model of optimization within the context of the present study. Reflecting Phan et al. (2018a,b) theoretical model and similar to previous research into negative emotions e.g., Pajares, 1996a,b; Pajares and Kranzler, 1995; Phan et al. (2018a,b), we depict an alternative approach for consideration:

$S \rightarrow V \rightarrow \text{emotions}$ , where S = informational sources and V = potential mediating variable.

This proposition differs somewhat from Phan et al. (2018a,b) theoretical model of optimization and contends that different informational sources could directly and indirectly predict positive emotions. Evidence derived from this consideration (i.e., predictive effect) may provide practical understanding into the 'heightening' of positive emotions. It would be of interest, for example, to transform different types of contextual influences into educational practices for the enhancement of positive emotions. Fig. 1 shows a detailed conceptualization of  $S \rightarrow V \rightarrow \text{emotions}$  by which we postulate the *social milieu* and *personal resolve* as S, and *relating to others*, *self-efficacy*, and *effective functioning* as Vs. Furthermore, aside from relating to others, self-efficacy, and effective functioning, we also consider *academic liking experience* as another V (e.g.,  $\text{personal resolve} \rightarrow \text{self-efficacy} \rightarrow \text{academic liking experience} \rightarrow \text{positive emotions}$ ).

1.2. The social milieu

The social milieu, from our examination and theoretical positioning, is concerned with the *totality* of the 'sociocultural climate' of a neighborhood where a family resides, a local community that a person is in, and a school that a student attend. The social milieu of a community (e.g., school), in this case, emphasizes the inclusiveness of sociocultural settings and influences, which may contextualize a person and his/her development (Bronfenbrenner, 1989; Vygotsky, 1978). Research development pertaining to the social milieu, to date, has focused on the contextual influences of the home environment, the school environment, and/or the local community environment (Bascia, 2014; Joshi and Acharya, 2013; Kiuru et al., 2014). Bronfenbrenner's (1979; 1989) *bio-ecological systems theory*, for example, has provided a detailed account of the shaping of a person's development via different influences from the contextual environment.

Over the years, within the field of academia, educators and researchers have focused on different related aspects of the social milieu and their effects on students' cognitive development and schooling experiences. One interesting inquiry has involved students' perceptions of the school social milieu, and their subsequent perceived sense of belonging (e.g., Goodenow, 1993; Goodenow and Grady, 1993; Phan and Ngu, 2016) –for example, how welcoming is the school? ... is the school tolerant towards others who may differ (e.g., culturally)? ... does the school encourage a sense of school belonging? Another inquiry, likewise, has delved into the potency of proactive social relationships at school (e.g., peer relationship: Leka, 2015; Li et al., 2011; Molloy et al., 2011).

The social milieu, in its totality, may serve as an important antecedent of different types of adaptive outcomes (Dorman and Fraser, 2009; Wong and Watkins, 1998). A school social milieu that is considerate, welcoming, and accepting is more likely to stimulate positive perceptions for children (e.g., the school is very accommodating of cultural diversity), which could then facilitate both favorable educational (e.g., improvement in academic performance) and non-educational (e.g., enriched experience in social relationship with peers and teachers) outcomes. Importantly, of course, a perceived positive school social milieu is more likely to motivate children to attend school, and to value and appreciate

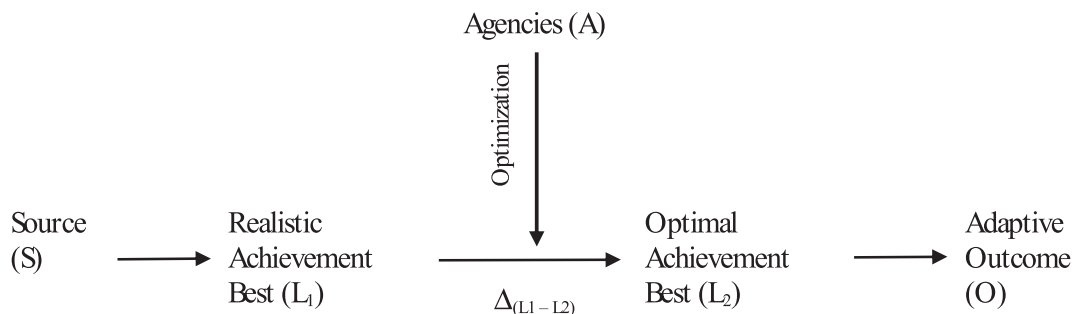


Fig. 2. Relationship between L<sub>1</sub> and L<sub>2</sub>.

their schooling experiences. In this analysis, a positive school social milieu may serve as an important source of motivation, proactive engagement, and positive emotional functioning, which may encourage and foster the perception that school could serve as a 'second home'.

A perceived negative school social milieu (e.g., the school does not tolerate cultural diversity), unlike a perceived positive school social milieu, may produce different types of unfavorable outcomes – for example, a child is more inclined to academically disengage from classroom learning and skip school altogether (Henry et al., 2012; Liem et al., 2008). At the same time, a non-positive school social milieu is likely to result in a decline of subjective well-being (e.g., a state of unhappiness), resulting in a child to partake in different types of anti-social behaviors such as bullying. Some children, likewise, may come to have strong resentment of their school social milieu, perceiving it as being unwelcoming, unhelpful, and alienating. When this is the case, as we explored, some children may choose and/or prefer to stay at home.

From the preceding sections, it is apparent that the school social milieu plays a central role in the prediction of different types of educational and non-educational outcomes. One interesting adaptive outcome, arising from existing research development (e.g., Lau et al., 2008; Liem et al., 2008; Opdenakker and Van Damme, 2000; Van Damme, De Fraigne, Van Landeghem, Opdenakker and Onghena, 2002) that we postulate could associate with the social milieu is the concept of 'social relationship with others'. *Relating to others* in academic contexts may, in this case, consist of *teacher-student relationships* (TSR) (Roorda et al., 2011) and *peer-peer relationships* (Lau et al., 2008; Liem et al., 2008; Liem and Martin, 2011). Teacher-student relationships are effective because teachers, in general, encourage student autonomy (i.e., giving a student the freedom to make his/her own choice), provide security (i.e., caring for a student) and lend emotional support to help students adjust. Peer-peer relationships, in contrast, provide friendship, social support, and healthy academic competition.

At the same time, of course, the complex nature of the social milieu at school contends that students may also socially interact with others, other than teachers, peers, and/or friends. For example, in school or university settings, a student may make social contacts with administrators, school counsellors, visiting scholars, etc. In his recent study, interestingly, Phan (2017) detailed four major characteristics that could define and explain the nature of the theoretical concept of 'relating to others': (i) a person's self-awareness of his/her own feeling in social relationships, (ii) a person's self-awareness of others' feelings in social relationships, (iii) a person's sensitivity to a peer's personal beliefs, and (iv) a person's ability to relate to others (e.g., a person knows how to confide to others). This mentioning is insightful as it places emphasis on the *underlying nature* of a person's social relationship with another person (e.g., a person's own self-awareness of his/her feelings). Referring to our previous discussion then, we would expect a perceived positive school social milieu to predict and stimulate the notion of a person's ability to socially relate to others. A perceived negative school social milieu, in contrast, is more likely to result in a person's inability to relate to others. This indication is not unexpected, given that an inactive and negative social milieu is liable to cause personal stress, impose obstacles, create a sense of alienation, which all combine to dissuade a person from making friends, interacting with others, etc.

### 1.3. The importance of personal resolve

Taking into account existing research development (e.g., self-determination: Deci and Ryan, 2008), Phan and Ngu (e.g., Phan et al., 2018a,b; Phan et al., 2017) recently conceptualized a psychological concept, coined as 'personal resolve', which is defined as a person's "internal state of decisiveness and resolute to strive for optimal achievement best in an optimistic manner. This definition emphasizes the importance of *determination* to overcome any obstacles that may arise, and reflects an *internal state of desire* and *purposive act* to achieve optimal

best in a subject matter" (Phan et al., 2018a,b, p. 415). Personal resolve, unlike resilience (Gonzalez and Padilla, 1997; Kwek et al., 2013), academic buoyancy (Collie et al., 2015; Martin et al., 2013; Martin and Marsh, 2008), self-determination (Deci and Ryan, 2008; Deci et al., 1991), etc., places emphasis on a person's 'time-contextual' state of focus to intentionally stay on task without any uncertainty of change or indecisiveness.

Personal resolve, theoretically reflecting the paradigm of positive psychology (Seligman and Csikszentmihályi, 2000; Seligman et al., 2009), is conceptualized to provide theoretical understanding of the underlying process of optimization. Personal resolve in school contexts may initiate the student's sense of resilience and his/her determination and striving to persist in a course of learning, regardless of difficulties and/or obstacles. Experience of personal resolve would enable a student to *purposive act* with the intent of achieving a noteworthy educational outcome. A lack of personal resolve, in contrast, may result in a case of indecisiveness, lethargy, and avoidance. Moreover, from Phan (2017) conceptualization, a low level of personal resolve is more likely to align closely with the engagement of maladaptive functioning (e.g., the use of surface cognitive strategies) and different types of negative outcomes. We contend that indecisiveness and uncertainty would result in a student acting in a non-purposive manner without any intention of determination, and/or desire to achieve goal-directed outcomes.

Personal resolve then, in its totality, may serve to facilitate and motivate the achievement of different types of adaptive outcomes (Phan et al., 2018a,b; Phan et al., 2017). This psychological construct is positive, in nature, and connotes the importance of determination, a focused mindset, and effort expenditure. Coinciding with the paradigm of positive psychology (Seligman and Csikszentmihályi, 2000; Seligman et al., 2009), we contend that personal resolve may operate as an in-class pedagogical practice and/or a school-based program to help students attain enriched learning experiences. There have been a few empirical research studies, since Phan et al.'s (2017) seminal publication, that focus on the potency of personal resolve. Our own recent non-experimental undertaking (Phan and Ngu, 2019a,b), for example, noted that personal resolve positively influenced academic achievement ( $\beta = .16, p < .05$ ). In another longitudinal project, likewise, Phan et al. (2018a,b) affirmed the potent effect of personal resolve, finding that this psychological construct exerted a positive effect on different types of contextualized self-efficacy beliefs for academic learning (e.g., personal resolve  $\rightarrow$  global self-efficacy:  $\beta = .14, p < .05$ ).

#### 1.3.1. Personal self-efficacy

From the preceding sections, we consider two comparable psychological constructs that could operate as adaptive outcomes of personal resolve, given its positive nature (Phan et al., 2018a,b; Phan et al., 2017). Personal self-efficacy, situated within social cognitive theory (Bandura, 1986, 1997), is an important non-cognitive construct that centrally features in the complex processes of human agency (Pajares, 1996a,b). Self-efficacy, according to Bandura (1997), is defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Self-efficacy is therefore concerned with a person's self-judgment of his/her perceived competence in a subject matter, which is specific and contextualized in nature – for example, in a classroom setting, a student may ask himself/herself this question: regardless of my currently ability, do I believe that I have what it takes to achieve this task in Algebra....?

Since Bandura's (1977) seminal publication in *Psychological Review*, titled "Self-efficacy: Toward a unifying theory of behavioral change", a plethora of research has been established to affirm the significance of self-efficacy in educational and non-educational settings. In brief self-efficacy, formed from the weighing, selection, and integration of different informational sources (e.g., enactive learning experience: Bandura, 1997), serves to mobilize different psychological processes (e.g., the use of effort expenditure), governs one's choice of behaviors and aspirations (e.g., choosing a mathematics-related choice), and

self-regulates both positive and negative emotions (e.g., weakens a state of anxiety). A heightened state of self-efficacy for academic learning, for example, may mobilize a student to expend more effort in his/her schoolwork (Li, 2012). In a similar vein, of course, a self-efficacious student may engage in deep cognitive strategies for meaningful learning and in-depth understanding (Fenollar et al., 2007; Liem et al., 2008; Sins et al., 2008).

The central role of self-efficacy (Bandura, 1986, 1997), which we integrate into the present study, is an important research inquiry for development. For example, in relation to our focus for examination, we postulate that personal resolve could act as an informational source to positively influence self-efficacy. A purposive act to stay on the task with the change to achieve and satisfy an internal desire without indecisiveness and/or any uncertainty of change, we contend, is likely to instill a sense of confidence, resulting a person to feel efficacious towards his/her learning. Moreover, we postulate that students, in the context of schooling, would use their personal resolve as a source of motivation to strive for educational successes. Phan et al.'s (2018a,b) recently longitudinal study, for example, found that personal resolve positively influenced different types of contextualized self-efficacy beliefs (e.g., personal resolve → task-specific self-efficacy,  $\beta = .14$ ,  $p < .05$ ).

### 1.3.2. Effective functioning

Fraillon's (2004) preliminary theoretical overview of subjective well-beings describes an interesting psychological concept, coined as 'effective functioning'. Effective functioning, according to the author, is concerned as "an evaluation of how a person's responses to their contextual environment support their capacity to satisfy the implicit and explicit demands placed upon them by that environment" (p. 23). Phan and his colleagues have since refined Fraillon's (2004) definition of effective functioning, and wrote the following: "... effective functioning is defined as the importance of structured thinking and organized behavior that enable personal accomplishment in an efficient manner. Engaging in effective functioning, for example, may motivate a student to remain steadfast and adhere to an effective study plan, regardless of the fact that it may be boring" (Phan et al., 2018a,b, p. 4).

Phan et al.'s (2018a,b) refined definition, interestingly, connotes the idea that effective functioning is related to the notion of efficiency of a person's cognition and behavior. This definition emphasizes, in our point of view, the importance of an estimated 'cost-benefit' ratio – that is, when benchmarked against the accomplished outcome, is the expenditure of effort, time, and/or a resource worthy for consideration? For example, engaging in surface cognitive strategies for a week, resulting in a modest Pass for a test is not efficient in terms of time or effort. In contrast, however, a student's engagement of specific self-regulatory processes and deliberate action (e.g., seeking assistance from someone who is more capable) to minimize his/her time may indicate the operational nature of efficiency. From this theoretical contention, we purport that personal organization, structured cognitive thinking, and purposive intent, in combination and efficient in nature, are indicative of a state of effective functioning.

Like the nature of personal self-efficacy, we postulate that effective functioning may also act as a central variable within a dynamic system of change. In this analysis, we postulate that personal resolve could act as an informational source in the formulation of effective functioning. A purposive act to stay on the task with the main goal to satisfy an internal desire without indecisiveness and/or any uncertainty of change may initiate and facilitate a person to be structured and more organized in his/her approach. Experience of personal resolve in an academic subject matter, in this case, may compel a student to place more emphasis on self-awareness, planning, organization, and deliberation for the purpose of effective learning.

### 1.4. Effects of relating to others, personal self-efficacy, and effective functioning

From the preceding section, we outlined the nature and characteristics of three central variables: relating to others, personal self-efficacy, and effective functioning. Formulated from two contrasting antecedents, the social milieu (e.g., the social milieu → relating to others) and personal resolve (e.g., personal resolve → self-efficacy), we postulate that the three central variables would positively influence an important adaptive outcome, namely, a student's 'academic liking experience' (Van Damme et al., 2002). *Academic liking experience* is an important educational outcome that may reflect the totality of a student's schooling experiences, both academic and non-academic.

In recent years, educators have argued that academic performance alone is a limited index of educational success. A student's modest academic grades at school or university, from this viewpoint, do not reflect his/her total schooling experiences. It is possible, of course, that the student may have more fruitful and enjoyable schooling experiences when referring to his/her social relationships with teachers and peers (Molloy et al., 2011; Roorda et al., 2011), and/or his/her engagement in afterschool-hour extracurricular activities, etc. Existing research has, on this basis, focused on different attributes of students' schooling experiences. For example, Lau et al.'s (2008) study focused on engagement in deep learning as an educational outcome, whereas Elliot and Murayama's (2008) inquiry into achievement goals recognized the importance of intrinsic motivation. Van Damme et al. (2002) amongst others (ACU and Erebus International, 2008; Fraillon, 2004), likewise, have considered the importance of subjective well-being experiences.

Our recent study (Phan, 2017), reflecting Van Damme et al.'s (2002) exploration of academic subjective well-being at school, explored different facets that could reflect the importance of a student's academic liking experiences, for example: *feelings* (e.g., "I feel safe at school (or university)") and *preference* (e.g., "I would rather stay at home than go to school (or university)") of school or of university. Interestingly, unlike educational successes that place emphasis on performance grades, we contend a student's academic liking/disliking experience is also relevant and indicative of successful/unsuccessful schooling. For example, a student may not necessarily do well academically at school but report positive feelings, consequently as a result of his/her social relationships with teachers, friends, and peers. In a similar vein, of course, shyness, a perceived lack of social support, few academic challenges, etc., may give us to academic disliking experience (e.g., I would rather stay at home and do my own things...). A high response score, in this case, would indicate and reflect positive academic liking experience. A positive school experience, in turn, would correspondingly relate to different types of adaptive outcomes – for example, a reporting of a high level of motivation to strive for educational success. Negative school experiences, in contrast, would associate with different types of detrimental consequences, such as school disengagement and engagement in maladaptive practices (Liem et al., 2008; Salamonson et al., 2009).

*What are the causes of a student's academic liking (or disliking) experience, and what is its effect?* Bronfenbrenner's (1979; 1989) bioecological theory, for example, has detailed the importance of different types of sociocultural systems (e.g., *the microsystem*: the immediate environment) that could shape a person's development. In a similar vein, theoretical contentions pertaining to the importance of proactive social relationships at school postulate that teachers, peers, friends, etc., could also influence students' schooling experiences. A perceived sense of animosity, unacceptance of cultural diversity, unfriendliness, etc., is more likely to initiate negative schooling experiences – for example, a student is more inclined in this case to stay at home and not attend school (i.e., preference: I would rather stay at home than go to school). Hence, from this understanding, we contend that relating to others at school (e.g., a student's difficulty to relate to others) may serve as an important source of a student's academic liking/disliking experience.

In a similar vein, we also postulate that a student's individual

attributes may also influence his/her academic liking/disliking experience at school. From the present context, and in conjunction with existing research that shows clear and consistent evidence (Bandura, 2018; Fast et al., 2010; Pajares, 1996a,b; Wilson and Narayan, 2014; You, 2018), we consider the potential of personal self-efficacy to influence a student's academic liking experience. A heightened level of personal self-efficacy for learning and schooling, in general, is likely to associate with a student's reporting of his/her academic liking experience. A low level of self-efficacy, in contrast, is more aligned with a student's academic disliking experience, consequently as a result of different factors – for example, a low level of self-efficacy is inversely related to a high level of anxiety (Jain and Dowson, 2009; Pajares and Kranzler, 1995; Pajares et al., 1999), resulting in negative schooling experiences.

In a similar vein, another individual attribute is that of effective functioning, which we postulate to act as an important source of information in the prediction of academic liking experience. Organization (e.g., daily planning), structured cognitive thinking, and purposive act in order to achieve efficiency in the process of quality learning may reflect a student's state of motivation and self-regulation, and a quest to attain positive schooling experiences. We derive this theoretical positioning, consequently as a result of Phan et al.'s (2018a,b) recent findings from their longitudinal study. The authors, interestingly, found that effective functioning at T<sub>2</sub> positively influenced secondary school students' schooling experiences ( $\beta = .62, p < .001$ ) and academic achievement ( $\beta = .30, p < .001$ ) at T<sub>4</sub>. We postulate that ineffective functioning, reflecting non-self-awareness of efficiency, disorganization, lack of planning, and non-purposive intent would instead give rise to the reporting of academic liking experience.

### 1.5. The importance of emotions: why?

A focus on the formation of positive emotions is an interesting inquiry for examination for educators. We want to consider this avenue of research because positive emotions, as detailed in the preceding sections, may produce beneficial educational yields for students and educators, alike. Just being happy in school or university, for example, may reflect and indicate an enriched state of subjective well-being (ACU and Erebus International, 2008; Phan, 2017). Importantly, of course, research has shown that positive emotions play a central role in the prediction of academic performance and other achievement-related outcomes (Phan and Ngu, 2019a,b; Villavicencio & Bernardo, 2013, 2016). This evidence, we contend, substantiates our rationale for the study of positive emotions in educational contexts. Continuing empirical contributions, in this analysis, may also inform educators of programs that they could design and develop to help promote and foster positive emotions.

One notable point for consideration, theoretically and empirically, is to consider different types of determinants that could encourage, facilitate, and foster positive emotions for students at university. Aside from academic performance, we contend that positive emotions are of significance for enhancement (e.g., Berger et al., 2011; Hamilton, 2013; Romero et al., 2014). Positive emotions in educational contexts indicate an enriched state of subjective well-being, whereas negative emotions would seem to suggest otherwise (ACU and Erebus International, 2008; Fraillon, 2004; NSW Department of Education and Communities, 2015; Phan and Ngu, 2019a,b). It would be sufficed to consider a correlational examination of  $S \rightarrow V \rightarrow$  emotions, given the absence of a more appropriate methodological design that could enable us to study the 'optimization' of positive emotions.

Research development into the broad topic of emotions (e.g., the effect of negative emotion on academic performance) has involved school children at both elementary (Berger et al., 2011; Crosnoe et al., 2010; Duchesne and Ratelle, 2010; Skinner et al., 2009; Valiente et al., 2010) and secondary (e.g., Allen et al., 2013; Romero et al., 2014; Seifert and O'Keefe, 2001) school levels. In a similar vein, a number of research studies have focused on the association between emotions and academic performance of university student (Daniels et al., 2008; Pekrun et al.,

2009; Villavicencio & Bernardo, 2013, 2016). Our research inquiry considers three major aims:

1. Discern two comparative sources of information, which could indirectly influence positive emotions via different psychological and psychosocial variables and academic liking experience.
2. Elucidate different psychological and psychosocial variables as potential mediators for future research development.
3. Support the postulation regarding academic liking experience as a direct predictor of positive emotions, and a potential mediator for future research development.

## 2. Methodology

### 2.1. Sample and procedure

The study reported in this manuscript was approved by the University of New England's Research Ethics Committee, Number: HE13-025. We verbally sought permission at the onset by asking any participant who did not wish to take part in the study to inform us. This method of verbally seeking participatory consent, which we previously used in a number of our research that involved university students, was logistically convenient and appropriate given the ages of the participants. Taiwanese students ( $N = 1010$ , Age range: 18–36 yrs,  $Mn = 21.75$ ,  $SD = .95$ ) from seven universities (i.e., two public universities, five private universities) located in Taipei City and New Taipei City, Taiwan took part in this study. In Taiwan, secondary students may seek entry into two types of university: (i) private university, which is private, less competitive, and requires personal funding from the student (e.g., private scholarship), and (ii) public university, which is public, more competitive, and is funded by the government. In general, students prefer public university and those who do not meet the cut-off threshold then proceed onto entry into a private university.

We followed university protocols and informed the students ( $N = 405$  males, 605 females) that participation was voluntary and confidential, and withdraw could be made at any time during the data collection process. The traditional paper-format, hard-copy method was used whereby administration of the questionnaires took place in tutorial classes. The questionnaires, in total, took approximately 30 min to complete, and the participants were encouraged to ask for clarification, etc., at the end of the period. We coupled the questionnaire with a front-page demographic information sheet, asking for information regarding the following: gender (e.g., male), university (e.g., National Taiwan University), department (e.g., Department of Engineering), course of study (e.g., Bachelor of Liberal Arts), age, and study status (e.g., Full-time).

The medium of formal instruction at school and in university is Mandarin. We used a three-step translation approach: (i) one of the authors, with the assistance of a graduate student who specialized in EFL studies, translated the questionnaires from English to Mandarin, (ii) a colleague from another university who specialized in EFL studies, and one of the authors of this article who is a native speaker of both English and Mandarin back-translated the questionnaires to English, and (iii) another colleague double checked the two versions from the first two processes (i.e., English  $\rightarrow$  Mandarin, Mandarin  $\rightarrow$  English) to ensure consistency and accuracy.

### 2.2. Instruments

We used existing Likert-scale inventories to measure and assess the mentioned concepts. For consistency, we structured the subscales to consist of five ratings: 1 (Completely Disagree) to 5 (Completely Agree).

1. *Personal Resolve*. We adapted five items from Phan et al.'s (2018a,b) study to measure and assess the concept of personal resolve. The items included, for example: "I will do whatever it takes to master my

- academic studies at university” and “I have a strong desire to succeed in my academic studies at university”. Reliability estimate for the scale was .85.
- The Social Milieu.** We adapted five items previously developed (e.g., Phan, 2015; Phan and Ngu, 2016) to measure and assess the perceived concept of the social milieu of university. The items included, for example: “I find this university is very welcoming” and “This university is very accepting of people from other cultures”. Reliability estimate for the scale was .83.
  - Personal Self-Efficacy.** We adapted five items from the *Motivated Strategies for Learning Questionnaire* (Pintrich et al., 1993) to measure and assess personal self-efficacy for academic learning. The items included, for example: “I believe I will receive excellent grades in classes at this university” and “I expect to do well academically in my classes for different subjects”. Reliability estimate for the scale was .72.
  - Effective Functioning.** We adapted five items Phan et al.’s (2018a,b) study to measure and assess the concept of effective functioning. The items included, for example: “I have been told at university that I am quite efficient” and “I always keep to my routine when studying at university”. Reliability estimate for the scale was .70.
  - Relating to Others.** We adapted the *LOSO Questionnaire* (Van Damme et al., 2002) and developed five items to measure and assess the concept of relating to others. The items included, for example: “I find it easy to relate to others at university” and “I find often it difficult to express my feelings to others at university”. Reliability estimate for the scale was .72.

- Academic Liking Experience.** We adapted the *LOSO Questionnaire* (Van Damme et al., 2002) and developed five items to measure and assess the concept of academic liking experience. The items included, for example: “I really like going to university” and “I would rather stay at home than to attend university”. Reliability estimate for the scale was .83.
- Emotions.** We adapted five items from the *Academic Well-Being Experience Questionnaire* (SWBEQ) (Phan and Ngu, 2014) to measure and assess the concept of positive emotions. The items included, for example: “I am always happy at university” and “My mood is always up at university”. Reliability estimate for the scale was .67.

### 3. Results

Structural equation modelling (SEM) was used to test the hypothesized *a priori* model, as shown in Fig. 1. SEM is more robust than other multivariate statistical techniques and provides a basis for us to explore and compare competing models. Importantly of course, aside recognizing that there are errors in developed items (i.e.,  $E \neq 0$ ), SEM also enables us to validate the appropriateness of the postulation of an *a priori* model by producing goodness-of-fit index values for assessment (Kline, 2011; Schumacker and Lomax, 2004). It is possible, in this case, to use the modification fit index values to assist in the respecification of an *a priori* model with the testing of an alternative *a posteriori* model. More importantly, however, relevant and significant to the present study’s focus, SEM has the advantage of allowing us to test for *direct* and *indirect effects* for further development into mediating mechanisms of central variables (Bollen, 1989; Kline, 2015; Trafimow, 2015).

**Table 1**  
Correlational matrix for measured indicators.

	Sm-1	Sm-2	Sm-3	Sm-4	Sm-5	Pr-1	Pr-2	Pr-3	Pr-4	Pr-5	R-1	R-2	R-3	R-4	R-5	SE-1
Sm-1	1.00															
Sm-2	.46**	1.00														
Sm-3	.46**	.55**	1.00													
Sm-4	.43**	.57**	.64**	1.00												
Sm-5	.40**	.46**	.54**	.53**	1.00											
Pr-1	.08*	.15**	.19**	.16**	.17**	1.00										
Pr-2	.10**	.15**	.24**	.23**	.25**	.61**	1.00									
Pr-3	.17**	.20**	.28**	.26**	.28**	.56**	.62**	1.00								
Pr-4	.13**	.15**	.26**	.24**	.25**	.61**	.55**	.60**	1.00							
Pr-5	.09**	.14**	.22**	.14**	.24**	.47**	.42**	.46**	.49**	1.00						
R-1	.07*	.12**	.18**	.16**	.16**	.26**	.23**	.19**	.22**	.16**	1.00					
R-2	.19**	.22**	.27**	.22**	.25**	.23**	.27**	.24**	.22**	.18**	.33**	1.00				
R-3	.16**	.19**	.34**	.28**	.29**	.24**	.26**	.27**	.29**	.20**	.33**	.52**	1.00			
R-4	.17**	.17**	.26**	.21**	.20**	.25**	.28**	.26**	.22**	.21**	.35**	.37**	.44**	1.00		
R-5	.09**	.17**	.19**	.19**	.20**	.14**	.20**	.16**	.16**	.14**	.27**	.23**	.27**	.31**	1.00	
SE-1	.12**	.19**	.24**	.22**	.20**	.34**	.34**	.34**	.38**	.42**	.19**	.24**	.27**	.28**	.12**	1.00
SE-2	.11**	.17**	.17**	.18**	.20**	.37**	.37**	.36**	.36**	.35**	.12**	.16**	.19**	.14**	.19**	.29**
SE-3	.11**	.21**	.29**	.25**	.25**	.41**	.44**	.45**	.41**	.47**	.17**	.25**	.30**	.30**	.13**	.50**
SE-4	.16**	.19**	.27**	.27**	.26**	.27**	.29**	.24**	.31**	.24**	.14**	.27**	.33**	.22**	.17**	.26**
SE-5	.17**	.25**	.29**	.27**	.30**	.37**	.39**	.42**	.39**	.39**	.27**	.31**	.35**	.29**	.24**	.42**
Ef-1	.10**	.15**	.20**	.19**	.23**	.42**	.38**	.37**	.40**	.44**	.18**	.24**	.26**	.22**	.15**	.37**
Ef-2	.10**	.08*	.12**	.06*	.14**	.10**	.04	.09**	.16**	.20**	0.03	0.01	0.05	0.03	0.06	0.06
Ef-3	.09**	.16**	.22**	.21**	.20**	.26**	.28**	.28**	.27**	.35**	.23**	.20**	.19**	.32**	.14**	.32**
Ef-4	.11**	.14**	.21**	.20**	.21**	.36**	.37**	.35**	.36**	.41**	.19**	.24**	.26**	.34**	.16**	.47**
Ef-5	.14**	.18**	.25**	.21**	.22**	.25**	.18**	.21**	.25**	.31**	.24**	.24**	.29**	.26**	.13**	.31**
L-1	.15**	.19**	.24**	.20**	.24**	.22**	.13**	.19**	.16**	.23**	.13**	.20**	.21**	.19**	.19**	.18**
L-2	.15**	.09**	.18**	.16**	.17**	.15**	.14**	.20**	.12**	.19**	.09**	.21**	.19**	.17**	.13**	.14**
L-3	.15**	.19**	.23**	.20**	.19**	.22**	.19**	.22**	.17**	.23**	.17**	.25**	.25**	.20**	.16**	.22**
L-4	.11**	.15**	.19**	.17**	.23**	.25**	.17**	.22**	.23**	.26**	.16**	.24**	.20**	.19**	.16**	.20**
L-5	.13**	.19**	.23**	.24**	.24**	.25**	.22**	.23**	.24**	.21**	.24**	.28**	.25**	.21**	.10**	.18**
Em-1	.24**	.24**	.39**	.29**	.34**	.24**	.18**	.26**	.27**	.24**	.26**	.37**	.39**	.24**	.20**	.25**
Em-2	.18**	.21**	.25**	.20**	.23**	.21**	.21**	.21**	.20**	.17**	.30**	.55**	.43**	.29**	.21**	.25**
Em-3	.09**	0.05	.08**	0.03	0.01	0.06	0.02	0.03	.07*	.10**	0.05	.14**	.13**	.13**	0.03	.11**
Em-4	.15**	.14**	.19**	.15**	.16**	.16**	.13**	.17**	.18**	.17**	.08**	.24**	.28**	.15**	0.05	.18**
Em-5	.18**	.17**	.29**	.24**	.24**	.23**	.22**	.27**	.29**	.25**	.31**	.40**	.39**	.30**	.24**	.27**

Note: Sm = Social Milieu, Pr = Personal Resolve, R = Relating to Others, SE = Personal Beliefs of Efficacy, Ef = Effective Functioning, L = Academic Liking Experience, Em = Emotions. \* $p < .05$ , \*\* $p < .01$ .

We used the MPlus 8 statistical software package (Muthén and Muthén, 1998–2012) with covariance matrices and maximum likelihood (ML) procedures to test the a priori model. We analyzed covariance matrices because correlation matrix analysis is known to have problems, such as producing incorrect goodness-of-fit measures and standard errors (Byrne, 1998; Jöreskog and Sörbom, 2001). Furthermore, depending on the multivariate normality of the data, we selected to use one of the two estimation procedures – ML or robust ML (RML) procedures. ML procedure, for example, has been observed to perform reasonably well when data are normally distributed (Chou and Bentler, 1995).

### 3.1. Structural equation modelling analyses

Our initial data screening using SPSS 25 showed that the data were largely normally distributed – for example, the kurtosis and skewness values were within the range of  $\pm 1.50$  (Curran et al., 1996), and there were no visible outliers. Following existing recommendations (Byrne, 2012; Loehlin, 2004), we tested two competing a priori models to help ascertain understanding of our conceptualization:

- i. Model M<sub>1</sub>, which is a basic model, included the following paths: (i) the social milieu to relating to others (i.e., one path), (ii) personal resolve to self-efficacy and effective functioning (i.e., two paths), (iii) relating to others, self-efficacy, and effective functioning to academic liking experience (i.e., three paths), and (iv) academic liking experience to positive emotions (i.e., one path).
- ii. Model M<sub>2</sub>, based on Model M<sub>1</sub>, is more complex and enabled examination of direct and indirect effects: (i) the social milieu and personal resolve to academic liking experience (i.e., two paths), (ii) relating to

others, self-efficacy, and effective functioning to positive emotions (i.e., three paths), and (iii) the social milieu and personal resolve to positive emotions (i.e., two paths). Specifying the direct path from the social milieu to academic liking experience, for example, permitted us to gauge into the exploration and validation of the indirect effect, via relating to others (i.e., the social milieu → relating to others → academic liking experience).

#### 3.1.1. Model M<sub>1</sub> analysis

The correlational matrix of the measured indicators is shown in Table 1. The Model M<sub>1</sub> SEM analysis consisted of the freeing of eight specific structural paths, and five error variances between five pairs of items from the one-factor congeneric model analyses: Item 4 and Item 5 for the self-efficacy latent factor, Item 4 and Item 5 for the relating to others latent factor, Item 4 and Item 5 for the effective functioning latent factor, Item 1 and Item 2 for the academic liking experience latent factor, and Item 4 and Item 5 for positive emotions latent factor. The goodness-of-fit index values that were somewhat below the threshold levels, for example:  $\chi^2/df = 3.58$ ,  $p < .001$ , CFI = .89, TLI = .88, RMSEA = .051 (Lo90 = .049, Hi90 = .054),  $p > .05$ , and SRMR = .086. In fact, the poor fit of this a priori model was expected given that the model, in total, was non-parsimonious. Moreover, in terms of decomposition of effects, this model analysis did not provide an understanding of potential mediating mechanisms of the concepts of relating to others, self-efficacy, effective functioning, and academic liking experience.

#### 3.1.2. Model M<sub>2</sub> analysis

The Model M<sub>2</sub> SEM analysis expanded from Model M<sub>1</sub> and involved

SE-2	SE-3	SE-4	SE-5	Ef-1	Ef-2	Ef-3	Ef-4	Ef-5	L-1	L-2	L-3	L-4	L-5	Em-1	Em-2	Em-3	Em-4	Em-5
1.00																		
.38**	1.00																	
.25**	.31**	1.00																
.31**	.48**	.37**	1.00															
.34**	.36**	.31**	.38**	1.00														
.16**	.14**	.15**	.13**	.23**	1.00													
.20**	.40**	.19**	.30**	.36**	.26**	1.00												
.30**	.52**	.29**	.37**	.42**	.17**	.60**	1.00											
.23**	.35**	.26**	.28**	.33**	.25**	.31**	.39**	1.00										
.18**	.18**	.16**	.18**	.16**	.09**	.11**	.12**	.13**	1.00									
.07*	.14**	.12**	.14**	.15**	.09**	.16**	.15**	.10**	.51**	1.00								
.12**	.22**	.22**	.21**	.16**	0.04	.17**	.19**	.14**	.63**	.64**	1.00							
.19**	.21**	.16**	.25**	.25**	.14**	.18**	.18**	.15**	.58**	.50**	.67**	1.00						
.13**	.22**	.18**	.18**	.24**	0.01	.17**	.20**	.21**	.33**	.39**	.44**	.33**	1.00					
.22**	.25**	.35**	.32**	.31**	.16**	.23**	.26**	.30**	.35**	.30**	.38**	.32**	.33**	1.00				
.13**	.21**	.28**	.27**	.25**	0.04	.16**	.21**	.17**	.28**	.25**	.36**	.27**	.32**	.44**	1.00			
.07*	.12**	.15**	.08**	.06*	.10**	0.02	.07*	.12**	.08**	.10**	.09**	0.03	.11**	.22**	.19**	1.00		
.14**	.15**	.22**	.17**	.20**	.07*	.11**	.16**	.14**	.09**	.12**	.15**	.13**	.15**	.27**	.27**	.22**	1.00	
.22**	.23**	.29**	.33**	.25**	.10**	.17**	.24**	.18**	.25**	.19**	.30**	.24**	.26**	.47**	.45**	.14**	.31**	1.00

the freeing of seven additional structural paths, which we previously detailed (e.g., the social milieu → academic liking experience). Consequently, from the perspective of SEM, this model was more parsimonious than that of Model M<sub>1</sub>. The goodness-of-fit index values showed an improvement in model fit from Model M<sub>1</sub> to Model M<sub>2</sub>:  $\chi^2/df = 3.02, p < .001, CFI = .92, TLI = .91, RMSEA = .045 (Lo90 = .042, Hi90 = .047), p > .05, and SRMR = .063$ . The  $\Delta\chi^2$  test between the two models was statistically significant,  $p < .001$  (i.e.,  $\Delta\chi^2_{(Model\ M_1 - Model\ M_2)} = 358.38$ , indicating support for Model M<sub>2</sub> over that of Model M<sub>1</sub>).

Overall, comparing with the threshold goodness-of-fit index values that researchers recommend (Byrne, 2012; Kline, 2011), we note that Model M<sub>2</sub> is relatively modest in model fit. An inspection of the modification fit index values showed a respecification of Model M<sub>2</sub>, which specified a direct path from social milieu to self-efficacy. This recommended path suggested the potential for the social milieu to act as a determinant of students' self-efficacy beliefs for academic learning. The respecification of Model M<sub>2</sub> improved its fit minutely (i.e.,  $\chi^2/df = 2.96, p < .001, CFI = .92, TLI = .91, RMSEA = .044 (Lo90 = .042, Hi90 = .047), p > .05, and SRMR = .059$ ). Despite comparative goodness-of-fit index values between the two models, the  $\Delta\chi^2$  test indicated support for the respecified model, Model M<sub>3</sub> (i.e.,  $\Delta\chi^2_{(Model\ M_2 - Model\ M_3)} = 33.53, p < .001$ ).

Model M<sub>3</sub>, likewise, is moderate in terms of model fit. The complexity of the measurement and structural components of the *a posteriori* model (e.g., 35 measured indicators × seven latent factors) could have, in our view, accounted for the modest model fit. For discussion of the results, we have included the final solution of Model M<sub>3</sub> in Fig. 3. Furthermore, Table 2 shows the decomposition of direct, indirect, and total effects of Model M<sub>3</sub>. The decomposition of the indirect effects, alone, is presented in Table 3. Results that highlight potential mediating mechanisms of relating to others, self-efficacy, effective functioning, and academic liking experience are presented in Table 4.

An inspection of the results presented in Fig. 3 and Table 2 indicate nine statistically significant direct effects. The social milieu positively influenced both relating to others ( $\beta = .50, p < .001$ ) and self-efficacy ( $\beta = .19, p < .001$ ), whereas personal resolve positively influenced self-efficacy ( $\beta = .73, p < .001$ ) and effective functioning ( $\beta = .72, p < .001$ ). At the same time, both the social milieu ( $\beta = .11, p < .05$ ) and personal resolve ( $\beta = .19, p < .05$ ) positively influenced academic liking experience. Only relating to others, and not self-efficacy and/or effective functioning, positively influenced academic liking experience ( $\beta = .28, p < .001$ ) and positive emotions ( $\beta = .58, p < .001$ ). Aside from relating to others, academic liking experience also influenced positive emotions ( $\beta =$

**Table 2**  
Decomposition of direct, indirect and total effects.

	Direct	Indirect	Total	
On Relating to Others				
• Of Social Milieu	.50	***	.50	***
On Self-Efficacy				
• Of Social Milieu	.19	***	.19	***
• Of Personal Resolve	.73	***	.73	***
On Effective Functioning				
• Of Personal Resolve	.72	***	.72	***
On Academic Liking Experience				
• Of Relating to Others	.28	***	.28	***
• Of Self-Efficacy	.05	-	.05	
• Of Effective Functioning	-.04	-	-.04	
• Of Social Milieu	.11	*	.26	***
• Of Personal Resolve	.19	*	.20	***
On Emotional Functioning				
• Of Academic Liking Experience	.26	***	.26	***
• Of Relating to Others	.58	***	.65	***
• Of Self-Efficacy	.04	.01	.05	
• Of Effective Functioning	.08	-.01	.07	
• Of Social Milieu	.09	.36	.45	***
• Of Personal Resolve	.03	.13	.16	***

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

.26,  $p < .001$ ).

Interestingly, from Table 4, only two variables served as potential mediators: relating to others (i.e., social milieu → relating to others → academic liking experience:  $\beta = .14, p < .001$ ) and academic liking experience (i.e., relating to others → academic liking experience → positive emotions:  $\beta = .07, p < .001$ ). Both variables also acted in tandem with each other to mediate the effect of the social milieu onto positive emotions (i.e., social milieu → relating to others → academic liking experience → positive emotions:  $\beta = .04, p < .001$ ). This evidence, overall, has provided some empirical support for further development into the mediating mechanisms of relating to others and academic liking experience (Kline, 2015; Trafimow, 2015).

#### 4. Discussion and conclusion

The present study proposed an innovative conceptual model for examination, namely, clarification into the prediction of positive emotions. We rationalize that positive emotions, reflecting an enriched state of subjective well-being (ACU and Erebus International, 2008; Fraillon, 2004) would produce both short-term and long-term educational outcomes for university students. Being happy and approaching university studies and personal learning with a perceived sense of optimism (Nes et al., 2009; Rand, 2009; Tschannen-Moran et al., 2013), in this case, emphasize the saliency of positive psychology and education (Seligman and Csikszentmihályi, 2000; Seligman et al., 2009). Our inquiry then, reflecting the recent interest in human optimization (Fraillon, 2004; Phan et al., 2018a,b; Phan et al., 2017), involved the conceptualization of the following for validation: S → V → positive emotions.

##### 4.1. The social milieu and personal resolve: contrasting effects

An interesting inquiry from our conceptualization delved into the complexity of two contrasting influences: the social milieu and personal resolve. The results that we obtained indicate support for our original hypothesis, highlighting the differential and similar effects for the two concepts – differentially, in this instance, the social milieu influenced the concept of relating to others, whereas personal resolve influenced effective functioning. In terms of similarity, in contrast, the social milieu and personal resolve both influenced self-efficacy and academic liking experience. This comparable pattern in relationships emphasizes the following:

- i. A perceived positive sense of the social milieu (e.g., “I find this university is very welcoming”) serves as an important source of information in terms of facilitating students' social relationships at university (e.g., proactive social relationship with others at university), their beliefs of efficacy for learning and, more importantly, the enrichment of academic liking experiences.
- ii. Personal resolve, reflecting a strong sense of decisiveness and unwavering focus to succeed academically, serves as an important source of information in the formation of self-efficacy for learning, as well as motivating students to consider the importance of efficiency during a course of action. A strong sense of personal resolve, likewise, may initiate different goals for achievement, which in turn instill enriched academic liking experiences for students.

In line with our original hypothesis then, both the social milieu and personal resolve serve as determinants of three major psychological and psychosocial variables. At the same time, as shown in Table 3 and Table 4, both informational sources also indirectly influence students' positive emotions, via the concepts of relating to others and academic liking experience. Testament of this evidence emphasizes a need to engage in applied educational practices that could emphasize the salient nature of social milieu and a person's state of personal resolve. One of the universities that took part in our research, for example, offers financial incentives (e.g., cheaper on-campus accommodation) to assist many of



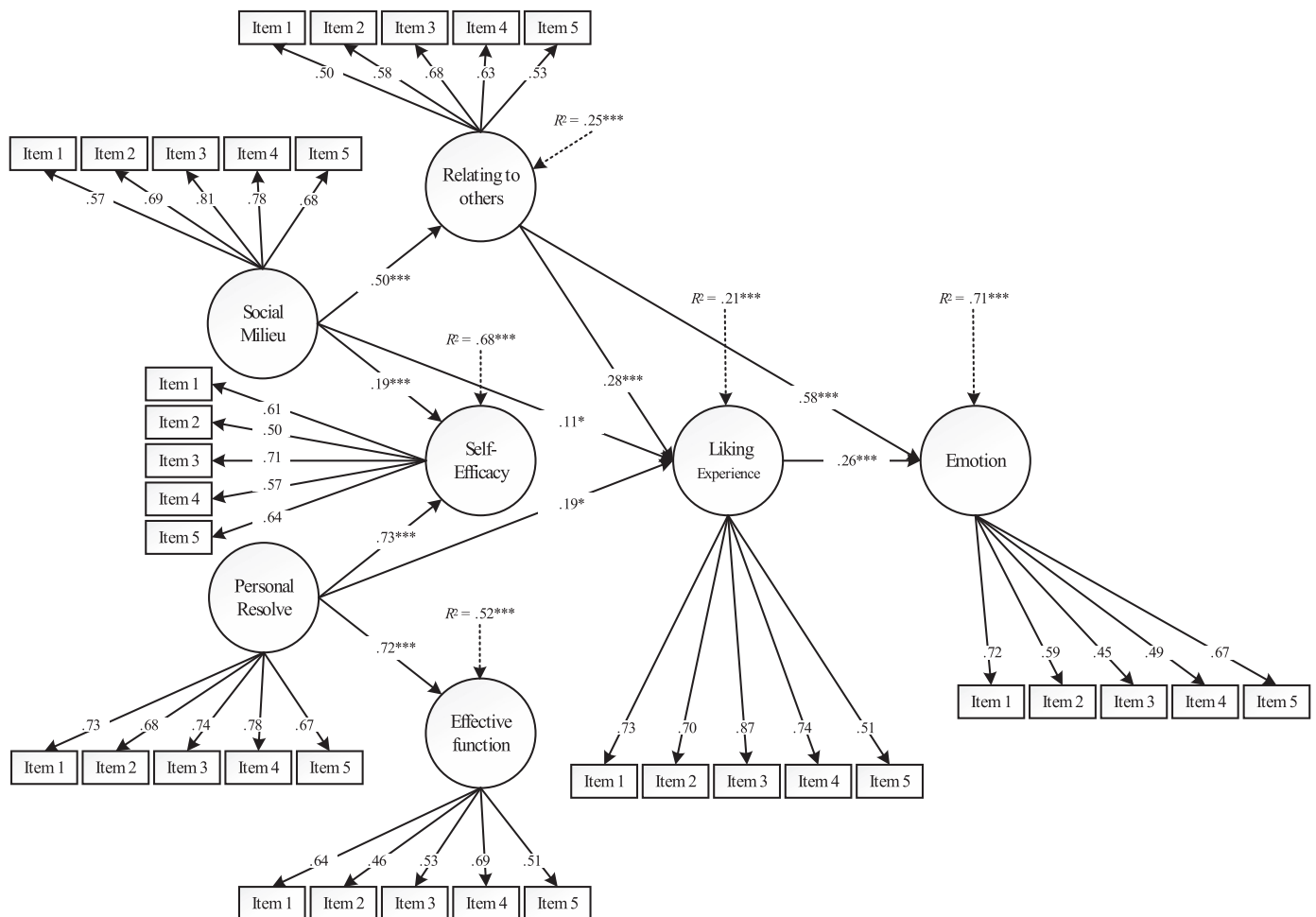


Fig. 3. Final Solution. Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . Non-statistically significant paths have been omitted for clarity.

Table 3  
Decomposition of indirect effects.

Predictor		Outcome	$\beta$	$p$
Social Milieu	Relating to Others	Academic Liking Experience	.14	***
Social Milieu	Self-Efficacy	Academic Liking Experience	.01	
Personal Resolve	Self-Efficacy	Academic Liking Experience	.04	
Personal Resolve	Effective Functioning	Academic Liking Experience	-.03	
Relating to Others	Academic Liking Experience	Emotional Functioning	.07	***
Self-Efficacy	Academic Liking Experience	Emotional Functioning	.01	
Effective Functioning	Academic Liking Experience	Emotional Functioning	-.01	
Social Milieu	Relating to Others	Emotional Functioning	.29	***
Social Milieu	Self-Efficacy	Emotional Functioning	.01	
Social Milieu	Academic Liking Experience	Emotional Functioning	.03	
Social Milieu	Relating to Others	Academic Liking Experience	.04	***
Social Milieu	Self-Efficacy	Academic Liking Experience	.00	
Personal Resolve	Self-Efficacy	Emotional Functioning	.03	
Personal Resolve	Effective Functioning	Emotional Functioning	.06	
Personal Resolve	Academic Liking Experience	Emotional Functioning	.05	*
Personal Resolve	Self-Efficacy	Academic Liking Experience	.01	
Personal Resolve	Effective Functioning	Academic Liking Experience	-.01	

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

the students who experience personal difficulties. In a similar vein, another institution where two of the authors teach has different extra-curricular programs to help prepare first-year students with general academic skills for academic learning. Of course, there are other initiatives that may instill positive perceptions and provide students with enriched learning experiences at university. Academics' willingness to actively engage with their students in the teaching and learning processes may convey strong messages of care, understanding, empathy, etc. Our own

personal experiences as academics have included bushwalking, meditation, and focus study groups, all of which have helped create a positive social learning climate.

By the same token, we need to consider educational programs and/or in-class pedagogical practices that could help instill personal resolve. One creative method that is worthy is to expose students to different types of competitive sports, which may showcase individual and/or collective mental fortitude, unwavering focus regardless of the situation at hand,

**Table 4**  
Mediating effects.

Predictor	Mediator	Outcome	$\beta$	<i>p</i>
Social Milieu	Relating to Others	Academic Liking Experience	.14	***
Social Milieu	Self-Efficacy	Academic Liking Experience	.01	
Personal Resolve	Self-Efficacy	Academic Liking Experience	.04	
Personal Resolve	Effective Functioning	Academic Liking Experience	-.03	
Relating to Others	Academic Liking Experience	Emotional Functioning	.07	***
Self-Efficacy	Academic Liking Experience	Emotional Functioning	.01	
Effective Functioning	Academic Liking Experience	Emotional Functioning	-.01	
Social Milieu	Relating to Others	Academic Liking Experience	.04	***
Social Milieu	Self-Efficacy	Academic Liking Experience	.00	
Personal Resolve	Self-Efficacy	Academic Liking Experience	.01	
Personal Resolve	Effective Functioning	Academic Liking Experience	-.01	

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

and self-confidence. Bandura's (1986; 1997) social cognitive theory has acknowledged the importance of vicarious learning and, as such, students may observe, imitate, and learn from sportsmen and sportswomen in term of their varying degrees of personal resolve. We contend that positive feedbacks (Schunk, 1982, 1983, 1984), likewise, may foster and encourage students to practice and engage in personal resolve. Experience of obstacles and setbacks (e.g., failing an extremely difficult test), from the perspective of intrinsic motivation, could also serve as a basis for students to remain determined and purposively stay on task without any indecisiveness for the sake of succeeding. For example, intrinsically in terms of mastery, deep meaningful learning, and improvement of personal competence, a student would not lose motivation simply because he/she has recently experienced failure(s). In other words, the quest to master and succeed for intrinsic reasoning may compel and facilitate personal resolve, unlike behaviorism (Watson, 1924; Watson and Rayner, 1920), which views obstacles and setbacks as sources of punishment, resulting in a sense of a demotivation (Phan and Ngu, 2019a,b).

#### 4.2. Relating to others, personal self-efficacy, and effective functioning

Of the three proposed psychological and psychosocial variables, only relating to others positively influenced academic liking experience and positive emotions. This evidence, supporting previous research (e.g., Lau et al., 2008; Liem and Martin, 2011; Phan, 2017), emphasizes the importance and implications of proactive social relationships. Positive social integration in lectures and tutorial classes, for example, may assist students both personally and professionally. As a point of discussion, being able to relate to others:

- i. May open up opportunities for university students to seek help and proactively work with others to achieve scholarly outcomes, both individually and collectively, which could then instill positive academic liking experiences (e.g., "I really like going to university"). Being able to relate to others, likewise, may instill a belief that university is a place that offers emotional and/or social support, resulting in enriched academic experiences for students to acquire.
- ii. May encourage friendship, academic assistance, and social support, which could then instill positive emotions. Personal friendship outside of class and in-class peer assistance are examples of successful schooling experiences. A student's inability to relate to others, in contrast, may yield a number of detrimental outcomes, such as loneliness, a perceived sense of alienation, and subsequent negative emotions.

The established evidence into the predictive and mediating role of relating to others is noteworthy for consideration in terms of applied educational practices. What can educators do to promote and encourage proactive student social relatedness in university and/or school? One possibility, from previous results, is to consider the fostering of a

perceived positive social milieu – a social milieu that has cross-campus extracurricular activities (e.g., sports activities) and/or encourages focus group studies, for example, may convey messages of harmony, acceptance of diversity, collective beliefs, etc., which could then result in more social engagement. Teaching pedagogies (e.g., cooperative learning: Phuong-Mai et al., 2009) and/or assessment tasks that emphasize group learning experiences, similarly, may encourage intentional and unintentional academic interactions.

The non-statistically significant effects of self-efficacy and effective functioning are of interest in terms of theoretical understanding and future research development. One possible reason for this absence of associations may arise from the issue of *microanalytical specificity* and *contextualization* (Bandura, 1997; Pajares, 1996a,b). A meaningful effect is likely when the criterial task at hand (e.g., academic performance) closely aligns with the antecedent under investigation (e.g., self-efficacy) (Pajares, 1996a,b; Pajares and Kranzler, 1995). Perhaps, from our evidence, it would be preferable to include microanalytical measures (e.g., academic performance), which in turn could predict academic liking experiences and positive emotions.

#### 4.3. The importance of academic liking experience

It cannot be overstated that the concept of academic liking experience is central to the teaching and learning processes. A student's high score on the self-report measure of academic liking experience may indicate his/her personal enjoyment, enriched learning experience, and/or appreciation of schooling, in general. A low score, in contrast, may suggest the existence of problems and difficulties, which in turn could reflect individual failures. Moreover, as affirmed from our results, academic liking experience served as a direct determinant of positive emotions – that is, for example, an enriched liking experience is likely to facilitate and instill a state of positive emotions and, in a similar vein, academic non-liking experience more likely to yield negative emotions.

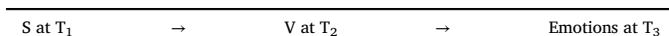
In a similar vein, from Table 3 and Table 4, academic liking experience serves as a central variable, potentially mediating the effects of the social milieu and relating to others on positive emotions. Indeed, this evidence empirically supports existing research (Phan et al., 2018a,b; Van Damme et al., 2002), emphasizing the importance of academic and schooling experiences, academically and non-academically. From an educational point of view, it is of value to focus on the enrichment and cultivation of students' university-wide experiences. Referring to our previous discussion, emphasis pertaining to the fostering of the social milieu and proactive social relationships (e.g., peer relationship: Molloy et al., 2011) is feasible.

#### 4.4. Caveats and future directions

An important inquiry of the present study involved both theoretical and empirical insights into the facilitation and enhancement of positive emotions for university students. We capitalize on existing

conceptualizations of motivation and positive psychology to develop our correlational model for examination. One notable caveat, which we alluded earlier, is that our research design involved the use of non-experimental data. As such, aside from identifying associative patterns between variables (e.g., academic liking experience → positive emotions), we were not able to elucidate the importance of ‘optimization’ – for example, whether and/or to what extent the concept of relating to others could actually ‘optimize’ the improvement of a student’s positive emotions. We acknowledge that a more complex methodological design is needed to appropriately validate the theoretical tenets of optimization in the enhancement of positive emotions (Phan et al., 2019). The use of *in situ* experimental treatments that involve personal resolve, say, may help to enhance and optimize students’ positive emotions. By the same token, it would also enrich this line of inquiry if researchers could incorporate some adaptive outcomes, such as academic performance in their study and analysis of the optimization of positive emotions. The question then for consideration is to explore and determine the effectiveness of optimization (Phan et al., 2018a,b; Phan et al., 2017; Phan et al., 2019) on academic performance, say, via means of positive emotions.

We note that our final solution, Model M<sub>3</sub>, is relatively modest in terms of model fit (e.g., CFI = ~.92). This evidence purports a need for further research development into the reconceptualization of Fig. 1. In this analysis, cross-sectional data do not provide grounding for us to test an alternative model, which could consist of other relationships (e.g., the direct influence of positive emotions on academic liking experience). Longitudinal data, in contrast, are more advantageous in allowing researchers to explore causal and mediating effects. Recent discussions have led researchers to propose the fulfilment of specific criteria when testing for mediating effects between variables (Baron and Kenny, 1986). In this analysis, aside from experimental treatments, researchers have emphasized the importance of *time precedence* between S, V, and emotions (i.e., V is the potential mediator) (Grice et al., 2015; Kline, 2015; Tate, 2015). True understanding of the mediating effect of V, in this case, requires a ‘time-sequencing’ of variables between a predictor and an outcome (Tate, 2015, p. 235) for examination – for example:



Finally, as an interesting point for future research development, educators, researchers, and/or institutions could consider pathways, opportunities, etc. that may enable the statistical testing and empirical validation of university-based initiatives to facilitate the positive sense of social milieu and/or the subjective sense of students. This line of inquiry is largely concerned with the collection of ‘hard data’ that could, indeed, affirm the potency and effectiveness of initiatives, programs, pathways, etc. to foster positive emotions, directly and/or indirectly. For example, we previously described the use of Buddhist meditation by some of us to help alleviate students’ anxiety and stress. It would be enriching to ‘transform’ this practice into a formal research inquiry for investigation. One particular focus, in this analysis, may relate to the elucidation of students’ judgments and perceptions of effectiveness and/or relevance of different types of university-based initiatives, pathways, and programs. This finding, aside from scientific interest, would inform and help administrators and senior executives to revise existing initiatives, pathways, and programs, and/or to explore other alternatives.

## Declarations

### Author contribution statement

H. P. Phan: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

B. H. Ngu: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

H-W. Wang, J-H. Shih, S-Y Shi, R-Y. Lin: Performed the experiments; Contributed reagents, materials, analysis tools or data.

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### Competing interest statement

The authors declare no conflict of interest.

### Additional information

No additional information is available for this paper.

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### References

- ACU and Erebus International, 2008. Scoping Study into Approaches to Student Wellbeing: Literature review. Report to the Department of Education, Employment and Workplace Relations. Australian Catholic University, Sydney, Australia.
- Allen, J., Gregory, A., Mikami, A., Lun, J., Hamre, B., Pianta, R., 2013. Observations of effective teacher-student interactions in secondary school classrooms: predicting student achievement with the classroom assessment Scoring system-secondary. *Sch. Psychol. Rev.* 42 (1), 76–98.
- Bandura, A., 1977. Self-efficacy: toward a unifying theory of behavioral change. *Psychol. Rev.* 84 (2), 191–215.
- Bandura, A., 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Prentice-Hall, Englewood Cliffs, NJ.
- Bandura, A., 1997. Self-efficacy: the Exercise of Control. W. H. Freeman & Co, New York.
- Bandura, A., 2018. Toward a psychology of human agency: pathways and reflections. *Perspect. Psychol. Sci.* 13 (2), 130–136.
- Baron, R.M., Kenny, D.A., 1986. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Personal. Soc. Psychol.* 51 (6), 1173–1182.
- Bascia, N., 2014. The school context model: how school environments shape students’ opportunities to learn. In: *In Measuring what Matters, People for Education*. Toronto. (Accessed 8 November 2014).
- Berger, C., Alcalay, L., Torretti, A., Milicic, N., 2011. Socio-emotional well-being and academic achievement: evidence from a multilevel approach. *Psicol. Reflexão Crítica* 24 (2), 344–351.
- Bollen, K.A., 1989. *Structural Equations with Latent Variables*. Wiley, New York.
- Bronfenbrenner, U., 1979. *The Ecology of Human Development*. Harvard University Press, Cambridge, MA.
- Bronfenbrenner, U., 1989. Ecological systems theory. In: Vasta, R. (Ed.), *Annals of Child Development: Theories of Child Development: Revised Formulations and Current Issues*, 6. JAI Press, Greenwich, CT, pp. 187–251.
- Byrne, B.M., 1998. *Structural Equation Modelling with LISREL, PRELIS, and SIMPLIS*. Erlbaum, Mahwah, NJ.
- Byrne, B.M., 2012. *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*. Taylor & Francis Group, New York, NY.
- Chou, C.P., Bentler, P.M., 1995. Estimates and tests in structural equation modelling. In: Hoyle, R.H. (Ed.), *Structural Equation Modelling: Concepts, Issues, and Applications*. Sage, Thousand Oaks, CA, pp. 37–55.
- Collie, R.J., Martin, A.J., Malmberg, L.E., Hall, J., Ginns, P., 2015. Academic buoyancy, student’s achievement, and the linking role of control: a cross-lagged analysis of high school students. *Br. J. Educ. Psychol.* 85 (1), 113–130.
- Crosnoe, R., Morrison, F., Burchinal, M., Pianta, R., Keating, D., Friedman, S.L., Clarke-Stewart, K.A., The Eunice Kennedy Shriver National Institute of Child Health and Human Development Early Child Care Research Network, 2010. Instruction, teacher-student relations, and math achievement trajectories in elementary school. *J. Educ. Psychol.* 102 (2), 407–417.
- Curran, P.J., West, S.G., Finch, J.F., 1996. The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychol. Methods* 1, 16–29.
- Daniels, L.M., Haynes, T.L., Stupnisky, R.H., Perry, R.P., Newall, N.E., Pekrun, R., 2008. Individual differences in achievement goals: a longitudinal study of cognitive, emotional, and achievement outcomes. *Contemp. Educ. Psychol.* 33 (4), 584–608.
- Daulta, M.S.N., 2008. Impact of home environment on the scholastic achievement of children. *J. Hum. Ecol.* 23 (1), 75–77.

- Deci, E.L., Ryan, R.M., 2008. Self-determination theory: a macrotheory of human motivation, development, and health. *Canadian Psychol./Psychologie Canadienne* 49 (3), 182–185.
- Deci, E.L., Vallerand, R.J., Pelletier, L.G., Ryan, R.M., 1991. Motivation and education - the self-determination perspective. *Educ. Psychol.* 26 (3-4), 325–346.
- Dorman, J.P., Fraser, B.J., 2009. Psychosocial environment and affective outcomes in technology-rich classrooms: testing a causal model. *Soc. Psychol. Educ.* 12 (1), 77–99.
- Duchesne, S., Ratelle, C., 2010. Parental behaviors and adolescents' achievement goals at the beginning of middle school: emotional problems as potential mediators. *J. Educ. Psychol.* 102 (2), 497–507.
- Elliot, A.J., Murayama, K., 2008. On the measurement of achievement goals: critique, illustration, and application. *J. Educ. Psychol.* 100 (3), 613–628.
- Fast, L.A., Lewis, J.L., Bryant, M.J., Bocian, K.A., Cardullo, R.A., Rettig, M., Hammond, K.A., 2010. Does math self-efficacy mediate the effect of perceived classroom environment on standardized math performance? *J. Educ. Psychol.* 102 (3), 729–740.
- Febrilia, I., Warokka, A., 2011. The effects of positive and negative mood on university students' learning and academic performance: evidence from Indonesia. In: Paper Presented at the the 3rd International Conference on Humanities and Social Sciences, Faculty of Liberal Arts, Prince of Songkla University.
- Fenollar, P., Román, S., Cuestas, P.J., 2007. University students' academic performance: an integrative conceptual framework and empirical analysis. *Br. J. Educ. Psychol.* 77 (Pt 4), 873–891.
- Frailton, J., 2004. Measuring student well-being in the context of Australian schooling: discussion paper (E. Ministerial council on education, training and youth affairs. In: Carlton South. The Australian Council for Research, Victoria.
- Gonzalez, R., Padilla, A.M., 1997. The academic resilience of Mexican American high school students. *Hisp. J. Behav. Sci.* 19, 301–317.
- Goodenow, C., 1993. The Psychological Sense of School Membership among adolescents - scale development and educational correlates. *Psychol. Sch.* 30 (1), 79–90.
- Goodenow, C., Grady, K., 1993. The relationship of school belonging and friends' values to academic motivation among urban adolescent students. *J. Exp. Educ.* 60, 60–71.
- Grice, J.W., Cohn, A., Ramsey, R.R., Chaney, J.M., 2015. On muddled reasoning and mediation modeling. *Basic Appl. Soc. Psychol.* 37 (4), 214–225.
- Gumora, G., Arsenio, W.F., 2002. Emotionality, emotion regulation, and school performance in middle school children. *J. Sch. Psychol.* 40 (5), 395–413.
- Hamilton, P.L., 2013. It's not all about academic achievement: supporting the social and emotional needs of migrant worker children. *Pastor. Care Educ.* 31 (2), 173–190.
- Hasnain, N., Wazid, S.W., Hasan, Z., 2014. Optimism, hope, and happiness as correlates of psychological well-being among young adult Assamese males and females. *J. Humanit. Soc. Sci.* 19 (2), 44–51.
- Henry, K.L., Knight, K.E., Thornberry, T.P., 2012. School disengagement as a predictor of dropout, delinquency, and problem substance use during adolescence and early adulthood. *J. Youth Adolesc.* 41, 156–166.
- Howell, R.T., Chenot, D., Hill, G., Howell, C.J., 2011. Momentary happiness: the role of psychological need satisfaction. *J. Happiness Stud.* 12 (1), 1–15.
- Jain, S., Dowson, M., 2009. Mathematics anxiety as a function of multidimensional self-regulation and self-efficacy. *Contemp. Educ. Psychol.* 34 (3), 240–249.
- Jöreskog, K.G., Sörbom, D., 2001. LISREL 8: User's Reference Guide [software Manual]. Scientific Software, Chicago.
- Joshi, S., Acharya, N., 2013. Home environment and achievement motivation of adolescents. *Soc. Sci. Int.* 29 (1), 105–120.
- Kiuru, N., Pakarinen, E., Vasalampi, K., Silinskas, G., Aunola, K., Poikkeus, A.M., Metsapelto, R.L., Lerkkanen, M.K., Nurmi, J.E., 2014. Task-focused behavior mediates the associations between supportive interpersonal environments and students' academic performance. *Psychol. Sci.* 25 (4), 1018–1024.
- Kline, R.B., 2011. *Principles and Practice of Structural Equation Modeling*, third ed. The Guilford Press, New York, NY.
- Kline, R.B., 2015. The mediation myth. *Basic Appl. Soc. Psychol.* 37 (4), 202–213.
- Kwek, A., Bui, H.T., Rynne, J., So, K.K.F., 2013. The impacts of self-esteem and resilience on academic performance: an investigation of domestic and international Hospitality and Tourism undergraduate students. *J. Hosp. Tour. Educ.* 25, 110–122.
- Lau, S., Liem, A.D., Nie, Y., 2008. Task- and self-related pathways to deep learning: the mediating role of achievement goals, classroom attentiveness, and group participation. *Br. J. Educ. Psychol.* 78 (Pt 4), 639–662.
- Leka, I., 2015. The impact of peer relations in the academic process among adolescents. *Mediterr. J. Soc. Sci.* 6 (1), 127–132.
- Li, L.K.Y., 2012. A study of the attitude, self-efficacy, effort and academic achievement of CityU students towards research methods and statistics. *Discov. - SS Stud. E-J.* 1, 154–183.
- Li, Y., Lynch, A.D., Kalvin, C., Liu, J., Lerner, R.M., 2011. Peer relationships as a context for the development of school engagement during early adolescence. *IJBD (Int. J. Behav. Dev.)* 35 (4), 329–342.
- Liem, A.D., Lau, S., Nie, Y., 2008. The role of self-efficacy, task value, and achievement goals in predicting learning strategies, task disengagement, peer relationship, and achievement outcome. *Contemp. Educ. Psychol.* 33 (4), 486–512.
- Liem, G.A.D., Martin, A.J., 2011. Peer relationships and adolescents' academic and non-academic outcomes: same-sex and opposite-sex peer effects and the mediating role of school engagement. *Br. J. Educ. Psychol.* 81, 183–206.
- Loehlin, J.C., 2004. *Latent Variable Models: an Introduction to Factor, Path, and Structural Equation Analysis*, fourth ed. Lawrence Erlbaum Associates, Publishers, Mahwah, NJ.
- Martin, A.J., Ginns, P., Brackett, M.A., Malmberg, L.E., Hall, J., 2013. Academic buoyancy and psychological risk: exploring reciprocal relationships. *Learn. Individ. Differ.* 27, 128–133.
- Martin, A.J., Marsh, H.W., 2008. Academic buoyancy: towards an understanding of students' everyday academic resilience. *J. Sch. Psychol.* 46 (1), 53–83.
- Molloy, L.E., Gest, S.D., Rulison, K.L., 2011. Peer influences on academic motivation: exploring multiple methods of assessing youths' most "influential" peer relationships. *J. Early Adolesc.* 31 (1), 13–40.
- Muthén, L.K., Muthén, B.O., 1998 - 2012. *Mplus User's Guide*, seventh ed. Muthén & Muthén, Los Angeles, CA.
- Nes, L.S., Evans, D.R., Segerstrom, S.C., 2009. Optimism and college retention: mediation by motivation, performance, and adjustment. *J. Appl. Soc. Psychol.* 39 (8), 1887–1912.
- NSW Department of Education and Communities, 2015. *The Wellbeing Framework for School*. NSW Department of Education and Communities, Sydney, NSW.
- Opendakker, M.-C., Van Damme, J., 2000. Effects of schools, teaching staff and classes on achievement and well-being in secondary education: similarities and differences between school outcomes. *Sch. Eff. Sch. Improv.* 11 (2), 165–196.
- Pajares, F., 1996a. Self-Efficacy beliefs and mathematical problem-solving of gifted students. *Contemp. Educ. Psychol.* 21, 325–344.
- Pajares, F., 1996b. Self-efficacy beliefs in academic settings. *Rev. Educ. Res.* 66 (4), 543–578.
- Pajares, F., Kranzler, J., 1995. Self-efficacy beliefs and general mental-ability in mathematical problem-solving. *Contemp. Educ. Psychol.* 20 (4), 426–443.
- Pajares, F., Miller, M.D., Johnson, M.J., 1999. Gender differences in writing self-efficacy beliefs of elementary school students. *J. Educ. Psychol.* 91 (1), 50–61.
- Pekrun, R., Elliot, A.J., Maier, M.A., 2009. Achievement goals and achievement emotions: testing a model of their joint relations with academic performance. *J. Educ. Psychol.* 101 (1), 115–135.
- Phan, H.P., 2015. Maximizing academic success: introducing the concept of optimized functioning. *Education* 135 (4), 439–456.
- Phan, H.P., 2017. The self-systems: facilitating personal well-being experiences at school. *Soc. Psychol. Educ.* 20 (1), 115–138.
- Phan, H.P., Ngu, B.H., 2014. The Academic Well-Being Experience Questionnaire (AWEQ). UNE, Armidale, NSW.
- Phan, H.P., Ngu, B.H., 2016. Optimal outcomes: a focus on theoretical tenets for consideration. In: Porter, J. (Ed.), *Deep Learning: Fundamentals, Methods and Applications*. Nova Publishing, New York, NY, pp. 33–60.
- Phan, H.P., Ngu, B.H., 2019a. Expanding on the theoretical concept of 'optimization' for effective learning: establishing empirical evidence from an Eastern sociocultural perspective. In: Liem, A.D., Hong, S.T. (Eds.), *Asian Education Miracles: in Search of Sociocultural and Psychological Explanations*. Routledge, Oxon, New York, pp. 222–240.
- Phan, H.P., Ngu, B.H., 2019b. *Teaching, Learning and Psychology*. Oxford University Press, Docklands, Melbourne.
- Phan, H.P., Ngu, B.H., Alrashidi, O., 2018a. Contextualised self-beliefs in totality: an integrated framework from a longitudinal perspective. *Educ. Psychol.* 38 (4), 411–434.
- Phan, H.P., Ngu, B.H., Wang, H.-W., Shih, J.-H., Shi, S.-Y., Lin, R.-Y., 2018b. Understanding levels of best practice: an empirical development. *PLoS One* 13 (6), e0198888.
- Phan, H.P., Ngu, B.H., Yeung, A.S., 2017. Achieving optimal best: instructional efficiency and the use of cognitive load theory in mathematical problem solving. *Educ. Psychol. Rev.* 29 (4), 667–692.
- Phan, H.P., Ngu, B.H., Yeung, A.S., 2019. The process of optimization: examination and proposition. *Front. Psychol.* 10, 1398.
- Puong-Mai, N., Terlouw, C., Pilot, A., Elliott, J., 2009. Cooperative learning that features a culturally appropriate pedagogy. *Br. Educ. Res. J.* 35 (6), 857–875.
- Pintrich, P.R., Smith, D.A.F., Garcia, T., McKeachie, W.J., 1993. Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educ. Psychol. Meas.* 53, 810–814.
- Rand, K.L., 2009. Hope and optimism: latent structures and influences on grade expectancy and academic performance. *J. Personal.* 77 (1), 231–260.
- Rittle-Johnson, B., Star, J.R., Durkin, K., 2017. The power of comparison in mathematics instruction: experimental evidence from classrooms. In: Geary, D.C., Berch, D.B., Koepke, K.M. (Eds.), *Mathematical Cognition and Learning: Acquisition of Complex Arithmetic Skills and Higher-Order Mathematics Concepts*. Elsevier, Waltham, MA, pp. 273–295.
- Romero, C., Master, A., Paunesku, D., Dweck, C.S., Gross, J.J., 2014. Academic and emotional functioning in middle school: the role of implicit theories. *Emotion* 14 (2), 227.
- Roorda, D.L., Koomen, H.M.Y., Spilt, J.L., Oort, F.J., 2011. The influence of affective teacher-student relationships on students' school engagement and achievement: a meta-analytic approach. *Rev. Educ. Res.* 81 (4), 493–529.
- Salamonson, Y., Andrew, S., Everett, B., 2009. Academic engagement and disengagement as predictors of performance in pathophysiology among nursing students. *Contemp. Nurse* 32 (1 - 2), 123–132.
- Schumacker, R.E., Lomax, R.G., 2004. *A Beginner's Guide to Structural Equation Modeling*, second ed. Lawrence Erlbaum Associates, Inc, Mahwah, NJ.
- Schunk, D.H., 1982. Effects of effort attributional feedback on children's perceived self-efficacy and achievement. *J. Educ. Psychol.* 74, 548–556.
- Schunk, D.H., 1983. Ability versus effort attributional feedback: differential effects on self-efficacy and achievement. *J. Educ. Psychol.* 75, 848–856.
- Schunk, D.H., 1984. Sequential attributional feedback and children's achievement behaviors. *J. Educ. Psychol.* 76, 1159–1169.
- Seifert, T.L., O'Keefe, B.A., 2001. The relationship of work avoidance and learning goals to perceived competence, externality and meaning. *Br. J. Educ. Psychol.* 71 (1), 81–92.

- Seligman, M., Csikszentmihályi, M., 2000. Positive psychology: an introduction. *Am. Psychol.* 55 (1), 5–14.
- Seligman, M., Ernst, R.M., Gillham, J., Reivich, K., Linkins, M., 2009. Positive education: positive psychology and classroom interventions. *Oxf. Rev. Educ.* 35 (3), 293–311.
- Sins, P.H.M., van Joolingen, W.R., Savelsbergh, E.R., van Hout-Wolters, B., 2008. Motivation and performance within a collaborative computer-based modeling task: relations between students' achievement goal orientation, self-efficacy, cognitive processing, and achievement. *Contemp. Educ. Psychol.* 33 (1), 58–77.
- Skinner, E.A., Kindermann, T.A., Furrer, C.J., 2009. A motivational perspective on engagement and disaffection: conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educ. Psychol. Meas.* 69 (3), 493–525.
- Spice, L.M., 2011. The Effect of Induced Happiness Levels on Academic Performance. Undergraduate Honors Thesis. Butler University.
- Tabbodi, M., Rahgozar, H., Abadi, M.M.M., 2015. The relationship between happiness and academic achievements. *Eur. Online J. Nat. Soc. Sci.* 4 (1), 241–246.
- Tate, C.U., 2015. On the overuse and misuse of mediation analysis: it may be a matter of timing. *Basic Appl. Soc. Psychol.* 37 (4), 235–246.
- Trafimow, D., 2015. Introduction to the special issue on mediation analyses: what if planetary scientists used mediation analysis to infer causation? *Basic Appl. Soc. Psychol.* 37 (4), 197–201.
- Tschannen-Moran, M., Bankole, R.A., Mitchell, R.M., Moore, J.D.M., 2013. Student academic optimism: a confirmatory factor analysis. *J. Educ. Adm.* 51 (2), 150–175.
- Tugade, M.M., Fredrickson, B.L., 2007. Regulation of positive emotions: emotion regulation strategies that promote resilience. *J. Happiness Stud.* 8 (3), 311–333.
- Valiente, C., Lemery-Chalfant, K., Swanson, J., 2010. Prediction of kindergartners' academic achievement from their effortful control and emotionality: evidence for direct and moderated relations. *J. Educ. Psychol.* 102 (3), 550–560.
- Valiente, C., Swanson, J., Eisenberg, N., 2012. Linking students' emotions and academic achievement: when and why emotions matter. *Child Dev. Perspect.* 6 (2), 129–135.
- Van Damme, J., De Fraine, B., Van Landeghem, G., Opendakker, M.-C., Onghena, P., 2002. A new study on educational effectiveness in secondary schools in Flanders: an introduction. *School Effectiveness and School Improvement. Int. J. Res. Pharmacol. Pharmacother.* 13 (4), 383–397.
- Villavicencio, F., 2011. Critical Thinking, Negative Academic Emotions, and Achievement: A Mediation Analysis (Vol. 20).
- Villavicencio, F.T., Bernardo, A.B.I., 2013. Positive academic emotions moderate the relationship between self-regulation and academic achievement. *Br. J. Educ. Psychol.* 83 (2), 329–340.
- Villavicencio, F.T., Bernardo, A.B.I., 2016. Beyond math anxiety: positive Emotions predict mathematics achievement, self-regulation, and self-efficacy. *Asia-Pac. Educ. Res.* 25 (3), 415–422.
- Vygotsky, L., 1978. *Mind in Society: the Development of Higher Psychological Processes*. Harvard University Press, Cambridge, MA.
- Watson, J.B., 1924. *Behaviorism*. People's Institute Publishing Company, New York, NY.
- Watson, J.B., Rayner, R., 1920. Conditioned emotional reactions. *J. Exp. Psychol.* 3, 1–14.
- Wilson, K., Narayan, A., 2014. Relationships among individual task self-efficacy, self-regulated learning strategy use and academic performance in a computer-supported collaborative learning environment. *Educ. Psychol.* 1–18.
- Wong, N.-Y., Watkins, D., 1998. A longitudinal study of the psychosocial environmental and learning approaches in the Hong Kong classroom. *J. Educ. Res.* 91 (4), 247–254.
- You, J.W., 2018. Testing the three-way interaction effect of academic stress, academic self-efficacy, and task value on persistence in learning among Korean college students. *High. Educ.* 1–15.