

PROTECTIVE RESOURCES FOR PSYCHOLOGICAL WELL-BEING OF ADOLESCENTS

EDITED BY: Lourdes Rey, Mario Pena and Félix Neto
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PROTECTIVE RESOURCES FOR PSYCHOLOGICAL WELL-BEING OF ADOLESCENTS

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Editorial: Protective Resources for Psychological Well-Being of Adolescents

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Editorial on the Research Topic

Protective Resources for Psychological Well-Being of Adolescents

Adolescence is an essential stage of the lifecycle, in which children begin to develop their identity, experiment with multiple changes in several areas and contexts (family, school, social, and personal) and cope with stressful events. How they manage each changing situation will influence their psychological adjustment and personal well-being. Positive Psychology constitutes a framework focusing on positive aspects, personal resources and protective factors that prevent, provide a buffer against and boost coping with stressful and difficult situations. Therefore, the main aim of this Research Topic is to examine the role of protective factors in family, school, social relationships and personal contexts in preventing psychological maladjustment and enhancing adolescents' psychological well-being.

For adolescents there are several important contexts that can influence how vulnerable or resilient they are in stressful situations. One of these contexts, considered to be one of the most important and immediate in which adolescents satisfy their basic needs, grow, learn and develop, is that of the family. Thus, Zhao et al. examined the regulatory effect of parental control on the association between sensation-seeking and tobacco and alcohol use among Chinese adolescents. They found that sensation-seeking predicted the use of tobacco and alcohol. However, their findings also revealed that parental psychological control enhanced and moderated the relationship between adolescents' sensation-seeking and their use of tobacco and alcohol. On the basis of these results, the authors proposed several ways of preventing or reducing adolescents' use of tobacco and alcohol. In another study of the family context, Liu et al. examined whether self-control moderated the relationship between parent-adolescent relationships and risk-taking behaviors in a sample of Chinese adolescents. Their findings showed that associations between parent-adolescent relationships were indeed moderated by self-control. Therefore, the authors suggested, interventions to reduce adolescent risk-taking should incorporate the personal features and interactions of families.

The second important context in adolescence is that of school. It is in educational centers that adolescents spend a great amount of time, acquire new knowledge and develop their ability to establish relationships with peers and teachers and to cope with stressful situations (emotions, conflict or academic performance, among others). In one study in this area, Carmona-Halty et al. carried out a longitudinal study to examine the mediating role of academic psychological capital (PsyCap) (including hope, efficacy, resilience, and optimism) on the relationship between

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the satisfaction of basic psychological needs (BPN) and academic performance in a Chilean sample. They found that adolescents with more satisfied BPN at school accumulated more academic PsyCap, implying better academic performance. These findings suggest that increasing the hope, efficacy, resilience, and optimism of students can enhance the school environment. In another study, Lázaro-Visa et al. looked at the influence of several personal competencies and the school environment, together with various socio-demographic characteristics, on life satisfaction in Spanish pre-adolescent and adolescent samples who had suffered bullying. Their findings showed the school environment, self-esteem and emotional repair to predict these adolescents' life satisfaction. Consequently, the authors pointed to the importance of considering both individual and contextual aspects in attempts to improve the life satisfaction of bullied adolescents.

Friends and social relationships are the third relevant context during adolescence. As the adolescents' peer group, they are a critical influence on adolescents' psychological development. Examining this perspective, Del Rey et al. looked at the impact of sexting and the influence of the need for popularity on this phenomenon among Spanish adolescents. Their results showed that greater need for popularity was accompanied by a higher likelihood of adolescents sharing images of themselves. Furthermore, although sexting implied an active emotional impact on the adolescents involved, a short-term negative impact was not apparent. The researchers stressed the relevance of this for future intervention and prevention programmes targeting sexting. Elsewhere, Gómez-López et al. analyzed the stability of psychological well-being (PWB) over time and the influence of romantic relationships on psychological well-being (including self-acceptance, positive interpersonal relationships, autonomy, and life development) in a prospective study of a Spanish sample. Their findings showed medium to high levels of PWB. In addition, romantic relationships were an important predictor of PWB, being related positively to positive interpersonal relationships and life development, and negatively to self-acceptance and autonomy.

Finally, the personal resources and strategies used by adolescents to manage various situations in this stage of their lifecycle will have an effect on their mental health and psychological adjustment. In this area of research, the role of certain strengths and strategies in terms of their consequences on adolescents' positive development and well-being have been analyzed. First, the role of emotional intelligence (EI), together with social support, life satisfaction and depression, in Moroccan students was examined by Lopez-Zafra et al. Their findings revealed EI to be a protective factor against depression, through social support and life satisfaction. Furthermore, EI moderated the relationship between social support and life satisfaction. Likewise, Chen investigated how school type (boarding schools and day schools) influenced the relationship between emotional intelligence (EI), perceived social support and resilience among Chinese adolescents. The results showed that the greater the perceived support from friends, the more positive the relationship between trait EI and resilience. In addition, for adolescents with lower perceived support from friends, the

boarding school experience was a better choice for those with high trait EI. The author went on to outline some implications of this study for parents as well as for mental health professionals.

Second, Tang et al. and Suárez et al. pointed to the important role of, respectively, character strengths and the strategies used by adolescents. Tang et al. considered the use of strengths as a mediator for understanding how character strengths were related to adolescents' academic achievement and well-being. In particular, they examined the following character strengths: caring, inquisitiveness, and self-control. Their findings revealed that the use of such strengths could be an explicative mechanism between character strengths and academic achievement. The authors therefore concluded that one practical implication of their findings is to encourage students to use their strengths in this way. In addition, Suárez et al. studied the use of self-motivation strategies involving classmates (i.e., the raising up of others, annihilation of others, deception, and comparison) and explored the relation of these with academic goals (including tasks, ego self-enhancing, ego self-defeating, and work avoidance goals) and belief in control and self-efficacy in learning, in two Spanish samples. Their results showed that adolescents who reported lower use of self-motivation strategies presented lower levels of belief in self-efficacy to learn and perform.

Third, Barcaccia et al. tested a model incorporating forgiveness, anger, hedonic balance, and depression in Italian adolescents using a structural equation modeling approach. Their results suggested that forgiveness protects against depression, helping to control and manage anger. On the basis of their findings, the authors outlined various implications for the well-being of adolescents.

Fourth, Fiorilli et al. analyzed the role of self-esteem and interpersonal stressors as predictors of depression manifestations (i.e., depressed mood, sense of inadequacy, and insecurity) among Italian pre-adolescents and adolescents. Their results revealed a secondary role of interpersonal stressors and pointed to the vital role of self-esteem as a predictor of depression, with negative emotion management being the most important protective factor.

Fifth, Su and Shum tested a model involving critical thinking, cognitive distortions, trait mindfulness and psychological distress on adolescents from Hong Kong. Their results pointed to the important role that mindfulness can have in psychological distress (i.e., depression, anxiety, and stress). At low mindfulness levels, critical thinking was related to greater psychological distress through more cognitive distortions. Given these findings, the authors suggested that mindfulness could have beneficial effects on adolescents' psychological well-being.

Lastly, Kor et al. explored relations between spirituality, character strengths, subjective well-being and prosociality in a longitudinal study of Israeli adolescents. Their findings showed spirituality to be a distinct dimension of character strengths that provided positive development in adolescents and remained stable over time. Furthermore, high levels of spirituality enhanced subjective well-being and prosociality.

We hope that the reader will find in this Research Topic a useful reference for the state of the art in the field of well-being of adolescents.

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LR, MP, and FN: writing, review, and editing.

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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A Longitudinal Study of Spirituality, Character Strengths, Subjective Well-Being, and Prosociality in Middle School Adolescents

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Using data from 1,352 middle-school Israeli adolescents, the current study examines the interface of spirituality and character strengths and its longitudinal contribution to subjective well-being and prosociality. Participants were approached three times over a 14-months period and completed measures of character strengths, spirituality, subjective well-being (positive emotions, life satisfaction), and prosociality. Findings revealed a fourth-factor structure of character strengths that included the typical tripartite classification of intrapersonal, interpersonal, and intellectual strengths together with spirituality emerging as a statistically autonomous factor. Spirituality was stable over time and contributed to higher subjective well-being and prosociality both cross-sectionally and longitudinally. Discussion focuses on spirituality as a fundamental character strength and an important aspect of positive development.

Keywords: spirituality, character strengths, well-being, adolescence, prosociality

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INTRODUCTION

In recent years, the arena of spirituality has garnered renewed interest in wide-ranging disciplines, including health (e.g., Hill and Pargament, 2003), education (e.g., Miller, 2009), clinical psychology and psychotherapy (e.g., Miller and Kelley, 2006), personality (e.g., Emmons, 1999), family studies (e.g., Tarakeshwar et al., 2001), and developmental psychology (e.g., Benson et al., 2003). Moreover, research in positive psychology and thriving consistently indicates that spirituality is associated with psychological adjustment and well-being (e.g., King and Benson, 2006; Johnson, 2008; Saroglou et al., 2008). Recently, major theoretical reviews in developmental psychology have emphasized the prominent role that spirituality plays in character formation and positive development (e.g., Benson et al., 2012a; Pargament et al., 2013; King and Boyatzis, 2015). However, while spirituality is highly relevant to youth development, the ways they relate to other character strengths and contribute to adolescents' psychological adjustment and well-being remain understudied.

A recent review of the descriptive attempts to define spirituality shows that this field of study is overrun with confusion (e.g., King and Boyatzis, 2015), though it is slowly moving toward greater clarity. This confusion is partly attributable to the concepts of spirituality and religiousness that initially were used synonymously (James, 1982), and more recently have begun to diverge in both psychology research and popular culture (Koenig et al., 2001). Spirituality is often characterized as the degree to which people affirm and honor a transcendent or sacred force in their life that often provides a profound sense of meaning and purpose (Benson et al., 2005). Thus, spirituality does not necessarily require belief in God or adherence to a particular religious denomination, whereas

religiousness include affiliation to such a denomination and commitment to specific religious beliefs and practices. Despite these differences, however, spirituality and religiousness are fairly highly correlated. Treating them as completely separate constructs may not accurately reflect how spirituality and religion are experienced in the lives of people (e.g., Zinnbauer and Pargament, 2005; Crawford et al., 2006). Therefore, recent conceptualizations of spirituality view the construct as a broader term encompassing a search for the sacred both within and outside traditional religious denominations (e.g., Cragun et al., 2015), with spirituality being perceived as more individually constructed and religiousness as more socially constructed (e.g., Kapuscinski and Masters, 2010; Benson et al., 2012a). According to Koenig et al. (2001), spirituality is a personal exploration of core questions about life, meaning, and transcendent forces, which may (or may not) lead to commitment to specific religious beliefs and practices. Researchers of youth development rely on similar definitions of spirituality, such as the capacity for self-transcendence, with the goal of finding meaning, awareness, purpose and connectedness (e.g., Johnson, 2008; Lerner et al., 2008; Benson et al., 2012a).

Spiritual Development and Well-Being in Adolescence

Although spiritual development in adolescence as a research subject has been almost absent from the developmental psychology literature (Benson et al., 2003), it is well agreed that adolescence is a sensitive period for developing spiritual belief and engagement (Good and Willoughby, 2008). The unique developmental changes that occur during adolescence, including increased capacity for abstract thought, development of metacognitive abilities, and identity formation, provide a particular opportunity for spiritual awakening (Templeton and Eccles, 2006). Stress and heightened negative emotions during adolescence are other important factors that may prompt spiritual exploration and commitment (Zinnbauer and Pargament, 1998). Research, although not providing conclusive evidence, indicate that most adolescents engage in spiritual exploration and have spiritual-like experiences and most of the spiritual commitments to beliefs and practices made during adolescence tend to persist throughout adulthood (Good and Willoughby, 2008). In the most comprehensive research on spirituality in adolescence, Benson and Scales (2009) viewed spiritual development as the dynamic interplay of three main psychological processes: (a) Being aware of the strengths, wonder, and beauty both within the self and the world in ways that cultivate meaning, identity, and purpose; (b) seeking and experiencing significance and interdependence in relationships with others or transcendent figures (God or a higher power) that provide meaning to life over time; and (c) authentically expressing one's values, passions, and identity through activities, practices and relationships that promote a sense of inner wholeness and harmony.

In an attempt to obtain a global picture of youth spirituality, Benson et al. (2012b) surveyed 6,725 young people, between ages of 12 and 25, from eight countries in five continents.

Findings yielded two main categories of youth spirituality. One category includes psychological processes that underlie spiritual development: connecting with others through pro-social beliefs and actions, discovering meaning, mindfulness, and alignment with values and action. The second category deals with religious and spiritual engagement, including spiritual practices, apprehension of God/Force, spiritual experiences, and religious practice. These findings were replicated across the eight countries and across different religious denominations. In addition, latent class analysis (LCA) rendered six types of spiritual development, which emphasized various combinations of spiritual variables (e.g., praying and experiencing a higher power or God) and religious variables (e.g., learning sacred texts and attending religious services). While this study greatly contributes to understanding youth spiritual development, its major limitation is that it was not longitudinal and therefore does not address developmental aspects.

Recent studies have also explored how spirituality is a potentially important anchor for socio-emotional adjustment. For example, spirituality has been found to shield adolescents against risky behavior, such as delinquency, substance abuse, sexual promiscuity, and emotional problems, such as depression, anxiety, and suicidality (e.g., Sinha et al., 2007; Desrosiers and Miller, 2008; King and Roeser, 2009). Studies have also demonstrated that spirituality is significantly associated with indicators of subjective well-being – higher levels of positive emotions (e.g., Ciarrocchi and Deneke, 2005; Holder et al., 2010; Smith et al., 2012) and more life satisfaction (e.g., Kelley and Miller, 2007; Kim et al., 2013). These findings are important for understanding the contribution of spirituality to socio-emotional adjustment, because recurrent experience of positive emotions, which are an important component of spiritual practices (e.g., Van Cappellen and Rimé, 2014), have been shown to build psychological, physical, and social resources that enhance one's ability to deal with life hardships (e.g., Fredrickson et al., 2008; Cohn et al., 2009). There is also mounting evidence that adolescents' spirituality contributes to prosociality – more compassionate feelings and behaviors toward needy others, higher levels of civic engagement, and heightened peer likeability, which, in turn, facilitate social adjustment and functioning (e.g., King and Furrow, 2004; Hardy and Carlo, 2005; Roehlkepartain et al., 2006). Some studies also point to spirituality as a source of optimism for good outcomes and of unwillingness to fall into despair during difficult times (Kloos and Moore, 2000; Park, 2005; Marques et al., 2013). Although optimism is considered a personality trait that is relatively stable over time (e.g., Cardemil et al., 2002), there is empirical evidence that optimism is reinforced by spiritual experiences (e.g., Gillham and Reivich, 2004; Gillham et al., 2007). Mofidi et al. (2007) noted that the relationship between spirituality and optimism is often bidirectional in that spirituality may promote optimism and optimism may support spirituality.

Spirituality as a Character Strength

The relatively new focus on character strengths and virtues within the positive psychology movement helps to locate spirituality as a human character strength. Synthesizing volumes

of inventories of human character strengths, both historical and contemporary, Peterson and Seligman (2004) developed the values-in-action (VIA) framework – a hierarchical classification of two main characteristics of the good character: virtues and character strengths. Virtues are conceptualized as positive traits of character that enable individuals to thrive and flourish (Park and Peterson, 2006). Based on a survey of religious, philosophical and historical texts, Peterson and Seligman (2004) identified six core human virtues: wisdom and knowledge, courage, humanity, justice, temperance, and transcendence. Character strengths are conceptualized as the psychological constituents, mechanisms or processes that define the virtues (Park, 2004). Peterson and Seligman (2004) proposed 24 character strengths that are embodied in the six core virtues. These virtues and strengths include the following: (1) Wisdom and Knowledge (curiosity, love of learning, judgment, creativity, perspective); (2) Courage (bravery, perseverance, honesty, zest); (3) Humanity (love, kindness, social intelligence); (4) Justice (teamwork, fairness, leadership); (5) Temperance (forgiveness, humility, prudence, self-regulation); and (6) Transcendence (appreciation of beauty, gratitude, hope, humor, spirituality). In this VIA framework, spirituality is considered a character strength embodied within the virtue of transcendence. That is, spirituality is not viewed as a discrete category by its own but only as part of the transcendence category that include other strengths of appreciation of beauty, gratitude, hope, and humor.

Research on Peterson and Seligman's (2004) scheme of strength categories has relied on the values in action inventory of strengths (VIA-IS) and its adaptation for studying children and adolescents – VIA-Youth (e.g., Seligman et al., 2005; Park et al., 2006; Toner et al., 2012).

Overall, empirical evidence for the validity of the six-virtue classification is mixed, with inconsistent numbers of higher-order factors and discrepancies in their compositions (e.g., Gillham et al., 2011; Ruch et al., 2013; Weber et al., 2013; Shoshani and Slone, 2016). However, they all contain factors that represent interpersonal, intrapersonal, and intellectual strengths, with an additional factor of transcendence that includes the strength of spirituality.

The VIA-IS for youth has been validated and found to be related to socio-emotional adjustment and psychological functioning (Park, 2004; Shoshani and Slone, 2013). Specifically, studies with elementary and middle school students have indicated that interpersonal strengths are related to better social functioning, wisdom strengths to more academic achievements, and temperance and transcendence strengths to higher levels of positive emotions and life satisfaction and fewer behavioral and emotional problems (Gillham et al., 2011; Shoshani and Aviv, 2012; Shoshani and Slone, 2013, 2016).

One basic issue that our study attempts to elucidate concerns the uniqueness of spirituality as a character strength. In other words, it aims to explore whether spirituality is only part of the broader category of transcendence or it is a discrete high-order category of strengths in its own. Although spirituality has been suggested to be only a component of the transcendence category, Peterson and Seligman (2004) themselves raised doubts about the composition of the transcendence factor

and postulated that they “would not be surprised if this final grouping is revised – collapsed or combined...in subsequent editions” (p. 519). Moreover, Piedmont (1999) viewed spirituality as a basic organizing principle of human personality that shapes people's life. He argued that spirituality represents a hierarchically structured domain of psychological functioning that directs, drives, and selects behaviors in both secular and religious contexts. In support of this view, Piedmont (1999) provided convincing evidence that spirituality represents a unique personality domain that does not overlap with other high-order personality traits.

Spirituality may also shape the ways other character strengths and virtues operate. Spirituality can add more passion and meaning to people's intrapersonal and intellectual aspirations; it can moderate how people interact with others; it can redefine the goals people pursue; and it can help people in reappraising life events and transcending hardships and difficulties (e.g., Piedmont et al., 2009; Rican and Janosova, 2010). Thus, spirituality may be a distinctive psychological domain of comparable breadth to the virtues contained in the VIA classification and ought to be considered a potential distinct major category of character.

In the current study, we follow Piedmont's (1999) claim that spirituality may be an independent dimension of personality or character altogether, and argue that the findings reported using the VIA classification may result from a narrow and incomplete operationalization of spirituality. In the VIA inventory of strengths, spirituality is operationalized as a belief in and commitment to the transcendent (non-material) aspects of life (Peterson and Seligman, 2004, p. 519). However, this operationalization fails to capture the complex, multidimensional nature of spirituality (e.g., King and Boyatzis, 2015).

The Current Study

The primary aim of the current longitudinal study is to examine the relationship between spirituality, character strengths, subjective well-being (positive emotions, life satisfaction), and prosociality throughout middle school adolescence. As reviewed above, previous research has established that spirituality is an important character strength and a correlate of both subjective well-being and prosociality. However, the lack of longitudinal research hampers causal and directional conclusions (King and Boyatzis, 2015). It is, therefore, important to note that the direction of causality in the field of spiritual development remains murky at best, which emphasizes the need for research designs that are longitudinal and that test the contribution of spirituality to socio-emotional adjustment and functioning over time (King and Boyatzis, 2015).

We expect to find that spirituality is a discrete, high-order factor of character, and that the current VIA definition of spirituality as part of “transcendence,” which includes other character strengths such as gratitude, humor, and hope, is lacking. Moreover, previous studies have found that spirituality is stable during adolescent development (Good et al., 2011; Lopez et al., 2011; Pearce and Denton, 2011), and we expect to further demonstrate this. We also predict that spirituality would

longitudinally contribute to positive emotions, life satisfaction, and prosociality during this period.

MATERIALS AND METHODS

Participants

The sample included 1,352 Israeli adolescents, 655 (48%) girls and 696 (51%) boys, ranging in age from 13 to 17 ($M = 13.43$, $SD = 0.98$). They were recruited from eight middle schools across Israel and were in grades 7–9. Participants were assessed at three time points in a period of 14 months, with 98% of them ($n = 1,328$) completing all three waves. The vast majority of the participants were Jewish (85%) although a minority (15%) identified as Christian and Muslim.

Procedure

Ethical approval for the study was obtained from the Chief Scientist of the Ministry of Education in Israel as well as from the Institutional Review Board (IRB) of IDC Herzliya and Teachers College, Columbia University. Authorization for running the study was also obtained from each of the school principals, and written consent was obtained from each participant and their parents. Participants were guaranteed confidentiality and were assured that they could withdraw from the study at any point, without having to provide a reason for doing so. The first wave of data collection (Time 1) took place at the beginning of the 2015 academic year (September). The second wave of measurement (Time 2) took place at the end of the academic year (June 2016) and the third wave (Time 3) occurred in November 2016. We will continue to collect data over the coming years. The same set of scales were completed at the three time points.

Measures

Character strengths were assessed with a Hebrew version of the VIA Inventory of Strengths for Youth – Short Form (VIA-Y; Park and Peterson, 2005, 2006). This scale includes 96 items and was designed for children and adolescents between the ages of 10 and 17 years. The VIA-Y assesses 24 character strengths (4 items per strength): Curiosity, love of learning, judgment, creativity, perspective, bravery, perseverance, honesty, zest, love, kindness, social intelligence, teamwork, fairness, leadership, forgiveness, humility, prudence, self-regulation, appreciation of beauty, gratitude, hope, humor, and spirituality. The VIA-Y short form had good psychometric qualities, with alpha scores ranging from 0.84 to 0.87 and has been already used among Israeli children and adolescents (e.g., Shoshani and Aviv, 2012; Shoshani and Slone, 2013). Based on the VIA's institute coding schema, we computed 24 total scores for each participant representing each of the strengths assessed in the questionnaire.

Participants also completed the Life Orientation Test-Revised (LOT-R; Scheier et al., 1994) in order to assess optimism as a character strength that is not included in the VIA-Y. The LOT-R is a 10-item questionnaire tapping adolescents' optimism and their positive expectations for the future. This measure includes positively phrased items reflecting optimism (e.g., "I'm always hopeful about my future"), and negatively phrased items

that reflect pessimism (e.g., "Things usually go wrong for me"). Participants rated their agreement with each item on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The LOT-R has been used in hundreds of studies and has been consistently found to be a reliable and valid scale (e.g., Steca et al., 2015). In the current study, Cronbach Alphas were acceptable (from 0.70 to 0.71) at the three time points. Then, we computed a total optimism score for each participant at each time point by averaging the 10 items.

We assessed spirituality with four different self-report scales. First, participants completed the Faith Maturity Scale (FMS, Benson et al., 1993). The FMS consists of 12 items that assess the extent to which spirituality plays a role in a person's life. It includes items tapping the extent to which spirituality influences one's inclination to help others (e.g., "I feel a deep sense of responsibility for reducing pain and suffering in the world") and one's closeness to God (e.g., "Every day I see evidence that God or a higher force is active in the world"). Items were rated on a 5-point scale, ranging from 1 (*never true*) to 5 (*always true*). Past studies have found this scale to be reliable and valid (e.g., Benson et al., 1993; Hall et al., 2016). In the current study, Cronbach Alphas were acceptable (from 0.93 to 0.95) at the three time points. On this basis, we computed a total score for each participant at each time point by averaging the items.

Second, participants completed the Duke University Religious Index (DUREL; Koenig et al., 1997). The DUREL consists of two items tapping participation in organized and non-organized religion practices, (e.g., "How often do you attend synagogue or other religious meetings?", "How often do you spend time in private religious activities, such as prayer, meditation or Bible study?") and three items tapping intrinsic religiosity (e.g., "My religious beliefs are what really lie behind my whole approach to life"). Items related to frequency of practice are scored on a 6-point scale, ranging from 1 (*rarely or never*) to 6 (*more than once a day*). The remaining items are scored on a 5-point scale, ranging from 1 (*definitely not true*) to 5 (*definitely true of me*). Previous studies have provided evidence on the reliability and validity of this scale (e.g., Koenig et al., 1997; Freire de Medeiros et al., 2017). In the current study, we computed two total scores for each participant at each time point – participation in religious practices (α s ranging from 0.72 to 0.76) and intrinsic religiosity (α s ranging from 0.90 to 0.92), by averaging the relevant items.

Third, participants completed three items from the Personal Devotion scale (PDS, Kendler et al., 1997): "How important are religious or spiritual beliefs in your daily life?"; "When you have problems in your life, how often do you seek spiritual comfort?"; and "When you have decisions to make in your daily life, how often do you ask yourself what God would want you to do?" Items were rated on a 5-point scale, either from 1 (*never important*) to 5 (*very important*), or from 1 (*never*) to 5 (*very often*). On this basis, we computed a total score for each participant at each time point by averaging the items. Cronbach Alphas were acceptable for the three PDS items (α s ranging from 0.80 to 0.82).

Fourth, participants completed four items from the Spiritual Transcendence Scale (STS; Piedmont, 1999), tapping the ability to view life from a more objective perspective, to perceive the fundamental unity in the world, and to see a larger meaning in

human existence. In the current study, Cronbach Alphas were acceptable for the four STS items (α s ranging from 0.75 to 0.87). We computed total scores for each participant at each time point by averaging items in the scale.

Subjective well-being was assessed with two scales tapping the two indicators of this construct: positive emotions and life satisfaction. Positive emotions were assessed with the positive affect subscale of the Positive and Negative Affect Schedule for Children (PANAS-C; Ebessutani et al., 2012). Using a 5-point scale, ranging from 1 (*very slightly*) to 5 (*very much*), participants rated the extent to which five adjectives representing positive emotions describe themselves over the last few weeks. The PANAS-C has been shown to have high reliability and validity (e.g., Ebessutani et al., 2012; Shoshani and Shwartz, 2018). For the present study, we only rely on these five positive emotions items, since we mainly focus on the link between spirituality and subjective well-being (Smith et al., 2012). The Cronbach alphas for this subscale were acceptable (from 0.79 to 0.82) at the three time points. On this basis, we computed a total score for each participant at each time point by adding the five items. Life satisfaction was assessed with the Satisfaction with Life Scale (SWLS; Diener et al., 1985). There are five items in the scale (e.g., “In most ways, my life is close to my ideal”), which are rated on a 7-point scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The total score is a sum of a participant’s responses. Previous studies have found the SWLS to have high reliability and validity (e.g., Pavot and Diener, 2008). In the current study, Cronbach Alphas were acceptable (from 0.85 to 0.87) at the three time points.

Prosociality was assessed with the prosociality subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman et al., 1998). This subscale includes five items (e.g., “I share readily with other children, for example toys, treats, pencils”) and participants rated how much each item described them best, using a 3-point scale, ranging from 1 (*not true*) to 3 (*certainly true*). Previous studies have provided evidence on the reliability and validity of this subscale (e.g., Goodman et al., 1998; Mansbach-Kleinfeld et al., 2010; Shoshani et al., 2016; Shoshani and Russo-Netzer, 2017). In the current study, Cronbach Alphas were acceptable (from 0.69 to 0.74) at the three time points. On this basis, we computed a total score for each participant at each time point by summing up the five items.

RESULTS

Is Spirituality a Unique Aspect of Youth Character Strengths?

In order to assess our hypothesis that spirituality is a discrete aspect of youth character strengths, we conducted an exploratory factor analysis (principal axis factoring) on the 24 VIA strengths, the optimism score, and the five spirituality scores from Time 1. Data was appropriate for exploratory factor analysis (Kaiser-Meyer-Olkin = 0.95; Bartlett’s test of sphericity: $\chi^2(435) = 29520, p < 0.001$). Results indicated that five factors had eigenvalues greater than 1 (ranging from 10.53 to 1.18). However, examination of the scree plot and a parallel analysis

using a bootstrapping method (O’Connor, 2000) suggested that a four-factor solution accounting for 57.28% of the variance fit the data optimally. Therefore, we retained the four-factor solution and rotated these factors using non-orthogonal, direct oblimin rotation. Six items loaded lower than 0.40 on each of the rotated factors or strongly cross-loaded on multiple factors (VIA scores of bravery, gratitude, perseverance, kindness, and social intelligence, and the STS score). These items were thus dropped and the remaining 24 items were reanalyzed. This yielded a clear four-factor solution with eigenvalues ranging from 7.94 to 1.31, and accounting for 59.04% of variance. All loadings were higher than 0.40 and no cross-loading was observed (see **Table 1**).

As reported **Table 1**, this analysis yielded four factors labeled Interpersonal strengths, spirituality, intrapersonal strengths, and intellectual strengths. The factors representing interpersonal, intrapersonal, and intellectual strengths included all VIA scores retained, with the exception of the VIA spirituality score. The optimism LOT-R score loaded on the intrapersonal strengths factor, and the spirituality factor included the VIA spirituality score and scores on intrinsic religiosity, personal devotion, religious practice, and faith maturity scales. Factor correlations indicated that the spirituality factor was moderately associated with the intrapersonal strengths factor (0.26), weakly with the interpersonal strengths factor (0.14), and minimally with the

TABLE 1 | Pattern matrix after rotation for the final four-factor solution.

	Interpersonal strengths	Spirituality	Intrapersonal strengths	Intellectual strengths
Prudence	0.72			
Fairness	0.72			
Judgment	0.69			
Self-regulation	0.64			
Forgiveness	0.61			
Humility	0.58			
Honesty	0.58			
Teamwork	0.57			
Personal devotion		0.91		
Intrinsic religiosity		0.89		
Faith maturity		0.87		
VIA spirituality		0.82		
Religious practice		0.73		
Zest			0.74	
Love			0.73	
Leadership			0.72	
Optimism			0.66	
Humor			0.65	
Hope			0.60	
Perspective			0.60	
Curiosity				0.81
Creativity				0.74
Appreciation of beauty				0.62
Love of learning				0.61

Loadings less than 0.40 are omitted.

intellectual strengths factor (0.08). The other three strengths factors showed stronger correlations between them (ranging from 0.36 to 0.42). The emergence of a spirituality factor incorporating the various aspects of spirituality and separated from other character strengths supported the hypothesis that spirituality is a unique, although related, aspect of youth character strengths.

To confirm the four-factor structure described above, we then conducted a series of multi-group confirmatory factor analyses (CFA) that tested configural invariances across boys and girls. Fit for CFA models was assessed using the guidelines suggested by Kenny (2015), and included RMSEA less than or equal to 0.08, CFI approaching 0.90, and decreasing BIC. Given the large sample size, non-significant chi-square values were interpreted cautiously. Results indicated that the above described four-factor model displayed reasonable fit among boys [$\chi^2(246) = 895$, $p < 0.001$, CFI = 0.90, RMSEA = 0.07] and among girls [$\chi^2(246) = 995$, $p < 0.001$, CFI = 0.88, RMSEA = 0.08]. The model for the entire sample was also adequate [$\chi^2(246) = 1597$, $p < 0.001$, CFI = 0.89, RMSEA = 0.07], suggesting that the four-factor structure described in **Table 1** was configurally invariant across genders.¹

To further explore the associations of the spirituality measures and the other character strengths, we conducted a LCA to select the best fitting categorization of participants. This analysis built upon the factor analytic model described above and added a fifth latent categorical variable that predicted means levels on each of the four factors. A series of models with the number of groups varying from 3 to 6 were run. Following Nylund et al. (2007), model fit was assessed by lower BIC, reasonable class size relative to sample size (minimum 20), entropy approaching 0.80, and non-significant VLMR, LRT, and bootstrapping likelihood ratio tests. Although inferential log-likelihood tests suggested that a five-latent class model fit the data best, this model had higher BIC, lower membership probabilities, and extremely small class sizes, suggesting that it was likely over-parameterized. A model with four latent classes provided the best balance between fit and parsimony, as indicated by BIC, entropy, membership probabilities, and class sizes (see **Table 2**).

Parameters for this model indicate that the four groups can be characterized according to the following participants' scores at Time 1 (see **Figure 1**): Low spirituality and average scores in the other three strengths factors (Class 1); medium spirituality and high-average scores in the other three strengths factors (Class 2); low spirituality, low interpersonal strengths, and high intellectual strengths scores (Class 3); and high spirituality and high intrapersonal strengths scores (Class 4). The vast majority of participants were classified in Class 1 (42%), and Class 2 (44%) and participants in other latent classes were relatively

TABLE 2 | Model fit and summary statistics for LCA models classifying participants according to their scores in the spirituality and the other three character strengths factors.

Number of classes	BIC	Class sizes	Entropy	Membership			
				probabilities	VLMR	LRT	Bootstrap
3	11674	566–30	0.71	0.57–0.88	38.78	37.50	38.58**
4	11666	471–30	0.75	0.74–0.89	42.73*	41.53*	42.73**
5	11700	560–2	0.80	0.60–0.88	25.31*	24.60*	25.31**
6	11705	468–3	0.80	0.60–0.90	4.48	4.35	4.48

Vuong-Lo-Mendell-Rubin (VLMR), Lo-Mendell-Rubin Adjusted (LRT), and parametric bootstrapped (Bootstrap) likelihood ratio tests inferentially compared a model with k classes to a model with $k-1$ classes. * $p < 0.05$; ** $p < 0.001$.

rare (3 and 11%). Of note, LCA analysis did not identify a latent class with participants scoring high on spirituality and low on the other three strengths factors, suggesting that most of the spiritually involved participants also scored high on other character strengths. In fact, the latent class with the highest level of spirituality included participants who scored high on the intrapersonal strengths factor.²

Is Spirituality Stable Over Time?

To examine the extent to which spirituality in adolescence is stable over time, we first assessed the structural stability of the four-factor structure described in **Table 1** by subjecting all variables to a CFA at Time 2 (9 months later) and Time 3 (14 months later). Results indicated that the four-factor structure of spirituality and three other character strengths continued to display reasonable fit at Time 2 [$\chi^2(246) = 20002$, $p < 0.001$, CFI = 0.87, RMSEA = 0.08] and Time 3 [$\chi^2(246) = 908.83$, $p < 0.001$, CFI = 0.89, RMSEA = 0.08].

In order to examine within-participant stability in spirituality over time, we estimated a full SEM model with the five spirituality variables that loaded high on the spirituality factor. In this model, all spirituality variables at each time point are assumed to load on a latent variable of spirituality, and stability was assessed through the standardized coefficient predicting latent spirituality at Time 2 from latent spirituality at Time 1, and latent spirituality at Time 3 from latent spirituality at Time 2. Overall, this model fit the data well [$\chi^2(88) = 1195$, $p < 0.001$, CFI = 0.88, RMSEA = 0.13, SRMR = 0.06]. Temporal stability of spirituality was strong [Time 2: $B = 0.95$, $SE = 0.04$, $Z = 25.369$, $p < 0.001$; Time 3: $B = 0.97$, $SE = 0.04$, $Z = 27.96$, $p < 0.001$], with 89% of the variance in latent spirituality at Time 2 explained by spirituality at Time 1, and 90% of the variance at Time 3 explained by Time 2.

We also compared stability estimates for the other three character strengths factors. Spirituality was slightly more stable than interpersonal strengths (Time 2: $B = 0.79$, $SE = 0.05$, $Z = 16.89$, $p < 0.001$; Time 3: $B = 0.74$, $SE = 0.05$, $Z = 16.23$, $p < 0.001$), intrapersonal strengths (Time 2: $B = 0.89$, $SE = 0.07$, $Z = 13.01$, $p < 0.001$; Time 3: $B = 0.82$, $SE = 0.06$, $Z = 13.98$,

¹ Measurement invariance between boys and girls was also tested by comparing a nested series of models that constrained additional parameters to be equal across groups. Results indicated that a model restraining loadings to be equal across groups but allowing intercepts to vary fit the data best as indicated by lower BIC and RMSEA values, and higher CFI. To assess if these differences reflect significant differences on the underlying factors, we compared two additional CFA models, one that fixed the intercept for each latent factor to be equal across groups, and one that allowed them to vary. Results indicated that the differences observed between genders were minimal and likely reflected over-fitting [$\Delta\chi^2(4) = 15.74$, $p = 0.003$, $\Delta CFI = -0.001$, $\Delta RMSEA = 0.001$, $\Delta AIC = 8$, $\Delta BIC = -13$].

² A conditional LCA model that included age and gender as covariates indicated that this model displayed poorer fit to unconditional models (BIC = 19566, entropy = 0.78, class sizes: 2–478) and that neither age ($Bs = -0.35$ through 0.05, $ps = 0.75$ through 0.98) nor gender ($Bs = -0.87$ through 0.13, $ps = 0.40$ through 0.98) significantly predicted participants' classification into latent classes.

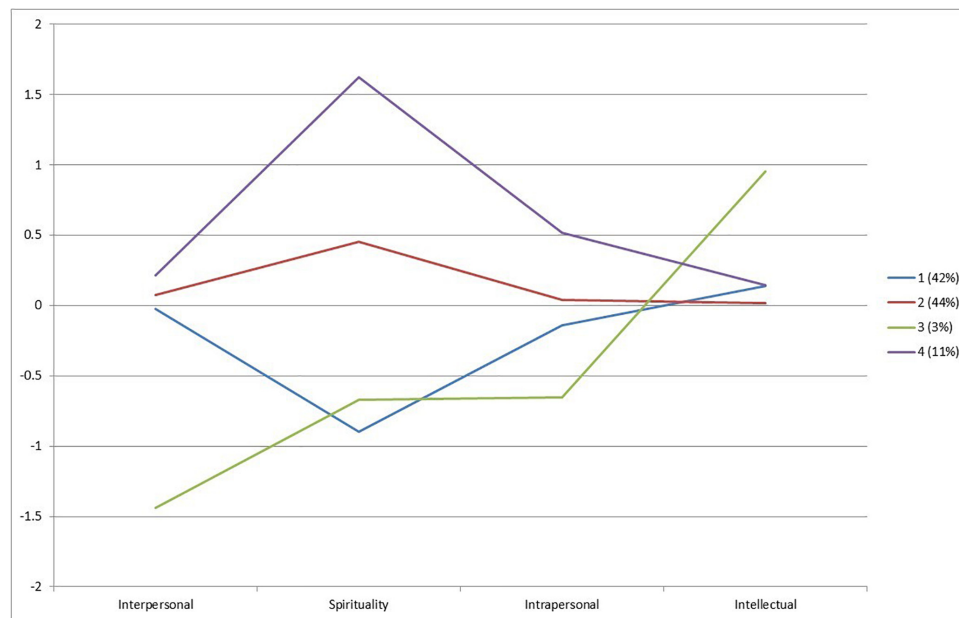


FIGURE 1 | Differences between four latent classes on mean levels of each underlying continuous latent factor of positive character at Time 1. Scores represent standardized Z scores on the latent variable representing each facet of character.

$p < 0.001$), and intellectual strengths (Time 2: $B = 0.81$, $SE = 0.05$, $Z = 16.02$, $p < 0.001$; Time 3: $B = 0.82$, $SE = 0.05$, $Z = 17.74$, $p < 0.001$). That is, spirituality in adolescence was largely stable over a 1-year period, and perhaps even more stable than other character strengths.

Cross-Sectional Associations Between Spirituality, Subjective Well-Being, and Prosociality

Pearson correlations were computed in order to assess cross-sectional associations between spirituality, on the one hand, and positive emotions, life satisfaction, and prosocial behavior, on the other, at each wave of measurement. Regression weights derived from the factor analysis described above were used to calculate a participant's score on the spirituality factor at each wave of measurement. Although there were some differences between the three time points, spirituality was found to correlate significantly but moderately with heightened life satisfaction

(0.23, 0.24, and 0.16, all $ps < 0.01$), positive emotions (0.21 and 0.23, 0.14, all $ps < 0.01$), and prosociality (0.11, 0.12, 0.18, all $ps < 0.01$). We also computed multiple regressions examining the unique contribution of spirituality beyond and above the contribution of the other three high-order character strengths. These analyses indicated that spirituality made a significant unique contribution to prosociality and life satisfaction at each of the three points (β ranging from 0.10 to 0.21, all $ps < 0.01$). However, its significant association with positive emotions was no longer significant after statistically controlling for the other three character strengths (β ranging from 0.01 to 0.05). In this case, the intrapersonal strength factor was the single predictor with a significant unique contribution to positive emotions (β ranging from 0.56 to 0.62, all $ps < 0.01$). In addition, the four latent categories identified using LCA were compared on mean levels on all positive outcome variables, using ANOVA and post-hoc Scheffe tests. Results of this analysis indicated that the high spirituality/high intrapersonal character (Class 4) group generally reported significantly higher levels of positive outcomes, such as life satisfaction, prosociality, and positive emotion, as compared to other groups (see Table 3).

TABLE 3 | Means, SDs, and ANOVAs statistics of subjective well-being and prosociality at Time 1 according to groups derived from LCA performed on spiritual, intrapersonal, interpersonal, and intellectual character strengths at Time 1.

	Class 1		Class 2		Class 3		Class 4		F
	M	SD	M	SD	M	SD	M	SD	
Life satisfaction	23.57 ^{ab}	6.91	25.37 ^{ab}	6.74	17.78 ^a	6.73	27.65 ^b	5.26	22.49***
Positive emotions	17.77 ^{ab}	4.04	18.82 ^{ab}	3.92	16.73 ^a	4.85	20.10 ^b	3.57	13.99***
Prosociality	7.21 ^{ab}	2.02	7.56 ^{ab}	1.94	6.33 ^a	2.02	8.13 ^b	1.91	10.49***

*** $p < 0.001$; Means with similar superscripts did not differ significantly ($p > 0.01$).

Do Changes in Spirituality Over Time Are Associated With Subjective Well-Being and Prosociality?

To explore the temporal pattern of the relationships of spirituality with subjective well-being and prosociality, we modeled the changes in spirituality across the three waves using a latent growth mixture model. This analysis built upon the factor analytic model of spirituality described above, and modeled individual growth trajectories (intercept and slope) on the latent

spirituality factor. For each participant, a latent individualized intercept and slope that best describe their baseline and rate of change were estimated. These individual growth trajectories were regressed on a categorical latent factor representing particular class memberships (LCA analysis). Then, an optimal mean slope and intercept for each class was estimated using maximum likelihood estimation. Model fit was assessed with the same LCA criteria described in the previous section.

Results indicated that a four class latent model fit the data best, as evidenced by low BIC, high membership probabilities, reasonable class sizes, and high entropy. This was confirmed by inferential log-likelihood tests, including bootstrapping (see Table 4). Examination of the mean intercept and slope parameters for these groups suggested that they can be characterized as high and increasing spirituality (Class 1, $I = 1.55$, $S = 0.16$, 11% of participants), high-average and stable spirituality (Class 2, $I = 0.68$, $S = -0.04$, 29%), low-average and stable spirituality (Class 3, $I = -0.26$, $S = 0.01$, 29%), and low and stable spirituality (Class 4, $I = -1.12$, $S = 0.04$, 31%).

TABLE 4 | Model fit and summary statistics for LGMM models assigning group membership on the basis of individual spirituality growth curves.

Number of classes	BIC	Class		Membership			
		Sizes	Entropy	probabilities	VLMR	LRT	Bootstrap
2	3188	279–182	0.87	0.96–0.97	18.05**	727**	766**
3	2913	4224–63	0.88	0.94–0.96	11.63**	278**	293**
4	2751	150–47	0.87	0.90–0.96	17.67*	171*	181**
5	2735	143–4	0.89	0.91–0.95	12.75	33	35†

Vuong-Lo-Mendell-Rubin (VLMR), Lo-Mendell-Rubin Adjusted (LRT), and parametric bootstrapped (Bootstrap) likelihood ratio tests inferentially compared a model with k classes to a model with $k-1$ classes. * $p < 0.05$; ** $p < 0.001$. †Bootstrapped draws failed to replicate.

TABLE 5 | Means, SDs, and ANOVAs statistics of subjective well-being and prosociality at the three waves of measurement according to groups derived from individual spirituality growth curves.

	Class 1		Class 2		Class 3		Class 4		F
	M	SD	M	SD	M	SD	M	SD	
Time 1									
Life satisfaction	27.96 ^a	5.54	24.30 ^{ab}	6.77	24.50 ^{ab}	6.17	23.14 ^{bc}	6.53	6.31***
Positive emotions	20.13 ^a	3.52	18.22 ^{ab}	3.80	18.25 ^{ab}	4.09	17.50 ^{bc}	3.98	5.04***
Prosociality	7.98 ^a	1.76	7.70 ^a	1.89	7.47 ^a	1.84	7.36 ^a	1.86	1.71
Time 2									
Life satisfaction	27.75 ^a	5.70	24.28 ^{ab}	6.10	24.61 ^{ab}	5.34	21.95 ^{bc}	6.71	11.30***
Positive emotions	20.11 ^a	3.59	18.66 ^{ab}	3.91	18.27 ^{ab}	3.88	16.75 ^{bc}	4.99	8.72***
Prosociality	8.01 ^a	2.01	7.73 ^{ab}	1.78	7.60 ^{ab}	1.91	7.14 ^{bc}	1.86	3.54*
Time 3									
Life satisfaction	27.27 ^a	6.65	24.52 ^{ab}	5.81	24.41 ^{ab}	5.92	22.53 ^{bc}	6.04	7.54***
Positive emotions	19.38 ^a	4.17	18.11 ^{ab}	4.18	17.72 ^{ab}	4.03	17.16 ^{bc}	4.71	3.25*
Prosociality	8.08 ^a	2.34	7.56 ^{ab}	1.68	7.37 ^{ab}	2.02	6.94 ^{bc}	2.06	4.56***

* $p < 0.05$; *** $p < 0.01$; Means with similar superscripts did not differ significantly ($p > 0.01$).

We then conducted ANOVAs comparing these groups on positive emotions, life satisfaction, and prosociality at each time point. As can be seen in Table 5, participants in Class 1 (high and increasing spirituality) reported higher life satisfaction and higher positive emotions at the three times point and higher prosociality at Times 2 and 3 than participants in Class 4 (low and stable spirituality). The high-average and low-average spirituality groups fell somewhere in between. Thus it appears that spirituality is longitudinally related to life satisfaction, positive emotions, and prosociality, and that participants with spiritual growth reported the highest levels of these variables.

DISCUSSION

For over a decade now, scientific inquiry into the domain of spirituality and spiritual development has blossomed. While fraught with conceptual confusion, spirituality has been conceptualized as a core character strength contributing to flourishing and thrive (e.g., Peterson and Seligman, 2004) and spiritual development as an essential aspect of positive human development (e.g., King and Boyatzis, 2015). The current findings clearly showed that spirituality is a specific, distinct area of character strength that longitudinally contributes to positive development during adolescence. Specifically, a latent factor of spirituality was found to represent a unique category of strengths that was empirically separated from other related character strengths and to be longitudinally related to subjective well-being (positive emotions, life satisfaction) and prosociality during the 1-year study period.

The current findings concerning the structural relationship of measures of spirituality and character strengths were in line with Piedmont's (1999) claim that spirituality is an independent dimension of character strengths. Specifically, Israeli adolescents were found to vary along a latent factor of spirituality (including measures of personal devotion, faith maturity, intrinsic religiosity, commitment to religious practices, and VIA-spirituality), which was empirically separated from other three categories of character strengths – interpersonal, intrapersonal, and intellectual. That is, exploratory and CFA yielded a four-factor structure of character strengths in which spirituality represented one of the four foundational categories of strengths. This four-factor structure does not fit the VIA's six virtue categories, into which the 24 strengths are organized. In fact, our findings are quite similar to those of previous adolescent studies of character strengths, which implemented various adapted VIA strength scales (e.g., Toner et al., 2012; Park et al., 2017). Nonetheless, these studies included spiritual characteristics (e.g., “theological strengths” and “transcendence and vitality factors”) that were more narrowly operationalized than in our study. Peterson and Seligman (2004) claim that their conceptualization of transcendence as a high-order category of character strengths “seems mixed” (p. 519). They argue that the prototype of this category is spirituality, and the other strengths in this category (appreciation of beauty, gratitude, hope, humor, and spirituality) are expressions of a fundamental belief that there is something greater than one's self. Our analyses clearly indicated

that measures of spirituality (including the VIA spirituality strength) loaded onto a high-order category distinct from other VIA's strengths, whereas the other strengths included in the transcendence category collapsed into other strengths categories (interpersonal, intrapersonal, and intellectual). While related to, there is no evidence suggesting that the strengths of appreciation of beauty, gratitude, hope, and humor are part of a distinct underlying component and foundation of character, as opposed to spirituality that represents a distinct category of strengths.

The emergence of a statistically autonomous spirituality factor incorporating the various aspects of spirituality measured in the current study suggests that spirituality is a distinct aspect of youth character. The implications of this finding to developmental and educational policy should not be underestimated, and educators, parents, and policy makers may need to consider incorporating spirituality into informal and formal education. Further research should more carefully explore the specific content of spirituality in adolescence, to help elucidate the mechanisms of spirituality as a foundation of character, develop theoretical models and intervention strategies, and address the challenges of integrating these concerns into the everyday lives of children and adolescents.

Adolescence has been theorized to be a time of spiritual turmoil by some (e.g., Pearce and Denton, 2011), and of spiritual stability and importance by others (e.g., Templeton and Eccles, 2006; Good et al., 2011), although there is virtually no empirical research to support either argument. Yet, Good et al. (2011), in a rare longitudinal study, found evidence for intraindividual stability in spirituality among 17–18 years-old adolescents over two time points. The current findings replicated and extended Good et al.'s (2011) findings, showing that the latent factor of spirituality we found in our sample of Israeli middle school adolescents remained stable over the three waves of measurement. Moreover, the results indicated that spirituality is slightly more stable than interpersonal, intrapersonal, and intellectual strengths. That is, it appears that spirituality among youth is largely stable over time, as shown in previous studies (Good et al., 2011; Lopez et al., 2011; Pearce and Denton, 2011).

Findings from the LCA indicated that adolescents with relatively high spirituality and high intrapersonal strengths had the highest scores on measures of subjective well-being and prosociality, whereas adolescents characterized by relatively low spirituality, high intellectual strengths, and low interpersonal strengths revealed the poorest level on these measures. This finding lend support to the hypothesis that intellectual strengths are not necessarily related to well-being during adolescence, while strengths of the heart are (e.g., Toner et al., 2012; Shoshani and Slone, 2013). Moreover, fitting previous findings (e.g., Benson et al., 2005; Ciarrocchi and Deneke, 2005; Marques et al., 2013), it seems that high levels of spirituality in adolescence tend to be closely associated with high levels of intrapersonal strengths (e.g., zest, life orientation, humor, hope, perspective) and that a mixture of them are related to heightened well-being and prosociality. Nonetheless, a thorough understanding of the mechanism by which spirituality impacts adolescent well-being is lacking. It may be that spirituality nurtures well-being and prosociality in adolescents by furnishing them with heightened purpose and connection to themselves and the divine, and with

comfort during upset and disappointment (Gillham et al., 2011). Together, these findings suggest that not only is spirituality a core human mechanism, but it can also lend adolescents a life of well-being and social impact.

Findings also indicated that changes in spirituality during the 1-year study period also contributed to explain individual variations in subjective well-being and prosociality at the three waves of measurement. Adolescents with high and increasing spirituality reported the highest life satisfaction, positive emotions, and prosocial behaviors across the three time points, whereas adolescents with low and stable spirituality reported the lowest levels of these measures. These findings suggest that spirituality is longitudinally related to subjective well-being and prosociality, that adolescents who exhibit spiritual growth report the highest levels of these variables, and that positive interventions should especially target adolescents with low levels of spirituality.

The current study is one of few to focus on the interplay of spirituality, character strengths, subjective well-being, and prosociality longitudinally in a national representative sample of adolescents. Nonetheless, this project has its limitations. First of all, the study exclusively relied on self-reports. Future studies could include reports from others, such as from parents or teachers. In addition, the generalizability of the findings is compromised by the fact that the participants are all adolescents raised in Israel, a complex country with a unique set of challenges, chief among which, perhaps, is the deep social divide between the secular and religious populations (e.g., Mayseless and Salomon, 2003). As such, it is an atypical sample that, due to its unique social make-up, may be inherently averse to spirituality, which, in turn, enhances the strength of the findings, given that the sample is largely made up of secular Israelis. Future research should examine the interplay of spirituality, character strength, well-being, and prosociality across different backgrounds and cultures.

More complex longitudinal designs that track intraindividual changes from adolescence to adulthood could strengthen the validity of our longitudinal findings and examine more in-depth the long-term contributions of youth spiritual development to subjective well-being and prosocial behavior at different life domains in adulthood. In addition, future studies could examine more systematically whether and how specific dimensions of spirituality (e.g., awareness, connectedness, meaning, awe) are differentially related to specific domains of socio-emotional adjustment. Moreover, these relationships may be highly influenced by culture (e.g., Pirutinsky et al., 2011) and gender (e.g., Desrosiers and Miller, 2007), and future research would benefit from cross-cultural samples and gender comparisons.

The findings have also important implications for the planning and implementation of character education programs that aim to impact children and adolescents' emotional, moral, and intellectual development. Spirituality has largely been absent from the discourse on character education and remains an elusive concept in the eyes of most developmental scientists. However, our findings suggest that any character education program that is devoid of spirituality may be lacking in that it ignores a foundational facet of character. Further research is

needed to create a conceptual framework that will facilitate the incorporation of spirituality into character education curricula and discourse. As the popularity of character research and interventions continues to grow, additional inquiries into spirituality should deepen and become incorporated into mainstream developmental and educational sciences.

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Predicting Adolescent Depression: The Interrelated Roles of Self-Esteem and Interpersonal Stressors

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Depression in adolescents can lead to social and educational impairment and is a major risk factor for suicide and substance misuse. Thus, predicting and preventing this disorder are extremely important. The current study aimed to analyze the contribution of adolescents' self-esteem (i.e., quality of interpersonal relationships, control of life events, and management of negative emotions) and interpersonal stressor sources (relationships with parents, teachers, classmates and friends) in predicting several depression manifestations (i.e., depressed mood, sense of inadequacy, and insecurity). Participants were 182 Italian pre-adolescents and adolescents, aged 10–14 years, were recruited from three Italian schools. They were asked to complete a self-report questionnaire. Results showed that self-esteem was a major factor to be considered in adolescents' depression. In particular, adolescents' perception of negative emotion management was the most important protective factor against depression manifestations. Conversely, sources of interpersonal stressors contributed only marginally to depression. Among these, problems with parents and friends increased adolescents' depressed mood, while troubles with classmates impacted on their sense of inadequacy and insecurity. Implications of these results for positive practices which could enhance adolescents' self-esteem and further expansions of the study are discussed.

Keywords: adolescents, depression, self-esteem, interpersonal relationship, stressor sources

INTRODUCTION

Adolescents are at higher risk to develop depression than younger children (Costello et al., 2011). Depression incidence, notably in girls, rises sharply after puberty and is often associated with morbidity and suicide risk (Rhew et al., 2010; Salk et al., 2016). Moreover, depression has detrimental effects on adolescents' social and academic functioning (Verboom et al., 2014). In their meta-analysis on the prevention of depression in children and adolescents, Horowitz and Garber (2006) highlighted the important role played by implementing mastery learning and behavioral management programs to prevent depression in school-age children.

Preventive actions addressing self-esteem may have a key role to play in reducing these risks. Self-esteem is the affective component of self-concept, as it concerns people's global appraisal of their positive or negative value, depending on how they estimate their value in different life domains (Harter, 1999). High self-esteem is related to several well-being conditions, such as high happiness

and life satisfaction (Duffy et al., 2014), as well as low anxiety, depression, and loneliness (Cacioppo et al., 2009). More specifically, adolescents with low self-esteem are at higher risk for depression. Low levels of self-esteem have been found to predict depressive symptoms in a time-frame ranging from 3 months to 10–15 years later on (Trzesniewski et al., 2006). Interestingly, Orth et al. (2008), in two samples of early and late adolescents, showed that self-esteem predicted depression after 6 years, while depression did not predict subsequent levels of self-esteem.

During adolescence, interpersonal relationships with parents, teachers, and friends may help and support their development. The ability to feel close to and accepted by parents (Mattanah et al., 2011; Lundervold et al., 2013), teachers, and peers (Birkeland et al., 2014) is strongly related to self-esteem. The significant impact of interpersonal relationships on adolescents' self-esteem may be due to several factors, including the increasing ability to form meaningful psychological relationships with others and the possibility to learn about oneself and one's own functioning in specific contexts (Nasir and Munaf, 2010; Compare et al., 2013; Buonomo et al., 2017). At the same time, research has shown that relationships can also be a common source of stress in adolescence (Compas et al., 2017). As relationships become more salient, they may generate negative events which, in turn, may be more predictive of a general maladjustment (Hankin et al., 2007). Effectively, interpersonal domains serve as sources of psychosocial stress in adolescence social network stress relationships outside the family increase the possibility of loss, rejection, and conflict. Recently, Rueger et al. (2016) in their systematic meta-analysis of the literature covering relations between social support and depression have shown that family support followed by school support. More specifically, social support may play a stress-buffering effect on children with high-stress conditions.

The association between stress, self-esteem, and depression is easily predictable when considering, on the one hand, the effects of self-esteem on adjustment and well-being and on the other hand, the detrimental association between self-esteem and interpersonal stressors (Babore et al., 2016). Indeed, when individuals perceive their interpersonal relationships as sources of stress, they experience life events as unpredictable or overwhelming (Rudolph, 2002). Moreover, some studies have shown that parents, teachers, classmates, and friends may significantly stress adolescents out, heightening the risk of developing depressive symptoms (Hutcherson and Epkins, 2009). However, to the best of our knowledge, no studies have addressed the relative contribution of individual factors in this context. Addressing the specific role of these variables could help identify protective factors to assist practitioners and educators in their task.

The main limitation of previous studies was the lack of focus on the interrelated roles of self-esteem and sources of interpersonal stressors in adolescent depression. We addressed two main exploratory questions: "How much can adolescents' self-esteem and interpersonal stressors explain their depressive symptoms?" and "Which aspects of self-esteem and which

interpersonal stress sources are the most important predictors of adolescents' depressive symptoms?"

MATERIALS AND METHODS

Participants and Procedure

The study included 182 Italian pre-adolescents and adolescents (92 girls, 50.55%, and 90 boys, 49.45%), aged 10–14 years ($M = 12.7$, $SD = 0.875$), with no psychological diagnosis. Participants were recruited from three schools located in Rome, Italy. They, as well as their parents, were informed in advance about the main objectives of the research and that participation was free and voluntary. Children whose parents consented to their participation filled in a self-report and anonymous questionnaire in their classrooms during school hours. This study was approved by the Scientific Board of the LUMSA University.

Measures

Depression

The Self-Administered Psychiatric Scales for Children and Adolescents-Depressive Scale (SAFA-D; Cianchetti and Fancello, 2001) was used for a total of 21 items with a total score ranging from 21 to 144. Respondents were asked to answer using a three-point Likert scale (1 = true to 3 = false). In the current study, we used the following scales: Depressed mood composed by seven items ($\alpha = 0.89$), Sense of inadequacy composed by seven items ($\alpha = 0.78$), and Insecurity composed by seven items ($\alpha = 0.82$).

Self-Esteem

Three subscales of the Multidimensional Self-Concept Scale (MSCS, Bracken, 1992; It. ad. Mazzeo, 2003) were used and respondents were asked to answer using a four-point Likert scale (1 = strongly agree to 4 = strongly disagree). MSCS was composed by 75 items with a total score ranging from 75 to 300. In the current study, we used the following scales: Interpersonal Relationships composed by 25 items ($\alpha = 0.85$), Control of life events composed by 25 items ($\alpha = 0.78$), and Management of negative emotions composed by 25 items ($\alpha = 0.78$).

Sources of Interpersonal Stressors

Adolescents were asked to answer using a four-point Likert scale (1 = strongly agree to 4 = strongly disagree) to what extent parents, classmates, teachers, and friends outside the class were the source of their problems.

Data Analysis

Preliminarily, we described the study variables in terms of means and standard deviations and measured their associations using Pearson correlations. Second, we conducted three separate multiple linear regressions (MRs), with depressed mood, sense of inadequacy, and insecurity as criterion variables. We estimated the overall R^2 and determined the statistical significance of individual regression coefficients which indicate the extent to which the criterion variable would change based on a given increase in one predictor while the other predictors remained constant. However, when predictors are correlated –

as likely in the case of the multidimensional predictors (e.g., self-esteem) – regression coefficients could be inadequate reflections of predictor importance, because all the predictors may interact with each other and simultaneously weight the criterion variable (Barni, 2015). We therefore combined MR with relative weight analysis (RWA), which uses a variable transformation approach to address the issue of correlated predictors. RWA focuses on the proportionate contribution each predictor makes to R^2 , considering both its unique relation with the criterion and its relation when combined with other predictors (i.e., relative contribution) (Johnson, 2000).

RESULTS

Table 1 presents the descriptive statistics of the study variables and the Pearson correlation coefficients, many of which were statistically significant. Specifically, self-esteem dimensions (i.e., interpersonal relationships, control of life events, and management of negative emotions) show the highest correlation values with depression (Pearson coefficients ranging from -0.65 to -0.76 , $p < 0.01$). At the same time, sources of interpersonal stress (i.e., parents, teachers, classmates, friends) show significant, but lower correlation values (Pearson coefficients ranging from -0.15 to -0.27 , $p < 0.01$). The multiple regression models were significantly predictive of depressed mood, sense of inadequacy, and insecurity (**Table 2**). Inspection of β weights revealed that self-esteem was the strongest predictor of adolescent depression. More precisely, the higher the scores were on interpersonal relationships and management of negative emotions, lower was the risk of feeling depressed, inadequate, and insecure. Additionally, the stronger the perception of control over events was, lower was the sense of inadequacy.

Among the sources of interpersonal stressors, problems with parents were a risk factor for adolescents' depressed mood and insecurity, problems with classmates for sense of inadequacy and insecurity, and problems with friends for depressed mood and sense of inadequacy. Negative relationship with teachers,

however, did not help predict any adolescent depression dimension. Girls showed higher levels of depressed mood, sense of inadequacy, and insecurity than boys did, with the largest gender difference found in insecurity. Conversely, adolescents' age was not related to the criterion variables.

The analysis through RWA of the relative contributions of each predictor in explaining adolescent depression largely confirmed the importance of self-esteem in accordance with the regression results (**Table 2**). Adolescents' ability to manage negative emotions was the most important predictor in the context of other predictors, followed by interpersonal relationships. Interestingly, RWA evaluated the contribution of adolescents' ability to control life events in predicting depression: it accounted for 16.7% of depressed mood variance, for 27.1% of inadequacy variance, and for 21.2% of insecurity variance. Probably because of the high correlation between this variable and interpersonal relationships ($r = 0.70$, $p < 0.01$) and management of negative emotions ($r = 0.76$, $p < 0.01$), the regression coefficients seemed to indicate that control of life events did not contribute significantly to depressed mood and insecurity.

According to RWA results, the three sources of interpersonal stressors contributed only marginally to depression. Among these predictors, problems with classmates were the most important predictors of insecurity (5.9% of the explained variance) and sense of inadequacy (2.0% of the explained variance); problems with friends were the most important in the case of depressed mood (4.6% of the explained variance).

DISCUSSION

The aim of the current study was to analyze the importance of self-esteem and interpersonal stressor sources in predicting different adolescent depression manifestations. Overall, our results showed that self-esteem and sources of interpersonal stressors play a large role in the development of depressed mood as well as sense of inadequacy and insecurity in adolescents.

TABLE 1 | Means (M), standard deviations (SD), and Pearson correlation coefficients ($N = 182$).

Variables	$M(SD)$	1	2	3	4	5	6	7	8	9	10
1. Age	12.07 (0.84)	–									
<i>Self-esteem</i>											
2. Interpersonal relationships	73.35 (11.17)	0.02	–								
3. Control of life events	73.71 (9.64)	–0.04	0.70**	–							
4. Management of neg. emotion	71.21 (12.74)	0.07	0.72**	0.76**	–						
<i>Sources of interper. stressors</i>											
5. Parents	2.09 (0.97)	0.09	–0.23**	–0.21**	–0.25**	–					
6. Teachers	2.16 (0.87)	0.04	–0.10	–0.18*	–0.17*	0.22**	–				
7. Classmates	1.83 (0.87)	–0.06	–0.25**	–0.15*	–0.18*	0.08	0.14	–			
8. Friends	1.85 (0.89)	0.08	–0.07	–0.04	–0.07	0.12	0.01	0.24**	–		
<i>Depression</i>											
9. Depressed mood	3.24 (3.47)	–0.07	–0.65**	–0.56**	–0.75**	0.22**	0.09	0.15*	0.20**	–	
10. Sense of inadequacy	3.03 (3.63)	–0.01	–0.71**	–0.69**	–0.76**	0.15*	0.08	0.21**	0.12	0.75**	–
11. Insecurity	6.68 (3.58)	–0.01	–0.62**	–0.59**	–0.69**	0.21**	0.10	0.28**	0.17*	0.64**	0.66**

Note. ** $p < 0.01$, * $p < 0.05$.

TABLE 2 | The importance of adolescents' self-esteem and sources of interpersonal stressors in predicting depression: multiple regression analysis (MR) and relative weight analysis (RWA) results.

Predictors	Depressed mood						Sense of inadequacy						Insecurity					
	MR			RWA			MR			RWA			MR			RWA		
	β	t	p	Raw importance	Rescaled importance (%)		β	t	p	Raw importance	Rescaled importance (%)		β	t	p	Raw importance	Rescaled importance (%)	
Gender	0.22	3.07	0.002	0.02	3.5		0.21	2.88	0.004	0.02	2.8		0.34	4.74	0.000	0.07	11.4	
Age	-0.05	-0.62	0.534	0.00	0.6		0.02	0.29	0.768	0.00	0.1		0.03	0.49	0.624	0.00	0.2	
<i>Self-esteem</i>																		
Interpersonal relationships	-0.28	-3.83	0.000	0.18	28.0		-0.29	-4.18	0.000	0.20	30.5		-0.22	-2.87	0.006	0.14	24.6	
Control of life events	0.10	1.33	0.186	0.10	16.7		-0.19	-2.50	0.013	0.18	27.1		-0.12	-1.46	0.144	0.12	21.2	
Management of neg. emotion	-0.62	-7.45	0.000	0.27	43.0		-0.40	-5.11	0.000	0.23	35.3		-0.36	-4.13	0.000	0.18	31.7	
<i>Sources of interp. stressors</i>																		
Parents	0.18	2.53	0.012	0.02	2.4		0.11	1.52	0.131	0.01	0.9		0.16	2.25	0.026	0.01	2.1	
Teachers	0.04	0.60	0.551	0.00	0.4		0.04	0.52	0.604	0.00	0.3		0.04	0.59	0.555	0.00	0.4	
Classmates	0.07	1.00	0.321	0.01	0.8		0.17	2.26	0.025	0.01	2.0		0.23	3.23	0.001	0.03	5.9	
Friends	0.16	2.17	0.031	0.03	4.6		0.05	0.69	0.488	0.01	1.0		0.08	1.14	0.255	0.02	2.5	
R^2				0.63	100					0.66	100					0.57	100	
$F(9,181)$	31.01**						36.53**						25.50**					

Note. Rescaled importance was computed by dividing the relative weights by the total R^2 and multiplying by 100. ** $p < 0.001$.

The strongest predictor of adolescent depression was self-esteem (i.e., perception regarding interpersonal relationships, negative emotions management, and control over life events). We found that, of all the predictors, the perception of negative emotion management was the most important protective factor against depressed mood, inadequacy, and insecurity. Adolescents with low self-esteem feel incompetent and worthless; they then try to manage the negative emotions arising from these beliefs but in a dysfunctional way, thus becoming even more stressed (Eisenbarth, 2012). Coherently, high levels of conflicts, like anger and rejections, contribute significantly to the persistence of depressive symptoms (Vulić-Prtorić and Macuka, 2006). With regard to interpersonal relationships, the four sources of stress we analyzed (i.e., parents, teachers, classmates, and friends) contributed only marginally to depression.

Among these, problems with classmates, friends, and parents impacted on depression, similarly to the findings of previous studies (Ng et al., 2007). Previous findings indeed showed that young adolescents are at higher risk when they feel high criticism and rejection by peers (i.e., friends and classmates) (Passiatore et al., 2017). Moreover, parental warmth and emotional support may be an important factor in protection against depression in children and adolescents (Capitello et al., 2016). According to Wang and Sheikh-Khalil (2014), some forms of parental involvement in their children's lives may positively affect their general self-esteem (e.g., supportive parent-adolescent communication at home), which, in turn, may protect adolescents against depressive symptoms (Flouri and Buchanan, 2003; Bean et al., 2006).

Even so, our results showed that parents and friends contribute to depressed mood, while classmates influence adolescents' sense of inadequacy and insecurity. While several studies showed that non-supportive, negative relationships with parents and close friends heighten depressive risks (La Greca and Harrison, 2005; Wang and Sheikh-Khalil, 2014), the impact of classmates on insecurity was studied less. Prinstein and La Greca (2002) showed that adolescents affiliated with a low-status group at school are more insecure as regards their behavior, appearance, and social and athletic abilities than peers affiliated with more popular and accepted groups.

Conversely, it emerged from our study that problems with teachers did not explain the dimension of adolescent depression. This result, however, requires deeper analysis in additional studies in view of the well-known relevance for adolescents' well-being of the school-life context and relationships with its actors (Fiorilli et al., 2017a,b).

Finally, our results confirmed that an adolescents' gender is associated with depression symptoms as reported in previous studies (Girgus and Yang, 2015).

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Several questions emerging from our findings need further research in order to overcome the caveats of our study. First, collection of data concerning adolescents' academic achievements may support analysis regarding adolescents' adjustment in the school context and may also show their impact on the adolescents' reputation within the family context (Moreira et al., 2015). Second, multi-informant methods would be particularly helpful and supportive in studies which focus on interpersonal relationships. Third, multiple measures should be considered for the future, with specific attention to the sources of stress.

Furthermore, due to the cross-sectional research method, the effective developmental pathways among studies variables remain unexplored. Finally, with regard to the gender differences which emerged from the current study, an interesting perspective is presented by other studies which suggest that gender differences in self-report measures are due to the high level of awareness of females compared to their male peers.

DATA AVAILABILITY

The datasets for this manuscript are not publicly available because of local legal and privacy restrictions (Italian Data Protection Code – Legislative Decree no. 196/2003). All datasets generated for this study are included in the manuscript and/or the supplementary files.

ETHICS STATEMENT

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation. All participants gave written informed consent in accordance with the Declaration of Helsinki. The study was approved by the Scientific Board of LUMSA University.

AUTHOR CONTRIBUTIONS

CF designed and carried out the study and contributed to the analysis of the results and to the writing of the manuscript. TGC designed and carried out the study, collected data, and contributed to the writing of the manuscript. DB contributed to the analysis of the results and to the writing of the manuscript. IB collected data and contributed to the writing of the manuscript. SG supervised the study design and the manuscript draft.

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The Parent-Adolescent Relationship and Risk-Taking Behaviors Among Chinese Adolescents: The Moderating Role of Self-Control

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The present study primarily aimed to examine whether self-control serves as a moderator in the associations between parent-adolescent relationships, including parental support and parent-adolescent conflict, and risk-taking behaviors among adolescents. The 917 Chinese adolescents whose mean age was 14.38 years ($SD = 1.69$) completed questionnaires effectively. The results indicated that the relationships between either parental support or parent-adolescent conflict and adolescent risk-taking behavior were moderated by self-control. Among those adolescents with lower levels of self-control, both higher levels of parent-adolescent conflict and lower levels of perceived parental support predicted more risk-taking behaviors, but their predicting roles got weakened with the increase of the level of self-control. Accordingly, good parent-adolescent relationship, particularly less parent-adolescent conflict, is critical for decreasing adolescent risk-taking. Otherwise, improving self-control is particularly helpful to those adolescents having more conflict with their parents or less parental support to decrease their risk-taking.

Keywords: Chinese adolescents, parent-adolescent conflict, perceived parental support, risk-taking behaviors, self-control

INTRODUCTION

Risk-taking behaviors refers to participating in behaviors which probably lead to some aversive consequences (Boyer, 2006). In general, it includes negative risk-taking behaviors, sometimes called problem behaviors, and positive risk-taking behaviors that is challenging but relatively socially acceptable (Özmen and Sümer, 2011). The former includes smoking, binge drinking, drug use and unsafe sexual behaviors, and so on, whereas the latter includes bungee jumping, skiing, and diving and other risky sports. During the last decade, scholars have paid much attention to negative risk-taking behaviors, such as alcohol use (O'Hara and Cooper, 2015; Passos et al., 2015), substance use (Jacobus et al., 2013; Wood et al., 2013), sexual risk taking (Downing and Bellis, 2009; O'Hara et al., 2012) and so on, because negative risk-taking behaviors not only do harm to adolescents' physical development but also have adverse impacts on their psychosocial adaptation. For comparison, the current study also put emphasis on negative risk-taking behaviors and tried to find out those risk factors or buffers for adolescent negative risk-taking behaviors. We did this job according to Problem-Behaviors Theory (PBT; Jessor, 1987), a psychosocial perspective focusing on the Personality System, the Environment System, and their interaction,

which believes that individual behavioral performance needs to be studied from the perspective of development, as well as the interactions between the three systems.

Self-control is an important factor in the Personality System, which is defined as the ability of human beings to suppress automatic, habitual or innate behaviors, impulsiveness, emotion, or desire, otherwise these behaviors will interfere with target oriented behaviors (Muraven et al., 2006), which glasses a struggle between urges, desires, and inhibitory forces (Hofmann and Van Dillen, 2012). That is to say, individuals with high self-control are theorized to have abilities to inhibit impulses and resist immediate pleasures (Hay and Forrest, 2008), while individuals with low self-control including traits like urges and feeling seeking (Doran et al., 2011) are thought to be the opposite. Meanwhile, the role of self-control in adolescent adjustments has obtained much attention empirically. For example, higher level of self-control is correlated with better physical and mental health (Tu and Yang, 2016); increased self-control is linked to decreased aggression (Keatley et al., 2017) and reduced involvement in gambling behaviors among adolescents (Belle and Tammie, 2015); there are significant negative correlations between self-control and school violence (Agbaria and Daher, 2015; Zimmerman et al., 2015); those adolescents whose impulse control deteriorated during secondary school also had a higher risk of using substances during high school (James et al., 2016). Accordingly, the current study also took self-control into great account linked with adolescent risk-taking behaviors.

One of contextual factors that may have great influences on adolescents is family. Of particularly important is parent-adolescent relationship. As a positive feature, parental support for basic psychological needs has a positive relationship with the Psychosocial adaptation of children and adolescents (Tu et al., 2016). Parents mostly provide emotional and instrumental support for adolescents and build psychological connections with them (Shakespeare-Finch and Obst, 2011), and emotional support is believed to promote children's internalization of social values and criterions (Patterson et al., 1989), making children more sensitive to social hints before action. Instrumental support is linked to practical assistance, playing a prominent role in offering advice and guidance to their children (Cheung and Sim, 2014). For example, Padilla-Walker et al. (2016) found that parental warmth was positively related to adolescents' pro-social behaviors; low instrumental support was associated with lower self-perception and higher level of depression (Wang et al., 2018), and there are negative associations between perceived parental support and behaviors problems (Yun et al., 2016), such as alcohol use (Maslowsky et al., 2016). Similarly, an inverse relationship has been found between perceived familial support and cigarette smoking (Hamid et al., 2015). However, the tendency of adolescents to think that parents are absolutely authoritative is declining (Fuligni and Eccles, 1993) and adolescents demand more autonomy (Laursen and Collins, 2004), leading to an increase in conflicts with parents (Steinberg and Morris, 2001). As Atkinson et al. (2005) put forward, when conflict took place during family discussions

or communications, one's emotional circuits in the brain were stimulated at the same time and it became increasingly difficult for an individual to reset his or her mind. As a result, their attention to information of externalizing behaviors is not enough. Considerable research has revealed the relationship between conflict and negative consequences for adolescents. For example, it has been found that conflicts between parents and adolescents are related to antisocial behaviors (Sentse and Laird, 2010), alcohol use (Chaplin et al., 2012; Abar et al., 2014), etc. Note that positive features and negative features of relationships are independent, not opposite ends of a continuum (Laursen and Mooney, 2008), independently predict adolescent externalizing problems, internalizing problems, and academic achievement (Adams and Laursen, 2007). Thus, it is important to focus on the effects of the two aspects of parent-adolescent relationship, support, and conflict, simultaneously, on adolescent adjustments.

Based on PBT, when the proneness in the Personality System and the Environment System is taken together, the combination may generate psychosocial tendency to make the prediction and explanation of problem behaviors. For example, positive emotionality can act as a resilience effect of a connection between parent-child clash and material use of adolescents (Wills and Sandy, 2001). Also, the associations of perceived parental support with aggressive or delinquent behaviors tend to be negative for adolescents with high empathy but positive for those with low empathy (Van der Graaff et al., 2012). Among persons with good self-control, risk factors (such as negative life events) have a reduced impact on drug use (Wills et al., 2008). As an individual's self-control increases, they require less social support to achieve subjective well-being; however, those with lower levels of self-control experience the opposite (Zhang and Xing, 2007). It can be seen that self-control can moderate the relationship between environmental factors and social adaptation. However, work examining whether adolescents varying in self-control are differentially influenced by parent-adolescent relationship, especially on adolescent risk-taking behaviors, is really limited. To our knowledge, no studies have tested whether self-control moderates the association between parent-adolescent relationship and risk-taking behaviors among adolescents. Therefore, in consistent with research indicating that low studious control and conflict between parents and adolescents is a common risk factor for depression, as well as participating in antisocial behaviors in adolescents (Wang et al., 2013), parent-adolescent conflict and low level of self-control in the current study are also expected as risk factors for adolescent risk-taking behaviors. Also, according to the risk-enhancing model (Fergus and Zimmerman, 2005), low self-control, as a risky factor, increases risks of low level of parental support. Accordingly, we hypothesized that low level of perceived parental support and high level of parent-adolescent conflict would increase adolescent risk-taking behaviors at low level of self-control while not at high level of self-control.

Lastly, note that adolescent risk-taking behaviors might predict parent-adolescent relationship as well. Transactional

model provides theoretical support for this possibility, which holds that development is the result of a sustained and dynamic two-way interaction between individuals and their environmental experience (Sameroff and Mackenzie, 2003). A follow-up study on adolescents found that internalizing and externalizing problem behaviors in the pre-test significantly predicted parenting attitudes and behaviors in the post-test (Buist et al., 2004). A cross-lagged panel model also revealed a reciprocal association between mother-adolescent relationship quality and adolescent antisocial behaviors (Crocetti et al., 2016). Accordingly, we established a competitive model in which adolescent risk-taking behaviors were the predictor, while parent-adolescent relationship was the outcome and hypothesized that more risk-taking behaviors would lead to poorer parent-adolescent relationship.

MATERIALS AND METHODS

Participants

The participants were recruited from a public secondary school and a public high school which were located in a county in Shandong Province in eastern China. They were all from rural areas. A total of 980 adolescents were invited as the initial sample. Among them, 917 adolescents completed the questionnaires, giving a response rate of 93.6%. Therefore, the final sample consisted of 917 Chinese adolescent students from 11 to 19 years old (mean age = 14.38, $SD = 1.69$; 493 boys).

Measures

Parent-Adolescent Relationship

Perceived parental support or parent-adolescent conflict was measured using the Chinese shortened version (Tian et al., 2012) of the Network of Relationships Inventory (NRI; Furman and Buhrmester, 1985). It includes 15 items in both relationships with father and mother and is made up of five dimensions, including companionships (e.g., “How long are you with this person when you are free?”), instrumental help (e.g., “Does the person often give you help when in need?”), affection (e.g., “How much does the person like you?”), intimacy (e.g., “Do you share your secrets or feelings with the person?”), and conflict (e.g., “Is there much quarrel between your parent and you?”), each dimension consisting of three items. For each item, participants were asked to rate it on a 5-point Likert scale, ranging from 1 (little or none) to 5 (the most). Because the former four dimensions correlated highly with each other and correlations between the mother’s and the father’s scores were high as well ($0.46 < rs < 0.81$, $p < 0.001$) in the present study, scores of them were combined into a composite parental support score, according to the procedure of previous research (Furman et al., 2002; Rubin et al., 2004; Tian et al., 2012, 2014). With higher scores, the levels of parental support are higher, and its Cronbach’s alpha coefficient was 0.94. Similarly, we averaged the scores on mothers and fathers to compose one score for parent-adolescent conflict. The higher the score, the more serious the conflict between

parents and adolescents, and its Cronbach’s alpha coefficient was 0.90. The Cronbach’s alpha coefficient for the whole NRI was 0.91 in the present study. The fit indices from a confirmatory factor analysis were adequate, $\chi^2/df = 2.80$, $GFI = 0.97$, $TLI = 0.98$, $CFI = 0.98$, and $RMSEA = 0.04$.

Self-Control

The Self-Control Scale for Chinese middle and high school students (SCS) was developed for assessing the ability of self-control of participants in learning, entertainment, and social life (Wang and Lu, 2004). It consists of 36 items (e.g., “I will shout and yell when I am happy” or “I am easily influenced by the outside”). For each statement, participants were asked to rate it on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). With higher scores, the levels of self-control are higher. In the present study, the Cronbach’s alpha coefficient of the SCS was 0.88. The fit indices from a confirmatory factor analysis were adequate, $\chi^2/df = 2.80$, $GFI = 0.91$, $TLI = 0.88$, $CFI = 0.90$, and $RMSEA = 0.04$.

Risk-Taking Behaviors

The Chinese version (Zhang et al., 2011) of the Adolescent Risk-Taking Questionnaires (ARQ; Gullone et al., 2000) was used to measure the frequency of participation in each of some behaviors (on a 5-point Likert scale: 0 = never done, 4 = done very often). It consists of 17 items with a satisfactory reliability and validity that can be applied to the assessment of Chinese adolescent risk-taking behaviors (Zhang et al., 2011). It is comprised of four dimensions, including thrill-seeking behaviors (five items, e.g., “going skating” or “going skiing”), reckless behaviors (two items, e.g., “drug abuse” or “unsafe sexy behaviors”), rebellious behaviors (six items, e.g., “smoking” or “alcohol use”), and antisocial behaviors (four items, e.g., “making fun of others” or “having cheated on school tests”). Thrill-seeking behaviors are regarded as positive or socially acceptable behaviors, while the last three dimensions are regarded as conveying negative risk-taking behaviors (Moore et al., 2004). Thus the last 3 dimensions were only investigated in the current study, and a risk-taking behaviors total score was calculated for each adolescent with a high score indicating more risk-taking behaviors. The Cronbach’s alpha coefficient was 0.71. The fit indices from a confirmatory factor analysis were adequate, $\chi^2/df = 3.22$, $GFI = 0.96$, $TLI = 0.94$, $CFI = 0.95$, and $RMSEA = 0.05$.

Procedure

In current research, data were collected by trained graduate students in participants’ respective classrooms. Before survey, participants were informed that the study was anonymous and they could withdraw freely. The present study adopted a passive consent procedure recommended by Ellickson (1989), which requires students and their parents to return forms only when they do not want to participate in the study. Those who do not return the forms are assumed to agree to participate in

the study. Then, all participants were given a series of self-reported questionnaires, and all measures were completed in approximately 20 min. Ethics approval was obtained from the Research Ethics Boards at our university.

Statistical Analysis

After obtaining the descriptive statistics for the study variables and assessing the correlations among them, separate hierarchical linear regression analyses were conducted using SPSS Version 22 to examine the hypotheses. Gender was re-coded into dummy variables separately (0 = male, 1 = female). The scores on perceived parental support, parent-adolescent conflict, and self-control were all transformed into Z scores before creating the interaction items (Aiken and West, 1991). In the regression analysis, the predictors were entered in three hierarchical steps: (1) age and gender; (2) perceived parental support or parent-adolescent conflict and self-control; and (3) the two-way interaction item. Post-hoc probing of significant interactions was conducted using the simple slope analysis (Aiken and West, 1991) when the predictor criterion was examined at high (i.e., 1 standard deviation above the mean) and low (i.e., 1 standard deviation below the mean) levels of self-control.

RESULTS

Common Method Biases

The common-method bias might occur owing to all data in the present study deriving from adolescents' self-reports. Thus, when collecting the data, we made questionnaires anonymous and made some items reverse scoring. Prior to data analysis, Harman's one-factor test was conducted, in which 17 factors with one-above Eigen values were extracted; in addition, the first factor could explain 17.28% of the variance much lower than the critical value of 40%. Therefore, there was no serious common-method bias in the current study.

DESCRIPTIVE STATISTICS AND CORRELATION ANALYSIS

Table 1 gives the means, standard deviations, and correlations of the study variables. Perceived parental support and self-control were negatively associated with risk-taking behaviors

TABLE 2 | Hierarchical regression analysis for perceived parental support and self-control predicting risk-taking behaviors.

	Predictors	ΔR^2	β	t	95%CI
Step 1	Age	0.08	0.06	7.62***	[0.04, 0.07]
	Gender		-0.10	-4.03***	[-0.15, -0.05]
Step 2	A: Perceived parental support	0.13	-0.01	-0.76	[-0.03, 0.02]
	B: Self-control		-0.14	-11.61***	[-0.17, -0.12]
Step 3	A \times B	0.01	0.03	2.72**	[0.01, 0.05]

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

($r = -0.11$, $p < 0.001$; $r = -0.40$, $p < 0.001$), whereas parent-adolescent conflict was positively correlated with risk-taking behaviors ($r = -0.16$, $p < 0.001$). The effects of gender ($t(915) = 4.00$, $p < 0.001$) and age ($r = 0.25$, $p < 0.001$) on risk-taking behaviors were both significant and thus were controlled statistically in the next analyses.

TESTING THE MODERATION MODELS

As shown as in Table 2, there was a negative main effect of self-control and a significant interaction between perceived parental support and self-control on adolescent risk-taking behaviors. Simple slope analyses (See Figure 1) indicated that perceived parent support was associated with risk-taking behaviors marginally significant at low levels of self-control ($b_{\text{simple slope}} = -0.04$, $t = -1.68$, $p = 0.09$), but the association was not significant statistically at high levels of self-control ($b_{\text{simple slope}} = 0.03$, $t = 1.29$, $p = 0.20$).

As shown as in Table 3, however, there were a positive main effect of parent-adolescent conflict on risk-taking behaviors and a negative main effect of self-control on risk-taking behaviors, as well as the significant interaction between them. Simple slope analyses (See Figure 2) indicated that among those adolescents with low levels of self-control, greater levels of parent-adolescent conflict predicted more risk-taking behaviors ($b_{\text{simple slope}} = 0.07$, $t = 3.63$, $p < 0.001$), but the association was not significant statistically among those with high levels of self-control ($b_{\text{simple slope}} = 0.03$, $t = 1.39$, $p = 0.16$).

To test the competitive model, we also used regression analysis, in which risk-taking behaviors was the independent variable and parent-adolescent relationship was the outcome variable. The analyses indicated that there was a negative main effect of risk-taking behaviors on perceived parental support and a positive main effect on parent-adolescent conflict ($\beta = -0.10$, $p < 0.001$, $R^2 = 0.02$; $\beta = 0.23$, $p < 0.001$, $R^2 = 0.09$, respectively), but their effect sizes (R^2) were much smaller than those in the hypothesized model ($R^2 = 0.09$, $R^2 = 0.15$). The interaction between risk-taking behaviors and self-control was not obvious ($p = 0.65$; $p = 0.12$), which indicated that the competitive moderation model was not well established.

TABLE 1 | Descriptive statistics and correlations among study variables ($N = 917$).

Variables	<i>M</i>	<i>SD</i>	1	2	3
1. Perceived parental support	3.36	0.78	—		
2. Parent-adolescent conflict	2.02	0.82	-0.16***	—	
3. Self-control	3.30	0.48	0.26***	-0.45***	—
4. Risk-taking behaviors	0.35	0.39	-0.11**	0.27***	-0.40***

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

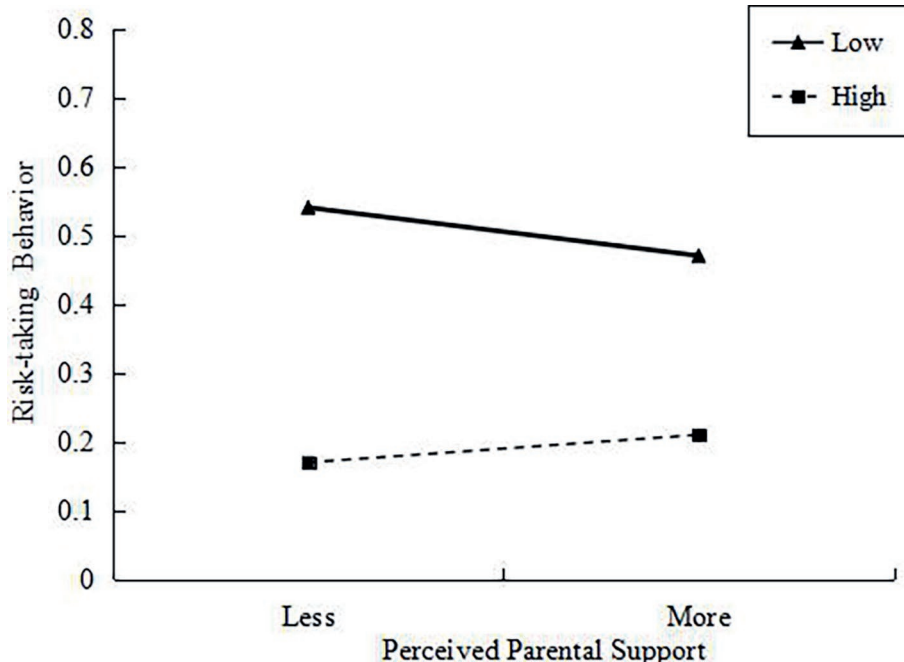


FIGURE 1 | Interaction between perceived parental support and self-control on adolescent risk-taking behaviors.

TABLE 3 | Hierarchical regression analysis for parent-adolescent conflict and self-control predicting risk-taking behaviors.

	Predictors	ΔR^2	β	t	95%CI
Step 1	Age	0.08	0.06	7.61***	[0.04, 0.07]
	Gender		-0.10	-4.03***	[-0.15, -0.05]
Step 2	A: Parent-adolescent conflict	0.15	0.05	4.00***	[0.03, 0.08]
	B: Self-control		-0.12	-9.39***	[-0.15, -0.10]
Step 3	A × B	0.01	-0.02	-2.31*	[-0.05, -0.004]

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

DISCUSSION

The main goal of the present study was to examine the associations of parent-adolescent relationships, including parental support and parent-adolescent conflict, with adolescents risk-taking behaviors and the moderating role of self-control. Overall, the results indicated that for those adolescents with lower levels of self-control, both higher levels of parent-adolescent conflict and lower levels of perceived parental support predicted more risk-taking behaviors, but their predicting roles got weakened with the increase of the level of self-control. Additionally, parent-adolescent conflict was significantly related to adolescents risk-taking behaviors, whereas the relationship between parental support and risk-taking behaviors was not obvious.

First, in agreement with previous research reporting that increased self-control is linked to decreased aggression (Keatley et al., 2017),

self-control was also negatively correlated with adolescent risk-taking behaviors in the present study. This is possibly because adolescents lower in self-control have more traits like impulses and feeling seeking (Doran et al., 2011), which in turn making them more likely to ignore potential passive consequences of their behaviors (Watson and Clark, 1993).

Second, in accordance with research regarding parent-adolescent relationship as important in moulding adolescent mental functioning (Lam et al., 2012; Skinner and Mchale, 2016), high levels of parent-adolescent conflict were associated with more risk-taking behaviors in the present study. When adolescents have more disagreements or conflicts with their parents, emotional circuits in the brain are stimulated (Atkinson et al., 2005), such as causing anger (Chaplin et al., 2012), then easily resulting in heightened risk taking. Chein et al. (2011) have also found that negative environmental factors (e.g., the existence of peers) enlarge adolescents' ventral striatum activation, resulting in much risk-taking behaviors. Another possible explanation is that high level of parent-child conflict will bring children a negative worldview, which easily causes some externalizing problem behaviors (Vanassche et al., 2014).

Third and importantly, as expected by PBT, the impact of parent-adolescent conflict was qualified by adolescent self-control. Specifically, high levels of parent-adolescent conflict predicted increases in adolescent risk-taking behaviors at low levels of self-control, but this predicting role got weakened at high levels of self-control. This result is in line with previous studies finding that less control and parent-adolescent conflict indicate common risk factors for adolescent depression as well as engagement in misconduct (Wang et al., 2013). Furthermore,

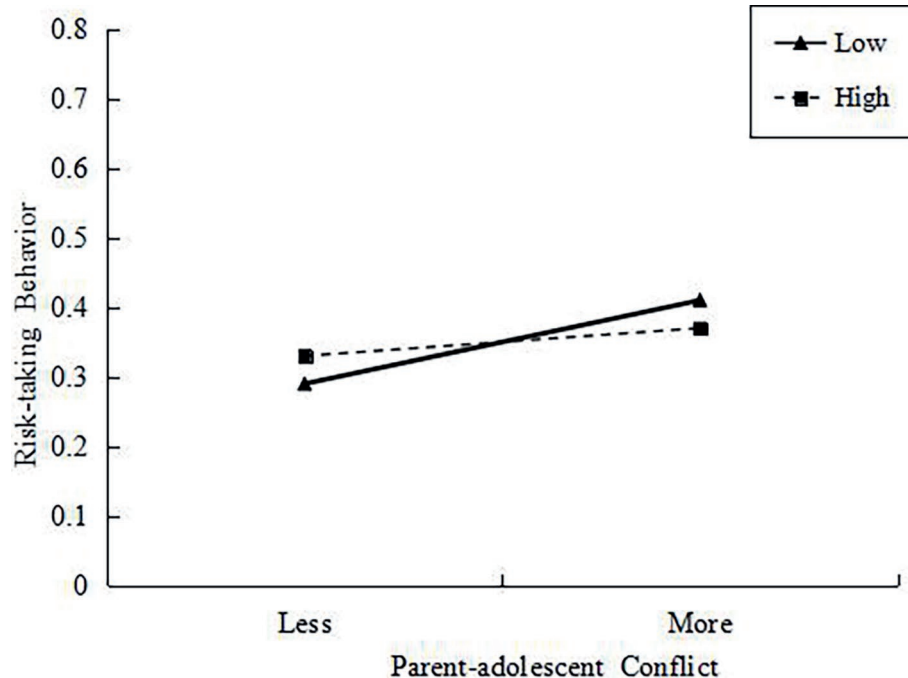


FIGURE 2 | Interaction between parent-adolescent conflict and self-control on adolescent risk-taking behaviors.

it also supports the risk-enhancing model (Fergus and Zimmerman, 2005), suggesting one risky factor will enhance the negative impact of another risky factor on adolescent development and adjustment. However, among those adolescents with high levels of self-control, self-control as a protective factor buffered the impact of parent-adolescent conflict on risk-taking behaviors.

Inconsistent with our expectation, increased perceived parental support was not linked to decreased risk-taking behaviors, even among those adolescents with high levels of self-control. A possible explanation is that low levels of perceived parental support of adolescents, particularly of Chinese adolescents who are usually only one child or have only one sibling in their family because of China's family planning policy, were not absolutely low ($M = 3.36 \pm 0.78$ in the current study) and thereby have no obvious difference in impacting adolescent risk-taking behaviors from those higher levels of perceived parental support. Also, it suggests that parental support is neither a protector nor a risky factor of adolescent risk taking because individuals during adolescence emphasize more on peer support rather than parental support (Macek and Jezek, 2007; Ju et al., 2011). The period of adolescence is in the transition period from school-age children to young adulthood. During this period, students have gradually transferred their main activities from family to social institutions such as schools, classrooms, and juvenile organizations. During this time, the closest relationship with the youth is the peer. At the low levels of self-control, however, lower perceived parent support was associated with more risk-taking behaviors marginally significantly, possibly because that both the factors may have synergistic effects and self-control is a stronger predictor of adolescent risk-taking behaviors than perceived parental support.

Therefore, it suggests that in adolescence, it is not enough to reduce risk-taking behaviors only relying on the environment, and that improving the internal personality power of individuals is a more fundamental way.

Finally, consistent with our hypothesis and prior studies (Buist et al., 2004; Crocetti et al., 2016), parent-adolescent relationship and risk-taking behaviors have a reciprocal relationship. However, the effect sizes (R^2) in the hypothesized model were greater than those in the competitive model. Importantly, the competitive moderation model was not well-established. The result provided empirical evidence for the Problem-Behaviors Theory. Parent-adolescent relationship as an important environmental factor has an important impact on adolescent risk-taking behaviors. The more conflict between parents and adolescents, the more risky-taking behaviors adolescents will be taken in their future life (Lam et al., 2012). This conclusion, however, should be accepted carefully before it is further examined, and more supportive evidence should be sought in future studies.

Lastly, there are some limitations to be noted in the present study. First, it was impossible to draw causal conclusions of the relationships between variables because of the cross-sectional design of the current study. Second, given that the particularity of Chinese context, it needs to be cautious to extend the present results to other cultural background. It would be of value to further examine the relationships in other countries or districts. Despite these limitations, the present study may offer a new sight into interaction between self-system and family system on adolescent development and adjustment, and these findings suggest that intervention and prevention measures devoted to decreasing adolescent risk-taking incorporate the interaction of family and personal characteristics.

Despite these limitations, the findings of the current study provide valuable information. First, this study simultaneously examined the moderating roles of self-control in the relationships between both parental support and parent-adolescent conflict with adolescent risk-taking behaviors. The findings of the present study provide evidence for Problem-Behaviors Theory, extend our insight into the mechanisms underlying the associations among parent-adolescent relationships, self-control, and adolescent risk-taking behaviors, and supplement data for previous relevant studies. Second, the current study found that parent-adolescent relationship could predict adolescent risk-taking behaviors and vice versa, which provides further support for transactional model. Finally, the findings may provide guidance for intervention and prevention of adolescent risk-taking behaviors. The study suggests that to decrease adolescents' risk-taking behaviors we should focus on building good parent-adolescent relationship and improving individual self-control, particularly the latter. It is important for adolescents to boost self-control training, cultivation, development, and promotion.

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DATA AVAILABILITY

All datasets generated for this study are included in the manuscript.

AUTHOR CONTRIBUTIONS

LL conducted measurements, data collection, data analysis, and completed the earlier draft of this manuscript. NW contributed to data analysis and revising the manuscript. LT provided a great amount of support and guidance in the research and revised the manuscript substantially.

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The Use of Classmates as a Self-Motivation Strategy From the Perspective of Self-Regulated Learning

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It can be stated that self-regulated learning (SRL) brings broad benefits to the process of students' learning and studying. However, research has yet to be undertaken in relation to one of its components, namely self-regulation of motivation and affectivity. The main objectives of this study are to examine the use of self-motivation strategies that involve classmates and to obtain models on the influence of academic goals and self-efficacy on such self-motivation strategies. To this end, was conducted a study using two different samples of students in the compulsory secondary education or baccalaureate stages in Spain ($N = 613$ and $N = 910$). The results obtained indicate that, with regard to gender, differences only exist in the use of the strategy of deception ($t = 5.450$, $p < 0.001$, $d = 0.364$). That the two pairs of strategies positively and significantly correlated with one another ($r = 0.239$, $p < 0.01$ and $r = 0.355$, $p < 0.01$). That only the strategy of annulation of others correlates with a more adaptive type of motivation. Thus, the group of students that reported the greatest level in its use also did so in relation to task and ego self-enhancing goals, to self-efficacy, and being negatively associated with the goal of work avoidance. Finally, were offered models on relationships between academic goals, self-efficacy and enhancement and annulation strategies [$\chi^2(8) = 5.204$, $p = 0.736$] and deception and annulation strategies [$\chi^2(4) = 3.228$, $p = 0.520$].

Keywords: self-regulated learning, self-motivational strategies, academic motivation, gender, goal orientations

INTRODUCTION

The concept of self-regulated learning (SRL) has been defined as the degree to which students are metacognitive, motivational and behaviorally active with regard to their own learning process (Zimmerman, 2013). However, a large proportion of learning now takes place interactively (Järvenoja et al., 2015). For this reason, this article is focused on the study of processes in which the student uses their classmates as a reference point for their own academic motivation. It addresses the self-regulation of the student's own motivation when they undertake specific evaluations and comparisons regarding the abilities of fellow students within a social context.

It can be said that the broad benefits of SRL have been proved (e.g., Pintrich and De Groot, 1990; Zimmerman, 2013; Järvenoja et al., 2015). Considering SRL offers several benefits to students' learning and products. For example, studying for exams, developing creative ideas, problem solving, long-term retention, motor tasks and skills that can be learned (Ariel and Karpicke, 2018; Callan et al., 2019), and in general with problems that are emerging in the educational world at present. Nevertheless, it requires that teachers show students how to use these techniques and students will adopt them. Thus, increasing understanding of SRL would inform educators of SRL procedures (Callan and Cleary, 2018).

However, research has yet to be undertaken in relation to some of the most basic components of SRL. While its behavioral and cognitive components have received significant interest, the study of the motivational component seems to have prioritized a focus on the study of motivation rather than on an examination of self-regulation of motivation. This is the case in spite of the fact that strategies of motivational self-regulation or of self-motivation can play an important role in the learning process, as they are aimed at generating and managing various motives and emotions (e.g., Pekrun et al., 2002; Scholer et al., 2018) which are prerequisites for initiating, directing, and maintaining behaviors.

Motivational self-regulation strategies have been addressed through a series of studies in which strategies such as self-handicapping, defensive pessimism and self-affirmation are considered (e.g., Kathryn and Maureen, 2010; Clarke and MacCann, 2016). Nevertheless, these studies do not deal with strategies that, based on a more situational approach, have classmates as a point of reference that can active the use of self-motivation strategies.

Wolters's (1998) attempt to collectively study various motivational self-regulation strategies gave rise to a subsequent suggesting of six strategies (Wolters and Benzon, 2013). However, there was no incorporation within that broader approach of strategies that, based on a more situational perspective, use classmates as a self-motivation strategy. Suárez and Fernández (2011a), meanwhile, have attempted to provide a more complete approach to motivational self-regulation. To this end, their departure point was Pintrich and De Groot's (1990) motivational approach. Thus, they used the three motivational components of Pintrich and De Groot's (1990) to incorporate particular types of self-motivational strategies, putting forward three components of motivational self-regulation strategies: expectations, worth and affectivity. The present studies are focused on the strategies of enhancement of others, annulation of others, deception, and annulation others, which Suárez and Fernández (2011a) located within the strategic components of expectatives and affect.

Accordingly, based on the study of particular self-motivation strategies, the consideration of approaches that offer a more structured view of the different types of these strategies, and ultimately the incorporation of strategies that via a more situational approach use classmates as a self-motivation strategy, it is possible to appreciate how the initial approach of this work has been constructed. Therefore, in this article, we will first of all study the strategies of enhancement and annulation of

others. A second part of the study will deal with the strategies of deception and comparison.

Through the strategy of enhancement of others, the student tries to protect their image, attributing their poor results not to low ability or effort on their part or to bad luck, but rather to their peers' very high capability in academic terms (or at least that of some of them). The student enhances their peers' qualities, though this does not necessarily have to be associated with a sense of admiration. Rather, it can even lead to a certain resentment or discomfort in relation to them.

Although in the case of enhancement of others the student enhances their peers' abilities, in the strategy of annulation they do the exact opposite – that is, they deny or minimize their peers' abilities. This can be achieved in different ways, such as not appreciating the qualities, contributions and good results of their peers or minimizing or simply ignoring them. Through doing so, the student consciously or unconsciously aims to avoid evidence that would allow a comparison in which their image came off worse, thereby letting them continue to see themselves as a student who is no less competent.

The self-motivational strategy of comparison is a characteristic of students who prioritize the pursuit of academic performance as a goal rather than the objective of learning, and for whom the reference point for determining that performance does not comprise the student's own results only, but also, and even primarily, comparison with the performance of students and peers in their environment. For this reason, the student uses comparison with others when their performance is superior to that of the students relative to whom they are making a comparison, in order to thereby derive feelings of satisfaction, worth and pride. On the other hand, they will seek to avoid this comparison when their performance is lower so as to avoid feelings of shame, guilt, anger or frustration.

Similarly to the comparison strategy, the deception strategy is exhibited by students whose primary goal is performance and whose main reference point is not their own performance, but comparison with the performance of students or peers in their immediate environment. For this reason, the student constructs the expectation of not being surpassed by others through various forms of deception in relation to their peers, such as lying about work carried out for exams, subjects and assignments or attributing any good exam results on their part to external factors.

It has been observed that the strategies of enhancement or annulation of others are related to and influence the development of cognitive strategies but not metacognitive strategies (Suárez and Fernández, 2011b), with the same occurring in the case of deception and comparison strategies (Suárez and Fernández, 2013). However, there are no studies on how such self-motivation strategies are related to students' affective-motivational variables. The role played by academic goals must be closely considered to this end, because goals are considered as the closest regulators of behaviors. Accordingly, SRL is defined as the regulation of learning that the student develops in order to achieve their personal goals (Nietfeld et al., 2014). A more innovative contribution has been the consideration given to the possibility that several goals simultaneously operate within students (e.g., Hyunjo, 2012). The different types of goals were

considered to simultaneously interact and influence the learning process. For this reason, this approach of multiple goals is also kept in mind in the present work. Another motivational variable that should be taken into account is self-efficacy, which may be described as the belief in one's own ability to organize and carry out the actions necessary to achieve specific goals (Bandura, 1997).

Self-regulated learning is a key competency that students should learn (Steinbach and Stoeger, 2018). Increasing understanding of SRL would inform educators of SRL procedures (Callan and Cleary, 2018) in order to show their students to use these techniques and thus to impact on students' learning and achievement. With the work that is presented here, was sought to fill in the gap that exists in research regarding motivational self-regulation strategies based on students' use of evaluations and comparisons with their classmates. Our research question was if enhancement of others, annulation of others, deception, and comparison strategies can be explained by academic goals and self-efficacy. Thus, our main objectives are firstly to study the use of these strategies, and secondly, to obtain initial exploratory models for each of these relating them to the academic goals and control and self-efficacy beliefs. It was also intended to verify if such models are appropriate regardless of gender, since the literature describes broad differences between the genders in terms of both academic motivation and the use of strategies (e.g., King, 2016; Suárez et al., 2016), as well as in relation to students' profiles in terms of the adoption of multiple goals. We expected low or middle use of the motivational self-regulatory strategies and that these motivational self-regulatory strategies would be explained by the motivational variables but not regardless of gender and motivational profile.

MATERIALS AND METHODS

Participants and Procedure

The participants in this first sample were a total of 613 students located in Spain, from different contexts, who were in the third year (46.9%) and the fourth year (37.5%) of compulsory secondary education, and the first year (7.3%) and the second year (8.2%) of baccalaureate studies. Of the students, 41.4% are boys and 57.1% are girls. Their average age was 15.69 (SD = 1.271) years.

The participants in second sample were a total of 910 students located in Spain, from different contexts, who were in the third year (36.9%) and the fourth year of compulsory secondary education (39.2%), and in the first year (16.0%) and the second year (7.8%) of baccalaureate studies. Of the students, 46.5% are boys and 52.7% are girls. Their average age was 15.82 (SD = 1.699) years. Learning or development disorders were not informed in both samples.

Non-probability sampling techniques were employed in order to select the study participants. Students were assured that their responses were confidential and that only the researchers would have access to the data. They were told that this was not a test, so they completed the instruments anonymously, with pencil and

paper. Finally, they were also informed that there were no right or wrong answers, but only statements that reflect their attitudes and behaviors during learning and studying. This study was carried out in accordance with the Declaration of Helsinki and ethical guidelines. Procedures followed were approved by the Research Ethics Committee of the UNED that waived the need for written informed parental consent to be obtained. The informed consent of the participants was implied through survey completion.

Variables and Instruments

For data collection, this study used a questionnaire focused on studying various relevant variables. Through it, was collected information on academic goals, beliefs on control and self-efficacy for learning, performance self-efficacy and self-motivation strategies. The instrument items were answered on a five-point scale from 1 (strongly disagree) to 5 (strongly agree).

To devise the part of the questionnaire that was used to measure academic goals, was used Skaalvik's (1997) Academic Goals Questionnaire. This questionnaire integrated four goal orientations, which were: task, ego self-enhancing, ego self-defeating, and work avoidance goals.

To measure performance self-efficacy and beliefs on control and self-efficacy for learning, was used the corresponding items of the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich et al. (1991).

Finally, to assess self-motivation strategies were used the corresponding items from the Scale of Motivational Strategies for Learning-Secondary Version by Suárez and Fernández (2011a). More specifically, with the first sample were evaluated the self-motivational strategies of enhancement of others and of annulation of others. And with the second sample were used the strategies of deception and comparison.

The Spanish version of the instruments have evidence of validity in previous research (e.g., Suárez and Fernández, 2011b, 2013; Suárez et al., 2016; Torrano and Soria, 2017; Suárez and Suárez, 2019).

Data Analysis

The analysis involved the application of a series of descriptive analyses and correlations. These tests were applied to the different types of academic goals, performance self-efficacy, beliefs on control and self-efficacy for learning and the self-motivation strategies of enhancement and annulation of others. Then focused on gender and clustering of students according to their motivation in subsequent analyses. To this end, were carried out a multivariate analysis of variance (MANOVA) in order to verify the existence of differences based on gender. These differences were also evaluated by means of partial eta square to estimate effect size (η_p^2). Then checked if different clusters of students, using Quick Cluster Analysis, could be obtained on the basis of their motivation. Analyses were performed using SPSS 25.0 version. Excel 14.0 was used to calculate Average Variance Extracted (AVE), Composite Reliability (CR), and McDonald's Omega (OM).

Finally, was used the technique of structural equation modeling using AMOS 22 (Arbuckle, 2013), with the aim

of putting forward an explanatory model of how the self-motivational strategies of enhancement and annulation are affected by the motivational variables studied. Structural equation modeling allows three strategies to be adopted. To obtain the model that was set out in this study and to avoid a completely exploratory approach, was adopted the strategy of model development. The estimation technique used was maximum likelihood and the estimation process used was direct estimation. Simultaneous analyses of several groups were performed to fit a model to several sets of data at once (by genders and clusters). In this way, simultaneous analysis of groups provides more accurate parameter estimates than would be obtained from separate single-group analyses (Arbuckle, 2013).

RESULTS

Descriptive and Correlational Study

The results of the descriptive and correlational analysis can be found in **Tables 1, 2**. We observed with the first sample (see **Table 1**) that the two self-motivation strategies correlate significantly and positively with one another and that both strategies correlate significantly and positively with the two ego-orientation goals. However, the strategy of praising others, unlike the strategy of denigrating others, correlates negatively with the task goal and with control and self-efficacy beliefs, while it correlates positively with the work-avoidance goal.

With respect to the second sample, it was observed that the two strategies of self-motivation correlated significantly and positively with one another; that both strategies correlated significantly and positively with the two goals of ego orientation and with the work-avoidance goal; and that both correlated significantly and negatively with control and self-efficacy for learning. In addition, the deception strategy correlates negatively with the task goal, while the comparison strategy does so with performance self-efficacy.

Consideration of Gender and Groups of Students With Different Motivational Characteristics

With a view to studying the appropriateness of considering gender, were conducted means difference analysis in relation to the rest of the variables studied. The results of this analysis suggest that the goals of ego self-defeating and work avoidance presented statistically significant differences according to gender (**Table 3**). Girls scored more highly in the ego self-defeating goal, whereas boys scored more highly in the work-avoidance goal.

In line with consideration of students' motivational characteristics, especially with regard to the adoption of multiple goals, and applying cluster analysis to the data collected, was observed that a clear grouping of students into three groups with different motivational characteristics (**Table 4**) was obtained. Moreover, this clustering is associated with a different use of strategies of enhancement and annulation of others. The students from the first group are those who reported the highest score in task and ego self-praise goals,

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

	M	SD	α	AVE	CR	OM	2	3	4	5	6	7	8
Task (1)	3.874	0.807	0.82	0.49	0.78	0.78	0.259**	0.147**	-0.235**	0.452**	0.288**	-0.116**	0.062
Self-enhancing (2)	2.841	0.946	0.85	0.54	0.82	0.82		0.196**	-0.053	0.148**	0.167**	0.302**	0.220**
Self-defeating (3)	2.734	1.144	0.87	0.64	0.87	0.87			0.050	-0.028	0.016	0.254**	0.069*
Work-avoidance (4)	2.867	0.905	0.69	0.43	0.75	0.75				-0.108**	-0.166**	0.180**	0.009
Control and self-efficacy for learning (5)	3.672	0.766	0.86	0.47	0.76	0.76					0.317**	-0.228**	0.042
Performance self-efficacy (6)	3.133	1.049	0.91	0.46	0.75	0.75						-0.078*	0.119**
Enhancement (7)	1.976	0.902	0.71	0.51	0.81	0.81							0.239**
Annulation (8)	2.560	0.967	0.68	0.42	0.66	0.66							

** $p < 0.01$; * $p < 0.05$. AVE, Average Variance Extracted; CR, Composite Reliability; OM, McDonald's Omega.

TABLE 2 | Means, standard deviations, and correlations between variables.

	<i>M</i>	<i>SD</i>	α	<i>AVE</i>	<i>CR</i>	<i>MO</i>	2	3	4	5	6	7	8
Task (1)	3.965	0.725	0.82	0.46	0.77	0.77	0.191**	0.103**	-0.258**	0.386**	0.198**	-0.099**	0.043
Self-enhancing (2)	2.758	0.996	0.85	0.54	0.83	0.83		0.215**	0.055	0.116**	0.202**	0.287**	0.338**
Self-defeating (3)	2.635	1.158	0.87	0.66	0.88	0.88			0.029	-0.102**	-0.017	0.226**	0.320**
Work-avoidance (4)	2.895	0.953	0.69	0.46	0.77	0.77				-0.133**	-0.213**	0.171**	0.123**
Control and self-efficacy for learning (5)	3.700	0.788	0.86	0.48	0.78	0.78					0.325**	-0.107**	-0.154**
Performance self-efficacy (6)	3.091	1.119	0.91	0.49	0.79	0.79						0.052	-0.100**
Deception (7)	1.818	0.717	0.69	0.33	0.60	0.60							0.355**
Comparison (8)	2.226	0.930	0.71	0.28	0.53	0.53							

** $p < 0.01$. *AVE*, Average Variance Extracted; *CR*, Composite Reliability; *OM*, McDonald's Omega.

in control and self-efficacy for learning, in performance self-efficacy and in the strategy of denigrating others, whereas, on an opposite basis due to its content, it is the group that obtained the lowest score for the goal of work avoidance. The second cluster comprises students who reported higher scores in ego self-frustration and work-avoidance goals and in the strategy of praising others. And, finally, the third cluster comprises students who reported the lowest scores in all variables, except in the work-avoidance goal.

With respect to the second sample, the results of means difference analysis suggest that the four goals and deception strategy present statistically significant differences according to students' gender (Table 3). Boys showed higher levels in the goals of self-enhancing and work avoidance and in the strategy of deception. Girls showed higher levels in task and ego self-defeating goals. With regard to the rest of the variables, the differences found are not statistically significant.

By applying cluster analysis was observed a clear clustering of students in three groups with different motivational characteristics (Table 4). Moreover, this clustering is associated with a different use of strategies of deception and comparison. In the first cluster students present the lowest levels in task goal and in the two goals oriented to the ego. And they also exhibit the lowest levels in the use of the two self-motivation strategies. The second clustering exhibits the highest task and self-enhancing goals, as well as the lowest level for the work-avoidance goal. And finally, a third cluster comprises students showing higher levels in self-defeating and work avoidance goals. And they also report the greatest use of the two strategies of deception and comparison.

A Model About the Relationship of the Strategies of Enhancement and Annulation of Others, Considering Gender and Groups With Different Motivational Characteristics

To assess the relationship between the different types of variables studied was specified a path diagram for the analysis of structural equation modeling in AMOS 22. The results suggest that, once the modification fit indices have been taken into consideration, the fit to the data of the model in Figure 1 (general model) is acceptable [$\chi^2(8) = 5.204$, $p = 0.736$] and that the fit statistics provide corroborating evidence (Table 5).

The results obtained for the general model show significant relationship from the four academic goals and control and self-efficacy for learning toward the strategy of enhancement of others. These relations are negative in the case of task goal and control and self-efficacy for learning. However, the strategy of annulation of others was only related with the ego self-enhancing goal and performance self-efficacy, in both cases in a positive way. The highest relationship in the model is that from the goal of ego self-enhancing toward the strategy of enhancement of others.

Then was confirmed that the general model's fit of the data was acceptable by applying it to both groups of gender at once [$\chi^2(8) = 10.747$, $p = 0.216$] and the fit statistics provided corroborating evidence in both cases (Table 5). In addition, the

TABLE 3 | Means, standard deviations, and differences by gender (sample 1 and sample 2).

Strategy	Gender	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η_p^2
Task	Male	3.811	0.839	3.449	0.064	0.006
	Female	3.925	0.769			
Self-enhancing	Male	2.915	0.909	2.546	0.111	0.004
	Female	2.773	0.961			
Self-defeating	Male	2.563	1.039	13.711	0.000	0.022
	Female	2.866	1.203			
Work-avoidance	Male	3.002	0.844	10.849	0.001	0.018
	Female	2.763	0.937			
Control and self-efficacy for learning	Male	3.6693.686	0.8200.730	0.079	0.779	0.000
	Female					
Performance self-efficacy	Male	3.101	1.050	0.299	0.585	0.000
	Female	3.149	1.058			
Enhancement	Male	2.055	0.909	1.478	0.225	0.002
	Female	1.922	0.890			
Annulation	Male	2.620	0.939	0.995	0.319	0.002
	Female	2.532	0.986			
Task	Male	3.899	0.747	6.215	0.013	0.007
	Female	4.019	0.702			
Self-enhancing	Male	2.949	1.007	30.480	0.000	0.033
	Female	2.590	0.950			
Self-defeating	Male	2.492	1.109	13.194	0.000	0.014
	Female	2.771	1.189			
Work-avoidance	Male	3.076	0.965	26.998	0.000	0.029
	Female	2.751	0.912			
Control and self-efficacy for learning	Male	3.694	0.814	0.021	0.886	0.000
	Female	3.702	0.769			
Performance self-efficacy	Male	3.069	1.084	0.253	0.783	0.000
	Female	3.107	1.153			
Deception	Male	1.952	0.732	30.003	0.000	0.032
	Female	1.695	0.676			
Comparison	Male	2.233	0.920	0.078	0.781	0.000
	Female	2.216	0.939			

same thing happened when was applied the model to the three clusters [$\chi^2(12) = 18.861, p = 0.092$].

A Model About the Relationships With the Strategies of Deception and Comparison, Considering Gender and Groups With Different Motivational Characteristics

To assess the relationship between the different types of variables studied, were conducted analysis through structural equation modeling. The results suggest that, once the modification fit indices have been taken into consideration, the fit to the data of the model in **Figure 2** (general model) is acceptable [$\chi^2(4) = 3.228, p = 0.520$] and that the fit statistics provide corroborating evidence (**Table 5**).

The model shows a similar pattern of positive relationships toward the two self-motivation strategies. These relations are from the two ego-oriented goals and from the goal of avoidance of work; the only difference seems to consist of these relations

being more intense in the case of the comparison strategy. However, this pattern is broken by the relation of the task goal toward the strategy of deception, which is also negative. With regard to control and self-efficacy beliefs variables, the comparison strategy shows negative relationships with both variables and the deception strategy is positively related with performance self-efficacy.

Then was confirmed that the general model's fit of the data was acceptable by applying it to both groups of gender at once [$\chi^2(8) = 8.807, p = 0.359$] and the fit statistics provided corroborating evidence in both cases (**Table 5**). In addition, the same thing happened when was applied the model to the three clusters [$\chi^2(3) = 350, p = 0.950$].

CONCLUSION AND DISCUSSION

In brief, with respect to the first sample, can be highlighted that enhancement and annulation of others strategies positively correlate and that both are the variables with the lowest mean scores. It can be observed, however, that they exhibit a very

TABLE 4 | Centers of clusters by motivational and self-motivation variables (sample 1 and sample 2).

	Cluster		
	1	2	3
Task	4.37	3.80	3.48
Self-enhancing	3.18	3.11	2.16
Self-defeating	2.52	3.57	1.89
Work-avoidance	2.37	3.11	3.05
Control and self-efficacy for learning	4.16	3.48	3.45
Performance self-efficacy	3.98	2.82	2.66
Enhancement	1.59	2.62	1.51
Annulation	2.92	2.67	2.04
Students in cluster	190	240	183

	Cluster		
	1	2	3
Task	3.70	4.33	3.85
Self-enhancing	2.09	3.16	3.04
Self-defeating	1.76	2.53	3.70
Work-avoidance	3.01	2.47	3.24
Control and self-efficacy for learning	3.55	4.15	3.37
Performance self-efficacy	2.48	4.07	2.68
Deception	1.53	1.77	2.18
Comparison	1.77	2.08	2.88
Students in cluster	311	314	285

different type of relation. The strategy of enhancing others is related with the four types of goals, whereas the strategy of annulling others is related only with the self-enhancing goal. In addition, in the first strategy, the relationships with the task goal and with the beliefs on control and self-efficacy for learning are negative – that is, there is a negative relationship with variables relating to the learning process. On the other hand, in the second

strategy the relationship of the ego self-enhancing goal and the performance self-efficacy goal is positive – that is, there is a positive relationship with the variables relating to performance. Therefore, both strategies may respond to different patterns, such that the strategy of enhancing others is associated with deficiencies in the learning process and the strategy of annulling others is associated with processes in which consideration of performance predominates.

However, because this part of the study considers only two strategies related to the use of classmates, it does not allow us to ascertain if this possible pattern in the use of the two strategies is something that can occur with other kinds of strategies that also relate to the use of classmates. For this reason, it was considered that this study was insufficient and that it was necessary to use a new sample that allows first whether this pattern is repeated with other strategies to be ascertained and second whether results about the other variables are corroborated.

With the second sample, once again was found that both strategies positively correlate with each other and that both are the variables with the lowest mean scores. Also was found that the deception and comparison strategies were explained by all the goals, except for the task goal with regard to the strategy of comparison. And was found that the strategy of comparison was characterized by a negative relationship with beliefs. On the other hand, the strategy of deception only showed a negative relation with the task goal, and there was a positive relation with performance self-efficacy.

Therefore, it appears that the strategy of deception is more related to the beliefs of the student regarding their performance and to the lack of the pursuit of learning as an end in itself, with the relations of the rest of the goals being very low. This is contrary to what occurs with the strategy of comparison, which seems more related with the goals of ego orientation and effort avoidance and is characterized by low beliefs relating to learning.

The management of one's own motivation is another element of what has been defined as SRL. To achieve it, the student

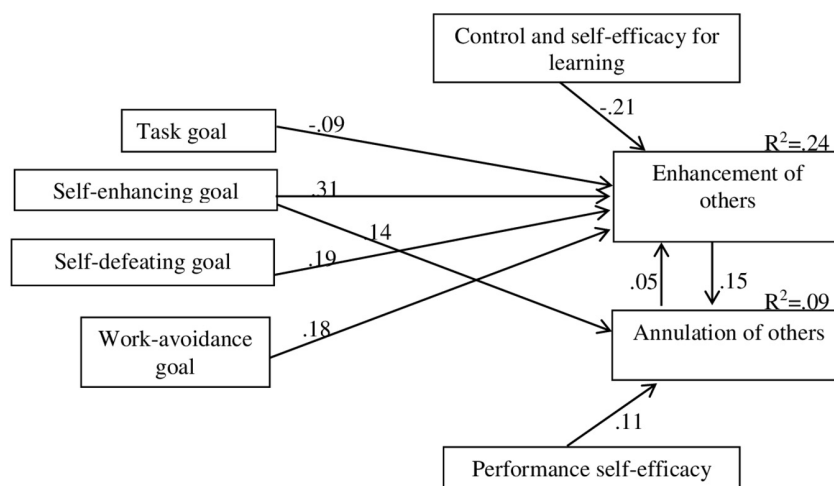
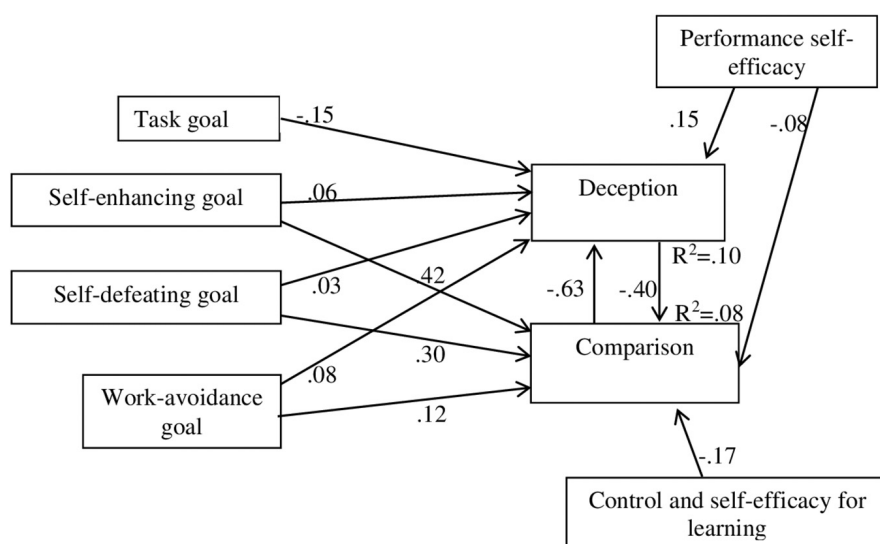
**FIGURE 1 |** Explanatory model of the relations between goals, control and self-efficacy for learning, performance self-efficacy, and strategies of enhancement and annulation.

TABLE 5 | Results of model fit and of the model's application to genders and clusters (sample 1 and sample 2).

	Chi-square	DF	Probability level	Chi-square/DF	GFI	AGFI	IFI	TLI	CFI	RMSEA
General model	5.204	8	0.736	0.651	0.998	0.990	1.005	1.018	1.000	0.000
Boys/girls	10.747	8	0.216	1.343	0.996	0.960	0.996	0.966	0.995	0.024
Clusters	9.219	8	0.417	1.571	0.997	0.970	1.000	0.994	0.999	0.005
General model	3.228	4	0.520	1.807	0.999	0.992	1.001	1.006	1.000	0.000
Boys/girls	2.448	4	0.654	0.612	0.999	0.988	1.002	1.024	1.000	0.000
Clusters	350	3	0.950	0.117	1.000	0.997	1.006	1.201	1.000	0.000

**FIGURE 2 |** Explanatory model of the relations between goals, control and self-efficacy for learning, performance self-efficacy, and strategies of deception and comparison.

has multiple strategies that can be used for self-motivation during their learning. In this paper, were addressed four specific motivation strategies, whose common element is a use of peers as a reference (enhancement and annulation of others, deception and comparison).

The mean scores obtained on the employment of these four strategies of self-motivation were of a low to medium level, which was predictable (Suárez and Fernández, 2011b). In any case, was observed a higher use of the strategy of annulation of others relative to the rest of the strategies. Furthermore, the four strategies seem to show a same pattern, in which both pairs correlate positively and significantly with one another.

The results obtained with the first sample regarding different patterns in both strategies, with the result that the strategy of enhancing others was associated with shortcomings in the learning process and the strategy of annulment of others was associated with processes in which the consideration of performance predominated, were not confirmed with the second sample. Nevertheless, the strategies of enhancement of others and deception seem to show a more disadaptative type of motivation because they correlate negatively with the task goal, in which the pursuit of learning is an end in itself (Skaalvik, 1997; Nietfeld et al., 2014), and with the control and self-efficacy beliefs, at

the same time as correlating positively with the work-avoidance goal. Conversely, the strategy of annulation of others is the only one that fits an adaptive pattern of learning, since in the cluster analysis was observed that the students that report on its use most were the only ones that reported a greater use of both the task goal and the ego self-enhancing goal, which may allow them to direct their study toward both the objective of learning as an end in itself and the pursuit of academic performance. That is, the results indicate that the group of students with the highest level for the strategy of annulation is the one that seeks to the greatest extent to learn, that increasingly seeks to obtain good grades and that presented the highest levels for beliefs about their ability to learn and perform. However, it must be remembered that these results refer only to the strategies studied here. Therefore, there are probably other self-motivation strategies that not only are more frequently used but that also have more adaptive potential. In any case, it remains curious that in studying the strategies that have peer relations as a common element it emerges that annulation of others is the one that is most adaptive for learning. This may reflect the inadequacy of the use of external elements in order to modify internal aspects such as academic motivation.

On the other hand, it is also important to note that the worst motivational levels were obtained by the two groups of

students with the lowest levels in the use of self-motivation strategies. The students with the lowest levels in the use of self-motivation strategies are those who to the least extent seek to learn and perform, and they exhibit the lowest levels in beliefs about their own ability to learn and perform. It is not surprising that these students report the lowest use of self-motivation strategies, because they are the students with the highest levels of demotivation. And it is reasonable to suppose that the lower interest that they have in their studies brings with it a lower interest in applying self-motivation strategies.

With regard to gender, it should be indicated that only were found differences in the use of the strategy of deception. And this occurred despite what we might have foreseen at the outset, as it is usual for girls to show significant and higher scores in certain variables that involve a social component (e.g., Trucco et al., 2013; Petersen and Hyde, 2014). Only was found that boys use the strategy of deception to a greater extent. It is logical since they are also the ones who reported to a greater extent an orientation toward the goal of ego self-enhancing and boys are more likely than girls to lie when interactions are fully anonymous and deceptive messages can secure a benefit (Dreber and Johannesson, 2008). Furthermore, in both samples girls scored more highly in the ego self-defeating goal, whereas boys scored more highly in the work-avoidance goal.

Finally, were obtained different models on relationships between the variables of academic goals, self-efficacy and self-motivation strategies. These models were also confirmed with both genders. And there was also confirmation with the groups of students created based on their motivational characteristics.

In terms of limitations to the study, alternatives models were not considered. They should be considered in future research, in the same way that other variable into the model. So it is important to highlight the need to study the diversity of self-motivational strategies. Moreover, it is important to highlight the need to use

other types of instruments too. Finally, it would be of interest to apply other designs. The results obtained do not demonstrate causality, hence the need to use other methodologies. Moreover, a longitudinal design would allow us to study the evolution of these strategies.

By way of conclusion, it is worth highlighting the need for further research on self-motivation strategies, so that this line of research takes into account not only self-regulation of the cognitive and behavioral components of learning but also the self-regulation of the student's own motivation (Zimmerman, 2013). More specifically, the strategies of enhancement of others, annulation of others, deception and comparison have a special relevance because they situate the student in a social, interactive context, highlighting the importance of considering the approach of situated learning at the same time as students' personal characteristics and thoughts (Dermitzaki and Efklides, 2001).

Educational and practical implications of the work are related mainly to the tutorial work of the teachers. SRL is a key competency that students should learn (Steinbach and Stoecker, 2018) so educators should know SRL procedures in order to show their students to use these techniques and thus impact on students' learning and achievement. In this way, teachers could train their students in the use of adaptive motivational self-regulation strategies, while discarding those other inadequate strategies, in order to improve their motivation and learning outcomes.

AUTHOR CONTRIBUTIONS

JS, AF, and ÁZ conceived and designed the study, organized the database, performed the statistical analysis, and wrote the sections and first draft of the manuscript. All authors contributed to manuscript revision and read and approved the submitted version.

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Chinese Adolescents' Emotional Intelligence, Perceived Social Support, and Resilience—The Impact of School Type Selection

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Choosing a school that can best assist children's development has become one of the major concerns of Chinese parents. To categorize schools by where students stay after school, this paper consider boarding schools or day schools as two major school types. This study examined the relationships among emotional intelligence (EI), perceived social support (from friends and family), and resilience for 493 Chinese adolescents (male = 249, female = 244; mean age = 13.9, SD = 0.71), and investigated how school type difference impacts these relationships. This research first used a moderator analysis to investigate the effects of trait emotional intelligence on resilience by perceived social support from family and friends, respectively. Results show that social support from family was non-significant, while support from friends was significant in moderating the relationship between EI and resilience. Furthermore, a moderated moderation analysis was used to understand if moderation by school type of perceived social support differs in the effect of trait EI on resilience. Results indicated that the magnitude of the moderation by social support from friends depended on school type. For students who have lower perceived friend support, boarding school experiences provided a stronger positive relationship between trait EI and resilience than day school experience. Ways to enhance students' perceived social support are discussed, along with the limitations of the current research and recommendations for future research.

Keywords: Chinese adolescents, emotional intelligence, perceived social support, resilience, school type

INTRODUCTION

What makes school choice so important? According to the data published by the Ministry of Education of the People's Republic of China in 2017, schools have direct contact with 1.4 billion students for at least 6 h a day (MEPRC, 2017). As an important place for children and adolescents to grow, it provides a developmental context, not only for students' academic learning but also for the growth of their emotional well-being and psychosocial adaptation (Martin and Brown, 2008), their emotional intelligence (Stillman et al., 2018), and their resilience level (Gómez-Baya and Mendoza, 2018). With a proliferation of school choices in China and the intensive educational competition among parents and students, choosing "the best school" for children has become a hot topic (Wu, 2012). Therefore, understanding the factors that might impact students' development and selecting a school that could best foster students growth is a meaningful decision.

THE RELATIONSHIPS AMONG EMOTIONAL INTELLIGENCE, PERCEIVED SOCIAL SUPPORT, AND RESILIENCE

Emotional intelligence (EI) is a popular concept, and the literature on emotional intelligence reveals that this concept is closely connected to one's academic performance (Sy et al., 2006), quality of social interactions (Summerfeldt et al., 2006; Song et al., 2010), stress management skills (Saklofske et al., 2012), and overall life satisfaction (Palmer et al., 2002). However, the definition of emotional intelligence varies depending upon the theory being used. Cherniss (2010) indicated that there are four dominant theories that are recognized in the field—"Mental Ability" model (Salovey and Mayer, 1989), "Emotional and Social Competence" model (Boyatzis et al., 2000), "Emotional and Social Intelligence" model (Bar-On, 2006), and "Trait Emotional Intelligence Model" (Petrides, 2009). Trait Emotional Intelligence Model is one of the theories that incorporates the key characteristics of the other models and conceptualizes emotional intelligence as an aspect of one's personality traits (Petrides, 2009).

The Trait Emotional Intelligence Model contains four different large constructs: Emotionality, Self-Control, Sociability, and Well-being. Each construct contains certain facets, with a total of 15 different facets comprising the model. To be specific:

Emotionality is composed of emotion perception, trait empathy, emotion expression, and relationship; Self-Control is composed of emotion regulation, stress management, low-impulsiveness, adaptability, and self-motivation; Sociability is composed of assertiveness, emotion management, social competence, and self-esteem; and Well-being is composed of self-esteem, trait happiness, and trait optimism (Petrides, 2009, p. 95).

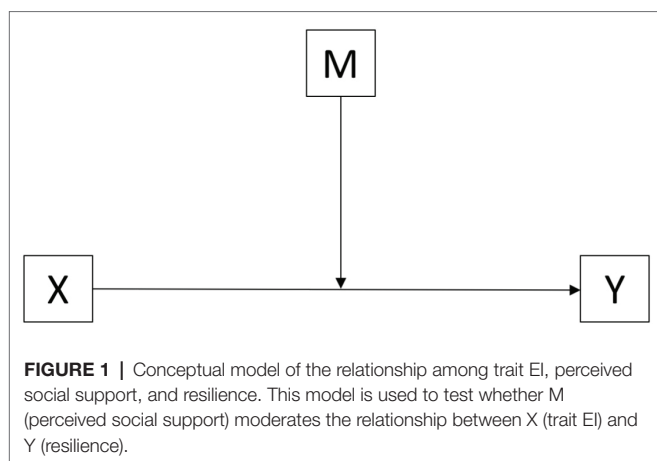
Researchers have found that emotional self-awareness, emotional expression, emotional self-control, and emotional self-management appear to be key components in emotional intelligence that serve a central function in psychological resilience (Armstrong et al., 2011), another vital concept that describes one's ability to successfully cope with challenge or misfortune (Wagnild and Young, 1993).

Resilient individuals are the ones who possess high self-esteem, have strong problem-solving abilities, maintain satisfactory interpersonal relationships, and effectively employ emotion regulation strategies (Tugade and Fredrickson, 2004; Skodol, 2010). The psychological literature has supported the positive relationship between emotional intelligence and resilience (Maulding et al., 2012). For example, Schneider et al. (2013) found that individuals with higher EI would perceive stress as a challenge rather than a threat; they also had less negative affect and showed less distressing psychological response to stress. Another researcher, who targeted a group of high school students (284 girls and 293 boys) found that emotional intelligence is a stronger predictor of resilience compared to cognitive intelligence (Jowkar, 2007).

Recently, resilience research has been a subject of intense interest (Xi et al., 2015). Beyond the finding that emotional intelligence can predict resilience, researchers are now trying to understand what other protective factors can promote one's resilience. Interestingly, social support, especially social support that is perceived, rather than objectively provided or received (Norris and Kaniasty, 1996), appeared to be a valuable factor in impacting one's resilience (Wong, 2008). Chan's (2005) study targeted a group of Hong Kong adolescents and discovered that there is a positive relationship between their perceived social support from family and resilience level. Malecki and Demary (2002) found that although boys and girls in their early adolescence perceive similar levels of support from their parents and teachers, girls perceive more support from classmates and friends. Research results have also revealed that, on one hand, positive peer relationship can predict future school achievement (Zucchetti et al., 2015); on the other hand, adolescents who report having low perceived social support are more likely to experience psychological distress (Klineberg et al., 2006; Jacobson and Newman, 2016), engage in more problem behaviors (Demaray and Malecki, 2002), and have more externalizing and internalizing disorders (Hodges et al., 2016). Other findings showed that adolescents' adjustment (e.g., school, academic, mental health) is not only predicted by parental support (Rueger et al., 2008) but also impacted by the association between family stress and friendship reciprocity (Ciairano et al., 2007).

Perceived social support is not only related to resilience but also connected with an individual's emotional intelligence. Petrides et al. (2006) reported that for adolescents who have higher trait EI, they tend to have fewer emotional problems and feel more supported by peers. Poulou (2010) investigated the relationship between personality traits and peer relationships; he reported that individuals who have lower scores on trait EI tend to have more peer problems. This finding is consistent with Petrides et al.'s (2006) report that, for adolescents, regardless of gender, the lower their trait EI, the more behavioral problems they exhibit, which would likely lead to poorer peer relationships. Conversely, students who have high trait EI are supported more by friends and are more likely to be a leader in a group. Gallagher and Vella-Brodrick (2008) further investigated how social support and emotional intelligence predict subjective well-being. Surprisingly, perceived social support was not consistently found to be important for one's well-being; rather, it was only found to be necessary for people with low emotional intelligence (Gallagher and Vella-Brodrick, 2008). This finding sheds light on the importance of increasing perceived social support for individuals who have lower emotional intelligence.

Based on the findings above, it appears that perceived social support might be a moderator factor between trait EI and resilience. However, previous research has not examined this specific moderation relationship. Therefore, initially, this study intends to investigate the relationships among these three factors. See **Figure 1** for a conceptual model depicting the relationships among trait EI, perceived social support, and resilience.



SCHOOL TYPE DIFFERENCE AND ITS IMPACT ON ADOLESCENTS' DEVELOPMENT

As mentioned above, emotional intelligence, perceived social support, and resilience level are all important factors during adolescent development. However, it is uncertain if school type would make a difference among these variables, since day schools and boarding schools provide different learning and socializing environments for students (Xi, 2011). To be specific, day school focuses on providing regular academic instruction to students, and, as the name implies, students usually go to school during the day and go back home at the end of the school day (Xi, 2011). Even though day schools represent the main form of schooling, boarding schools are also beginning to be a well-established sector of schooling type around the world (Martin et al., 2015). Based on Bronfenbrenner's (2005) ecological systems theory, boarding school provides a unique socialization environment for students. Students spend most of their time in the same developmental context and they have more opportunities to form personal relationships with teachers, school staff, and peers. This type of interaction is also more regular, stable, and secure (Martin et al., 2014). In addition, boarding school students have more regulations and tight scheduling to follow, their level of school activity involvement is higher than that of day school students, and they tend to form more of a collective identity (Martin et al., 2014).

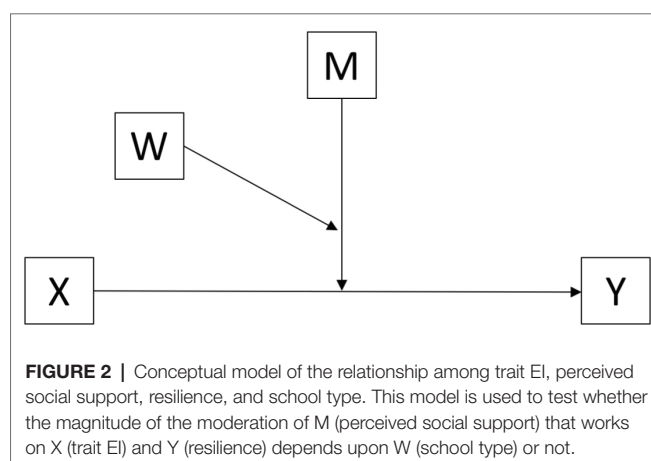
Though the number of boarding schools is growing and parents are starting to more frequently consider sending their children to boarding school, only a limited amount of research has focused on school type differences and the impact on students' development. One of the largest studies on boarding school effects on students' academic and non-academic outcomes indicated that, overall, boarding school students develop more self-discipline and independence than day school students, and they are more mature, better at cooperative learning, and have better critical thinking ability (Martin et al., 2014). Martin and his colleagues also found that students' academic resilience was higher in a boarding school environment (Martin et al., 2012), boarders who have a non-maladaptive relationship with their

parents also tend to develop more personal resources to cope with living away from home (Bramston and Patrick, 2007).

Research does not consistently find positive results for all boarders. Schaverien (2015) described "Boarding School Syndrome" and discussed the trauma experienced by many children who were sent to boarding school at a young age. She found that many boarders adopt unconscious coping strategies to deal with the loss, bereavement and various types of abuse they experienced, which led to a split between the "home self" and the "boarding school self." This pattern continues into their adult lives and was hypothesized to be the source of considerable emotional distress and relationship difficulties. Though the level of trauma experiences is lower among boarders in recent years, Mander and Lester (2017) corroborated Schaverien's research, at least in part, with their finding that adolescent boarders reported significantly increased depression, anxiety, emotional symptoms, and hyperactivity over time, compared to nonboarders. Similarly, Behaghel et al. (2017) found that boarders' levels of well-being were lower when compared to day school students after 1 year. However, their findings revealed that this outcome would be ameliorated after 1 year for students who have the ability to adapt to change. These resilient students tend to benefit more from a boarding school environment when compared to students who have a weaker ability to adjust.

Based on the findings above, it appears that boarding school might be an effective environment for some students, but not for others; and various factors, such as an individual's emotional intelligence (Stillman et al., 2018), perception of social support (Hodges et al., 2016), and ability to recover from adversity (Gómez-Baya and Mendoza, 2018) might all play a role in deciding what type of school would best fit any particular student. Therefore, this research also intends to explore the relationship among these factors to understand how school type selection is impacting Chinese adolescents. **Figure 2** demonstrates a conceptual model that adds school type difference as another moderator.

The purpose of this study is, first, to understand the relationships among trait EI, perceived social support from friends and family, and resilience for adolescents. Based on these initial findings, a more important purpose of this study is to understand the role that school type play in impacting the strength of the relationships



among the three variables mentioned. Gallagher and Vella-Brodrick (2008) found that perceived social support is important for low trait EI individuals' well-being, but less so for those with high trait EI. Therefore, it was predicted that school type might impact the level of perceived social support, which, in turn, would influence the magnitude of the relationship between trait EI, perceived social support, and resilience. In summary, understanding these complex relationships provides the opportunity to offer culturally relevant recommendations for parents in their decision-making around the issue of school selection. At the same time, mental health professionals can target a more specific adolescent group when attempting to provide prevention or intervention, so as to enhance this population's emotional well-being.

MATERIALS AND METHODS

Participants

A total of 507 adolescents from five middle schools (equivalent to grades 7–9 in the U.S. system) in Hangzhou, Zhejiang Province, were recruited for the study. Four hundred and ninety-three students completed the measures. Of the participants who completed the measures, approximately half were male (50.5%, $n = 249$) and half were female (49.5%, $n = 244$). The average age for these students was 13.9, ranging from 13 to 16 ($SD = 0.71$). A breakdown of participants' gender, school experience, and age is presented in **Supplementary Table S1**.

Procedures

This research project, including all noted attachments, were reviewed and received approval by the Institutional Review Board (IRB) of Indiana University, Bloomington. Prior to recruiting the schools, the researcher sought recommendations from the dean of the local Educational Department in Hangzhou and ultimately selected five middle schools based on students' heterogeneous backgrounds and whether the schools were representative of regular middle schools in Hangzhou. Among these five schools, two are day schools and have similar school schedules, consistent with what is recommended by the local Education Department. The two boarding schools included in this study also have a similar school environment. The fifth school is a little different from the other schools because it is a mixed type; majority of the students in that school attend the day school section, and students who cannot go back home every day can choose to live at the school. A breakdown of students' distribution in these schools is presented in **Supplementary Table S2**. All five schools use the same school curricula, and have around 40 students in each class. Following the school selection, recruiting efforts were made by contacting principals, and, upon receiving permission, classes at each school were randomly selected. After selecting the classes, teachers of these classes were contacted to facilitate the data collection process. Then, student assent forms, parent consent forms and letters to participants were sent. Students could opt out of this study if they chose not to participate; therefore, this was not a passive consent. After obtaining both written informed parental consents and student assents, the questionnaires were

distributed by teachers. To increase the confidentiality of the responses, efforts were made to protect students' privacy; their answer sheets and the questionnaires were returned in sealed envelopes. All students' answer sheets were read through a preprogrammed computer, and their choices were converted to an excel spreadsheet format.

Measures

The complete survey was a combination of three different questionnaires, consisting of 69 questions, assessing adolescents' trait emotional intelligence, perceived social support, and their resilience. Each questionnaire is described below.

Trait Emotional Intelligence Questionnaire-Adolescent Short Form-Chinese

Trait Emotional Intelligence Questionnaire-Adolescent Short Form (TEIQue-ASF; Petrides et al., 2006) is a simplified version of the TEIQue, designed specifically for adolescents 12–17 years old. It is composed of 30 statements, rated on a 7-point Likert type scale (1 = *strongly disagree*, 7 = *strongly agree*). Examples of the questions in this scale include: "I am a very motivated person" and "I find it hard to control my feelings" (TEIQue-ASF; Petrides et al., 2006). As with the short version of TEIQue, the TEIQue-ASF was designed to assess adolescents' global trait EI instead of the factor structures of the construct, because the global score reflects a more holistic picture of one's trait EI (Petrides, 2010). The TEIQue-ASF has been used with various samples and showed good psychometric properties (Mavroveli et al., 2007). In addition, the global trait EI score obtained from TEIQue-ASF was found to correlate 0.95 with the global score of the long version—TEIQue (Petrides, 2006). The TEIQue-ASF has been translated into over five different languages, including simplified Chinese (London Psychometric Laboratory at UCL, 2015), which was used in this study.

Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) is a 12-item scale originally designed to measure three sources of support: Family, Friends, and Significant Others. Participants were asked to rate items on a seven-point scale, from 1 = *strongly disagree* to 7 = *strongly agree*. Examples of the questions in this scale include: "I get the emotional help and support I need from my family" and "I have friends with whom I can share my joys and sorrows." The MSPSS has been widely used for participants with diverse ethnic backgrounds and ages and showed adequate psychometric properties (Zimet et al., 1988; Eker and Arkar, 1995; Canty-Mitchell and Zimet, 2000; Chou, 2000; Zhang and Norvilitis, 2002). Zimet et al. (1988) reported good overall internal reliability (Cronbach's $\alpha = 0.88$) and high subscale internal reliability. The simplified Chinese version of MSPSS was used with an adolescent sample from Hong Kong (Chou, 2000) and Mainland China (Chen, 2017). Both of the studies found that only two factors (Friend support and Family support) were revealed in the adolescent sample. Therefore, this study

will only examine perceived social support from these two sources in relation to the other variables discussed in this study.

Resilience Scale for Chinese Adolescents

Resilience Scale for Chinese Adolescents (RSCA; Hu and Gan, 2008) is an indigenous scale developed by Chinese scholars. It is a 27-item scale, measuring five different factors: Goal planning, Help-seeking, Family support, Affect control, and Positive thinking. Participants were asked to rate items on a five-point Likert-type scale—1 = completely disagree, and 5 = completely agree. Examples of the questions are, “I am always discouraged by failure”, “Compared to the result, the process is more beneficial to one’s growth”, and “My parents always encourage me to do my best”. Evidence has been provided to indicate adequate psychometric properties, and this measurement was judged to be especially appropriate to assess Chinese adolescents’ resilience (Hu and Gan, 2008; Gan and Yu, 2011; Wen et al., 2015). This scale has been widely used in China in assessing adolescents’ resilience under various situations (Hu and Gan, 2008; Zhou et al., 2011; Wen et al., 2015). Gan and Yu (2011) demonstrated in their study that using the total score of the Resilience Scale derived from the five factors is the best way to measure Chinese adolescents’ resilience level because it captured different facets of resilience. Based upon this finding, the current study will use the total resilience score to represent Chinese adolescents’ resilience level.

Data Analyses

Preliminary Analysis

Before answering the research questions, preliminary analysis of the raw data was conducted. The total missing values constituted less than 3% of the data, and were missing at random (Little’s MCAR test: $\chi^2 = 22.761$, $df = 18$, $p = 0.20$). For the purpose of obtaining a complete data file, participants with missing data ($n = 14$) were dropped from the sample. Another preliminary analysis was to test the internal consistency of the scales. Cronbach’s alpha (Cronbach, 1951) was used to assess the internal consistency, with results of the reliability tests for all measures presented in **Supplementary Table S3**. The Cronbach’s alphas ranged from 0.76 to 0.91 and are considered satisfactory.

Moderation Analysis

A Moderation Analysis was used to answer the research question regarding whether adolescents’ trait EI’s effect on resilience is contingent on their specific source of perceived social support. The conceptual model is presented in **Figure 1**. PROCESS is a “computational tool for path analysis-based moderation and mediation analysis as well as their integration in the form of a conditional process model” that was developed by Hayes (2013, p. 419). PROCESS Model = 1 is the best model to fit the path analysis that could address this research question. In this model, predictor variable X was the global trait EI value, the outcome variable Y was the total score derived from the resilience scale, and the moderator M was the subscale score of the perceived social support. To test the moderation

relationship, the estimation was that the coefficients of a regression model in which the effect of individual’s trait EI (X) on resilience level (Y) is allowed to vary linearly with their perceived social support level (M) by including the product of X and M as a predictor of Y along with X and M : $Y = i_1 + b_1X + b_2M + b_3XM + e_Y$.

The key interest of this test was to test b_3 , along with an inferential test. If b_3 is not statistically different from zero (*via* a confidence interval test for b_3 that straddles zero), this means that the effect of trait EI is not dependent on perceived social support. But if b_3 is statistically significantly different from zero, it could be concluded that the effect of trait EI on resilience depends on perceived social support.

To ensure the magnitude of the discrepancy in resilience between different trait EI levels was subject to sampling error at each and every value of M (perceived social support), a follow up “probing an interaction” test was carried out. Since the perceived social support scale is a quantitative variable, a common strategy when probing an interaction is to use pick-a-point approach. According to Hayes (2013), this approach could “estimate the conditional effect of X on Y when M is equal to mean, a standard deviation below the mean, and a standard deviation above the mean” (p. 236). However, since it is arbitrary to use plus and minus one standard deviation from the mean to represent “low,” “moderate,” and “high” on the moderator, the Johnson-Neyman (JN) technique was applied as well. The JN technique might generate a single solution within the range of the measurement of the moderator to indicate a statistically significant transition point in the observed moderators. It is also possible to have no solution within the range of the moderators. This could either mean the conditional effect of X on Y was statistically significant across the entire range of the moderator, or the conditional effect of X on Y was not statistically significant anywhere in the observed distribution of the moderator.

Advanced Moderated Analysis

Moderated moderation model is an advanced moderation model that was used to answer the second research question—whether the magnitude of the moderation by perceived social support of the effect of trait EI on adolescents’ resilience depends upon school type (W). Two identical moderated moderation models were used to assess the three-way interaction among trait EI, perceived social support (from family and friends respectively), and school type. A conceptual model of this analysis is presented in **Figure 2**.

PROCESS, model 3 is built to simplify the estimation of a moderated moderation model. Model 3 identified the outcome variable Y (resilience), focal predictor X (trait EI), the primary moderator M (perceived social support), and secondary moderator W (school type). PROCESS calculated all the necessary products, estimated the best-fitting ordinary least square (OLS) regression model, and probed the interaction. For probing the interaction, the pick-a-point approach was used to select the value of perceived social support on its low, moderate, and high level (mean and plus/minus one SD from mean), and assessed whether school type moderates trait EI’s effect on

resilience, conditioned on these selected values of perceived social support. The Johnson-Neyman (JN) technique was applied here as well to generate a single solution within the range of the measurement of the moderator to indicate a statistically significant transition point in the observed moderators.

RESULTS

Moderation Analysis

To investigate the effects of trait Emotional Intelligence on resilience by perceived social support from Family and Friends, respectively, two identical moderation analyses were conducted, using PROCESS model 1 in SPSS (version 22). In the first analysis, the interaction between trait EI and perceived social support from Family (b_3) was not statistically significant, $t(489) = 0.56$, $p > 0.05$, 95% CI $(-0.02; 0.04)$. Based on data from the current sample, then, Chinese adolescents' trait EI's impact on resilience was not moderated by their perceived social support from family. In the second analysis, the interaction between trait EI and perceived social support from friends emerged as a significant predictor, $t(489) = 2.31$, $p < 0.05$, 95% CI $(0.01; 0.06)$, $R^2 = 0.60$, $F(3,489) = 243.04$, $p < 0.001$ (**Supplementary Table S3**); and the R^2 had a statistically significant change due to the interactions, $F(1,489) = 5.32$, $p = 0.022$, changing $R^2 = 0.0044$. This means the moderation component of the model explained about 60% of the variance in resilience. The result indicated that the effect of adolescents' trait EI on their resilience level depends on their perceived social support from friends. **Figure 3** illustrates the interaction by depicting the regression lines of the relationship between trait EI and resilience at high, medium and low (+1 SD, mean, -1 SD) scores of the subscale score of MSPSS Friends. The fan pattern of the

figure showed that Perceived Social Support from Friends functioned as a magnifier for the positive relationship noted in the research literature between adolescents' trait EI level and their resilience. The highest level of resilience occurred in individuals who reported high trait EI and high perceived social support from friends. Overall, then, the moderation analyses results indicated that perceived social support from friends, but not from family, enhanced the relationship between Chinese adolescents' trait Emotional Intelligence and resilience.

Advanced Moderation Analysis

To understand if the moderation by gender of perceived social support differs in the effect of trait EI on resilience, two moderated moderation analyses were conducted through PROCESS model 3 on SPSS (version 22). The regression coefficients for both of the three-way interactions were not statistically significant [when perceived social support from family was employed as one of the moderators, $t(485) = 0.22$, $p = 0.82$; and when perceived social support from friends was used as one of the moderators, $t(485) = -1.48$, $p = 0.14$]. This means the magnitude of the moderation by perceived social support of trait EI on resilience level did not depend on gender.

When investigating if the moderation by school type of perceived social support differs in the effect of trait EI on resilience, there was no evidence of a three-way interaction among trait EI, perceived social support from family, and school type on resilience level, $t(485) = -1.10$, $p = 0.27$. However, there was a statistically significant interaction among trait EI, perceived social support from friends, and school type on resilience level, $t(485) = -2.19$, R^2 increase = 0.004, $F(1,485) = 4.78$, $p = 0.03$ (**Supplementary Table S4**). This means that the magnitude of the moderation by perceived

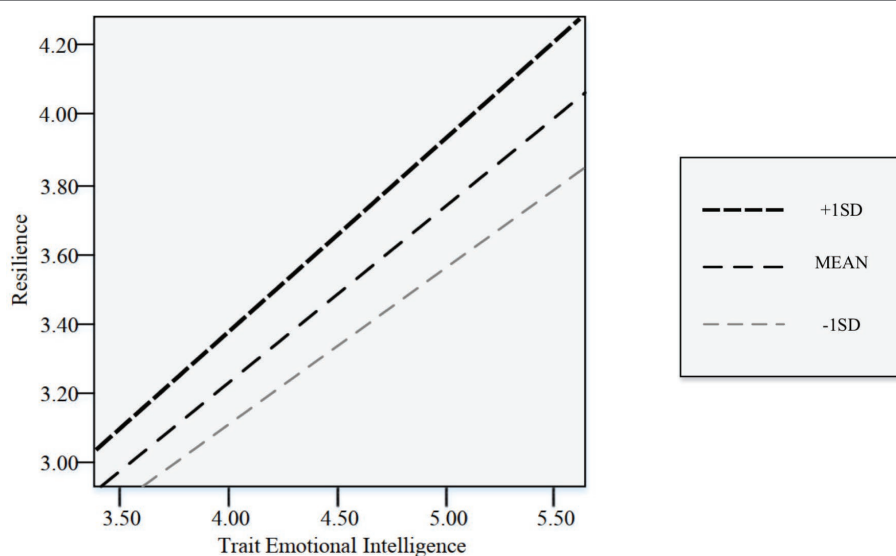


FIGURE 3 | Results of the moderation model. Three lines are the visual representation of different moderation effects of Trait EI on resilience when perceived social support from friends scores were at its +1 SD, mean, and -1 SD.

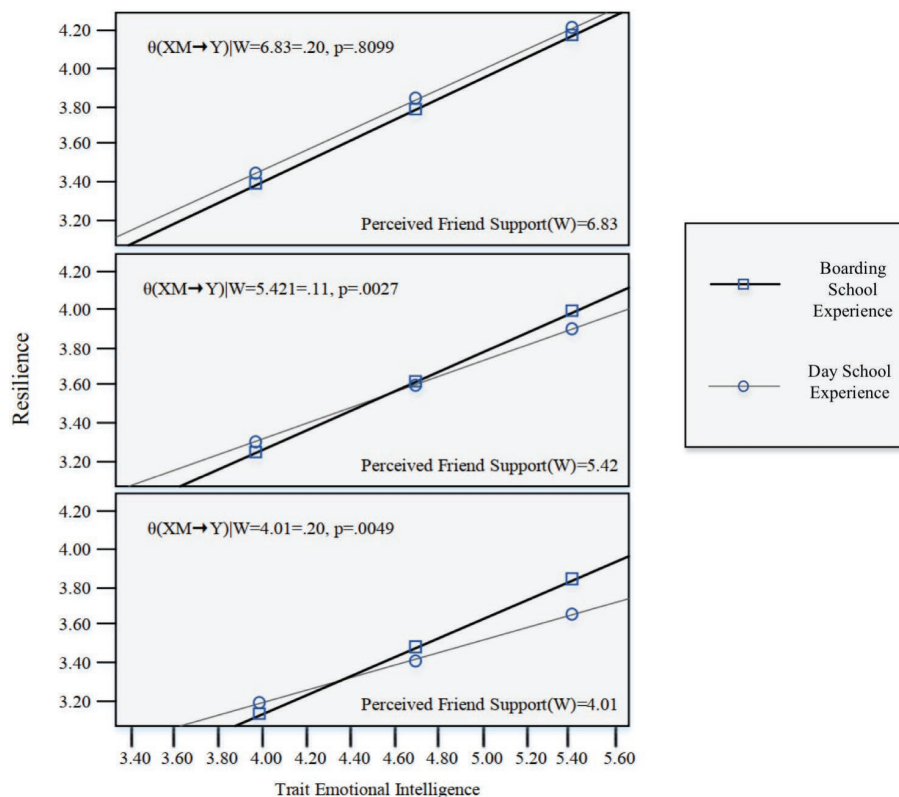


FIGURE 4 | Results of the moderated moderation model. This is a visual representation of the moderated moderation analysis, examining the moderation by school type of perceived social support from friends' differences in the effect of trait EI on resilience.

social support from friends on trait EI depended closely on school type, which impacted adolescents' resilience level.

When probing the interaction using the pick-a-point approach, the visual representation of this model (Figure 4) shows that the effect of trait EI on resilience was consistently positive, and there was a statistically significant school type difference when perceived social support was at a low [$\theta_{(XM \rightarrow Y)|W=4.01} = 0.20$, $p = 0.0049$] to moderate level [$\theta_{(XM \rightarrow Y)|W=5.42} = 0.11$, $p = 0.0027$]. However, when perceived social support was at a high level [$\theta_{(XM \rightarrow Y)|W=6.83} = 0.02$, $p = 0.8099$], the school type difference was not statistically significant. To be more specific, there was a statistically significant difference in the effect of trait EI on resilience between students with boarding school experience and day school experience among those whose perceived social support from friends score was less than 5.46. Above this score, school experience did not moderate the effect of trait EI on resilience. Practically speaking, when perceived social support from friends was in the low to moderate range, trait EI was more strongly associated with resilience among boarding school students than among day school students. This result partially validated the hypothesis that school type would impact the relationship between trait EI, perceived social support, and resilience. This finding also has practical implications for school selection, as well as clinical implications, providing a rationale for targeting students with lower social support from friends.

DISCUSSION

The results of this study indicate that perceived social support from friends, but not from family, served a moderating role between trait EI and resilience. In addition, for adolescents whose perceived social support from friends was at a low to moderate level, there was a statistically significant difference in the effect of trait EI on resilience level between students with boarding school experience and those with day school experience. The reasons for these results will be discussed in a subsequent section of the paper.

The Moderator Role of Perceived Friend Support for Adolescents

Perceived social support serves an important role in people's lives, especially for adolescents, whose developmental goals include, but are not limited to, becoming independent from parents, establishing closer connections with a peer group, forming close friendships, and developing a romantic relationship (Pfeiffer et al., 2016). Consistent with this, the findings that emerged from this study demonstrate that perceived social support from friends is more influential than family for adolescents at this stage of their development. To be specific, for adolescents who have similar levels of trait EI, the higher the friend support they perceived, the more resilient they were in facing adversity and challenge. The powerful influence

of perceived friend support replicated what had been found previously. Specifically, friend support exceeded the importance of parent support for students in late adolescence (Bokhorst et al., 2010), and friendship was rated as the most important source of social support among a group of Asian immigrant adolescents (Thomas and Baek Choi, 2006). The reasons behind the weighty role perceived friend support played in this study might be related to adolescents' developmental need of having a sense of intimacy with and support from friends (Furman and Buhrmester, 1992). The great intimacy among peers can satisfy their need to be recognized socially (Collins and Laursen, 2004), and feeling supported by their peers, especially reciprocal friendship, can give them a sense of belonging, which, in turn, increases their courage to face adversity and decrease their aggressive behavior towards challenges (Ciarrano et al., 2007). However, this finding does not mean that perceived social support from family is not important. Parental support has been shown to play a critical role in children's development and serves as a foundation for their sense of secure attachment (Bowlby, 1969/1982). Research also supports the idea that when children have better attachment and perceived high social support from parents when they are young, they are more likely to perceive and seek peer support in their adolescence (Szwedo et al., 2017). Moreover, when family creates a high stress environment, supportive friendship appeared not to have a positive impact on adolescents' expectation for success and sense of belonging (Ciarrano et al., 2007). Therefore, supportive parents and positive family environment, even though secondary in importance to peer support during adolescence, continues to be an important factor that should not be ignored.

Since the current study reveals that the higher the perceived friend support, the stronger the positive relationship between trait EI and resilience, it is vital to increase adolescents' awareness of social support from their social network, especially from their peers. To increase one's perceived social support, utilizing gratitude practice has been found to be one evidence-based strategy (Wood et al., 2008). In related fashion, keeping gratitude journals and reflecting upon simple moments that one perceives as a gift (Emmons and McCullough, 2003) can also increase one's perceived social support. It is recommended that mental health professionals, teachers, and parents intentionally provide opportunities for adolescents to try these strategies so as to enhance their ability to feel supported by others.

School Type Selection Impact on Adolescents' Development

Another result from the current study reveals that, for students who have lower perceived friend support, boarding school experience (e.g., attending boarding school or mixed type school with staying at school during the week as an option) was a better choice for those who had high trait EI (total trait EI score equal to or greater than 4.5). To understand this finding, students' trait emotional intelligence and school culture need to be evaluated together. First, students with higher trait EI

are more likely to have stronger ability to regulate their emotions and manage their relationships with others (Zolkoski and Bullock, 2012). Though some of these students do not perceive high friend support, they can still manage their interpersonal relationships well, fit into the boarding school environment, and seek additional support. Second, school and teacher support are important protective factors in a student's life. While Chinese day school teachers devote most of their attention on students' academic performance (Zhang et al., 2013), boarding school teachers are involved in students' daily lives, in addition to their regular role, and offer more resources to students. Thus, boarding school students spend more quality time with supportive teachers and school personnel (Tian et al., 2013). This explained the higher resilience level that boarding school students with high trait EI presented, compared to day school students, even though their perceived friend support was at the low to medium level (Zolkoski and Bullock, 2012).

Nevertheless, for students who obtained scores indicative of a similar level of perceived friend support (lower than 5.46), but with lower trait EI, day school was a better choice. These students were more likely to feel overwhelmed in boarding school environments that promote independence, autonomy, and assertiveness; some of them might even be bullied or experience other relational victimization (Pfeiffer and Pinquart, 2014). Due to their inadequate social skills and their higher levels of emotionality, for these students, a boarding school's environment becomes a risk factor that might potentially decrease adolescents' sense of school belongingness and increase their feelings of loneliness. On the contrary, day school offers a contained and time-limited space for students to focus on academics in school and recover after school, which makes day school a better choice that can slightly increase their resilience.

Implications

As the first study to explore the role school type played among trait EI, perceived social support, and resilience, it has implications for parents and mental health professionals. For parents, this study provides some guidance on school selection for their children, which includes considering their emotional intelligence level and their perceived friend support as two important factors. In general, adolescents with high perceived friend support would fit in any type of school and have a high resilience level. However, when perceived friend support is lower, adolescents with higher trait EI are more resilient in a boarding school environment, while adolescents with lower trait EI fit better in day school environment. This result validates Qualter and his colleagues' finding that students with average to high EI cope better with school transition than students with low EI (Qualter et al., 2007). Therefore, parents should evaluate adolescents' trait EI level and their perception of the friend support they would likely receive in school before making this school choice decision, so that they can create an optimal fit in the school environment and enhance their psychological well-being. Nevertheless, if boarding school is a choice that has already been made, and

adolescents were having some adjustment difficulties and revealing psychological distress, parents can consider helping adolescents to learn some emotional intelligence strategies, so that they can improve their skills in facing these challenges (Qualter et al., 2007).

Furthermore, school professionals play a significant role in providing prevention and intervention to cultivate students' psychological development (Van Ryzin, 2011). One of the fundamental differences between boarding school and day school experience is the level of emotional support and quality time school professionals provide to students. School professionals, no matter what school setting they are in, are recommended to form positive relationships with students, be good role models in their lives, and enhance adolescents' feelings of worthiness and belonging. They can also encourage students to write gratitude journals and keep regular contact with parents and friends in order to foster a smooth adaptation to the new environment. For students who are lacking adequate abilities in emotion regulation, stress management, and social interaction, school mental health professionals can provide individual counseling or group counseling services to teach students skills that would allow them to be more emotionally intelligent and to be more prepared for the inevitable difficult times.

Limitations and Future Directions

Beyond the implications, there are some areas needing improvement in future studies. First, only two types of social support (from friends or family) were examined in this study, and the data were all collected through a self-report format. Due to the vital role that teacher support and support from other social resources play in an adolescents' life (Van Ryzin, 2011), future studies should at least consider using measures that include perceived social support from teacher as an important variable. Future studies should also collect data that extends beyond the self-report format. Parents and teachers' feedback regarding students' emotional intelligence and resilience, and support they provide to students, might be interesting moderators to examine. Second, this study included adolescents from 13 to 16 years old (mean = 13.9, SD = 0.71), an age period that did not well represent the entire adolescent stage. Since adolescents experience dramatic changes in terms of their emotion regulation abilities, their ability to solve problems or establish relationships, there might be a different trend between preadolescents, early adolescents, and late adolescents. Future studies can therefore consider making a comparison between different adolescent age groups. Third, even though the five schools selected in this study may represent normal middle schools in Hangzhou, each school and even the randomly selected classes have their unique culture. For instance, some schools or classes have a more liberal environment than the others, or some have formed a more supportive and collaborative classroom environment. Since these subcultures were not examined in this study, it can be an important piece that impacts adolescents' development. Last but not least, the cultural diversity within China requires

special considerations regarding the generalizability of the research results. Hangzhou is the fourth-largest metropolitan area in China and attracts people from all over the country. Population demographics in Hangzhou are much more diverse than those from the western or more rural areas of China. Therefore, the findings and conclusions of this study may only be applicable to students from eastern, metropolitan areas of China. To form a well-rounded understanding of the connection between Chinese adolescents' trait EI, perceived social support, resilience, and school type, future research can replicate this study, but increase generalizability by selecting adolescents with a broader age range from western and less-developed parts of China. In addition, future studies can consider collecting information regarding students' family socioeconomic status, parents' educational level, and early parent-child attachment style as variables controlled before analyzing data, in order to better understand the complex interactions among adolescents' trait EI, perceived social support, and resilience.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of Institutional Review Board (IRB) of Indiana University Bloomington, with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Institutional Review Board (IRB) of Indiana University Bloomington.

AUTHOR CONTRIBUTIONS

SC is the sole author who initiated this study, collected data, ran the data analysis, and completed the manuscript.

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The Moderating Effect of Mindfulness on the Mediated Relation Between Critical Thinking and Psychological Distress via Cognitive Distortions Among Adolescents

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Critical thinking has been widely regarded as an indispensable cognitive skill in the 21st century. However, its associations with the affective aspects of psychological functioning are not well understood. This study explored the interrelations between trait mindfulness, critical thinking, cognitive distortions, and psychological distress using a moderated mediation model. The sample comprised 287 senior secondary school students (57% male and 43% female) aged 14–19 from a local secondary school in Hong Kong. The results revealed that high critical thinking was significantly associated with high levels of psychological distress when mindful awareness was low among adolescents. Trait mindfulness was found to moderate the indirect effects of critical thinking on psychological distress via cognitive distortions as the mediator. Specifically, in low trait mindfulness conditions, critical thinking was found to associate positively with cognitive distortions and psychological distress. Such associations were not observed in high trait mindfulness conditions. The findings reveal that though critical thinking has positive associations with cognitive functioning, its associations with affective well-being might be negative. The results also suggest that mindfulness might play an important role in preventing the possible psychological distress associated with critical thinking. Educational implications relating to the fostering of critical thinking and mindful awareness are discussed.

Keywords: mindfulness, critical thinking, cognitive distortions, psychological distress, moderated mediation

INTRODUCTION

Critical Thinking as a 21st Century Skill

With the fast-paced technological advances, the rise of the “knowledge economy,” and the information overload brought about by the internet, educators from all over the world have been re-evaluating the skill sets that are vital for people to thrive in the 21st century. Critical thinking is one of the most frequently reported and cited 21st century skills (Ananiadou and Claro, 2009;

Dede, 2010). Research has shown that critical thinking is associated with numerous positive cognitive outcomes such as academic attainment (Bitner, 1991), cognitive performance (Witt, 2002), decision-making abilities (Shin, 1998), and decreased cognitive bias and heuristic thinking (Facione and Facione, 2001). It has been found to be a better predictor of life decisions than intelligence (Butler et al., 2017). The benefits of critical thinking are particularly prominent in the 21st century when the internet has become the essential vehicle of information. Anyone can now create “information” online. It is critical thinking that allows people to judge the truthfulness, credibility, and bias of information they come across in online environments (Leu et al., 2014) and synthesize the information into a coherent knowledge base (Brand-Gruwel and Stadtler, 2011). In addition, as scientific research and findings are becoming more accessible to the general public, a certain degree of scientific literacy is highly desirable, if not essential. Such scientific literacy can be developed by learning the skills and techniques in critical thinking (Britt et al., 2014). Critical thinking has also been shown to be useful in social and interpersonal problem solving and decision making (Ku, 2009).

The benefits of critical thinking are well researched and established in the cognitive and, more recently, the social domains. However, less is known about the relation between critical thinking and the affective aspects of psychological functioning. The goal of our study is to explore such possible relations. As critical thinking skills have been endorsed and promoted by various education systems around the world (Australian Council for Educational Research, 2002; Association of American Colleges and Universities, 2005), the findings of our study may have important implications for the educational practices across the globe regarding the development of critical thinking skills among students, especially adolescents. This is because the development of higher order cognitive processes is believed to be most active in late adolescence and early adulthood (Sowell et al., 1999). The development of critical thinking is found to be less mature in children (Giedd et al., 1999) and many critical thinking inventories have suggested minimum age for administration (Halpern, 2003; Ennis et al., 2005).

Critical thinking is broadly defined as “reasonable reflective thinking that is focused on deciding what to believe and do” (Ennis, 1987, p.10). Halpern (2003) provides a more elaborate definition by referring to it as “purposeful, reasoned, and goal-directed... thinking involved in solving problems, formulating inference, calculating likelihoods, and making decisions (p.6).” In this sense, the word critical is not meant to imply “criticism” or “fault-finding” but careful evaluation or judgment that aims at improving the thinking process (Halpern, 1998). Critical thinking is considered to be a trait instead of a state. A trait is thought to be a personal characteristic that remains comparatively stable across time and situations, whereas a state is considered to reflect one’s adaptation to a specific circumstance (Hamaker et al., 2007). For the current study, the working definition of critical thinking is based on the conceptualization of Ennis (1987) which has a narrower focus on one’s ability to make inferences based on (1) induction, (2)

credibility of sources and observation, (3) deduction, and (4) assumption identification.

Possible Relations Between Critical Thinking and Affective Functioning

Very few research studies have explored the relation between critical thinking and its effect on affective functioning. Among these studies, Scott (1983) empirically explored the relation between critical thinking performance and state anxiety level in 85 women (aged 18–60) prior to experiencing breast biopsy and 6 to 8 weeks post-procedure. Only participants later found to have benign conditions were included and post-tested. The results showed that state anxiety and critical thinking ability were not significantly correlated pre- or 6–8 weeks post- biopsy. Scott did notice a negative relation between critical thinking performance and state anxiety in participants from the high-anxiety subgroup. It was hypothesized that after reaching a certain level of anxiety, critical thinking ability begins to decline as a function of high anxiety. However, no proper moderation analysis with state anxiety as the moderator was conducted. Also, the criterion for classifying participants into the high anxiety subgroup was not provided. It appears questionable to analyze the relationship of a variable after dissecting it into extreme groups without sound justifications.

Irwin and Bassham (2003) theorize that critical thinking might influence affective functioning based on the theory of cognitive therapy. Cognitive therapy maintains that dysfunctional or maladaptive thinking is the root cause of psychological distress (Beck, 1976; Beck and Weishaar, 2000). Dysfunctional thinking is characterized by the presence of systematic errors in reasoning, also known as cognitive distortions, which in turn compromises people’s mood and behaviors. Common cognitive distortions include arbitrary inference, false dichotomy, selective abstraction, overgeneralization, etc (Beck, 1967, 1976; Beck and Weishaar, 2000). Empirically, cognitive distortions have been shown to be associated with depression, anxiety, and other affective symptoms (Leung and Poon, 2001; McGrath and Repetti, 2002; de Oliveira et al., 2015). Moreover, gender differences have been observed in various forms of psychological distress in which females were significantly over-represented (Hankin and Abramson, 2001; McLean et al., 2011).

Irwin and Bassham (2003) scrutinized ten cognitive distortions proposed by Beck (1967, 1976) and concluded that they each exhibit and epitomize at least one logical fallacy – an erroneous pattern of reasoning for arriving at the conclusion of an argument (Van Eemeren et al., 2009). The ability to identify and avoid making logical fallacy is indeed one of the key attributes of a critical thinker (Halpern, 2003). Although Irwin and Bassham (2003) made no claim that cognitive distortions are the results of weak reasoning ability, it raises the question of whether people with high critical thinking skills in general would experience fewer and less intense cognitive distortions and perhaps have better affective well-being. The point of particular interest here is whether critical thinkers can direct or generalize their critical thinking ability to evaluate their own thoughts and emotions.

The Role Mindfulness Plays

The conceptual overlap of critical thinking and cognitive distortions has not been directly explored in the existing literature. One construct that is frequently associated with critical thinking and cognitive distortions, respectively, is metacognition. It is simply defined as “the monitoring and control of thought” (Martinez, 2006, p. 696). Kuhn (1999) views critical thinking as one of the sub-categories of metacognition known as “metacognitive knowledge” which can aid in the monitoring of thought. Scherer-Dickson (2004) postulates that cognitive distortions are both monitored and controlled by metacognition.

Recent research has highlighted the intricate relation between mindfulness and metacognition (Jankowski and Holas, 2014). Mindfulness is defined as one’s conscious awareness of the present moment in a non-judgmental manner (Kabat-Zinn, 1994). It is grounded in a perceptual, rather than cognitive or emotional manifestation of the current moment as it is. Shapiro et al. (2006) propose that mindfulness can bring about mental shifts in perspective which allow us to perceive our experience with enhanced clarity and objectivity. Such a shift in perspective is not only found to help regulate affects and behaviors but is also therapeutic in that it allows us to step back and observe our thoughts objectively without being controlled by them. Mindfulness can be measured as a trait or disposition (Brown and Ryan, 2003). Significant negative correlations have been demonstrated between trait mindfulness and depression (Cash and Whittingham, 2010), rumination (Raes and Williams, 2010), cognitive reactivity (Raes et al., 2009), social anxiety (Rasmussen and Pidgeon, 2011), and general psychological symptoms (Baer et al., 2006).

Cognitive distortions refer to both the frequency and intensity in which one engages in illogical thinking patterns (de Oliveira et al., 2015). As critical thinkers are good at evaluating arguments, making decisions, and solving problems, they should be less likely to commit thinking errors frequently, and intensely. However, this might not be the case for critical thinkers who are low in mindfulness. When people are too drowned in their thoughts and feelings (i.e., low in mindfulness), their metacognitive regulation ability is impaired (Jankowski and Holas, 2014), and they are more likely to commit cognitive distortions (Schütze et al., 2010). Critical thinkers are no exception. Even though critical thinkers know declaratively that cognitive distortions are illogical in theory, those with low mindfulness might still fall prey to committing cognitive distortions in everyday life due to their compromised metacognitive regulatory skills. Knowing and doing can be two different things. Furthermore, when critical thinkers with low mindfulness are unaware of their compromised critical thinking ability and continue to be self-assured in their judgment and decision, they are likely to believe in the cognitive distortions more strongly, which can then inflate their overall level of cognitive distortions.

The Current Study

The current study explored the interrelations between critical thinking, cognitive distortions, mindfulness, and psychological distress. Specifically, this study hypothesized that:

- (1) Mindfulness moderates the relation between critical thinking and psychological distress. At low mindfulness, high critical thinking would predict high psychological distress, whereas the opposite direction of association would be expected at high mindfulness (i.e., negative relation between critical thinking and psychological distress).
- (2) Cognitive distortions mediate the relation between critical thinking and psychological distress, moderated by mindfulness (see **Figure 1**). We postulate that at low mindfulness, critical thinking would more strongly predict cognitive distortions, which in turn predicts psychological distress. If the hypotheses of the present study hold true, high critical thinking ability could potentially be associated with psychological well-being when coupled with low mindfulness.

MATERIALS AND METHODS

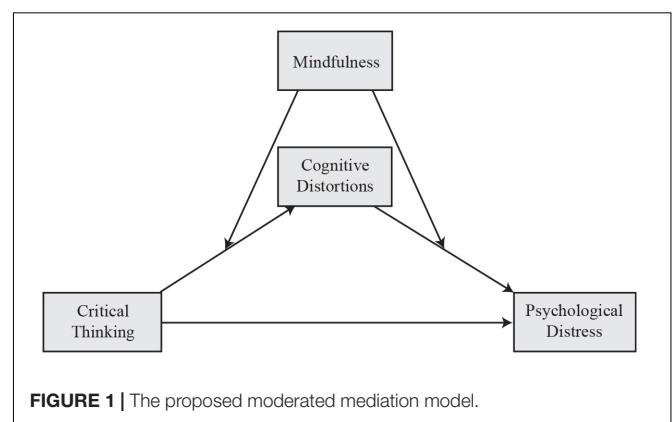
Participants and Procedures

The participants of this study consisted of 287 senior secondary school students (57% male and 43% female) from a local secondary school in Hong Kong. Ages ranged from 14 to 19 years, with a mean of 15.58 ($SD = 0.85$). Voluntary informed consent was obtained from the participants, their parents, and the school principal. Participants were guaranteed anonymity and confidentiality. Approval to conduct the study was granted by the research ethics committee at the university. Each participant attended a 40-minute session in group format in their respective classrooms to complete the measures during regular school hours. They were first allowed 15 min to fill out a questionnaire, which included demographic information (age, gender, and grade level), as well as measures of cognitive distortions, psychological distress, and mindfulness. They were then asked to complete the critical thinking assessment within a time limit of 25 min.

Measures

Cognitive Distortions Questionnaire

Cognitive distortions were measured using the *Cognitive Distortions Questionnaire* (CD-Quest; de Oliveira et al., 2015).



It is a 15-item six-point Likert scale ranging from “0” to “5” which assesses one’s overall level of cognitive distortions based on self-reported frequency and intensity of cognitive distortions committed during the past week. An example item on dichotomous thinking (also called all-or-nothing, black-and-white, or polarized thinking) reads: “I view a situation, a person or an event in “either-or” terms, fitting them into only two extreme categories instead of on a continuum.” The scoring for each item captured both the frequency of commission (from *No* to *Almost all of the time*) and the intensity of belief (from *A little* to *Very much*) (see **Table 1**). Higher scores indicate higher levels of cognitive distortions. The CD-Quest was translated by the first author into Chinese. A back-translation procedure was conducted to ensure the accuracy of the translation. Internal consistency reliability for the sample as measured by Cronbach’s alpha was 0.90.

Depression Anxiety Stress Scales

The 21-item version of the *Depression Anxiety Stress Scales* (DASS-21; Lovibond and Lovibond, 1995) was used to assess the psychological distress of the participants by measuring their level of depression, anxiety, and stress as three separate domains in the forms of cognitive, emotional, and physiological symptoms during the past week. Each domain consists of seven items. Self-report responses from the participants were scored on a four-point Likert scale (from “0” = *Never*, “1” = *Sometimes*, “2” = *Often*, to “3” = *Almost Always*), with higher scores indicating more anxiety, depression, and stress symptoms. Sample items include “I found it hard to wind down” and “I was aware of dryness of my mouth.” The Chinese version of the measure translated by Chan (2005) was used. Internal consistency reliabilities for the sample as measured by Cronbach’s alpha in the domains of depression, anxiety, and stress were 0.86, 0.76, and 0.81, respectively.

Mindful Attention Awareness Scale

The *Mindful Attention Awareness Scale* (MAAS; Brown and Ryan, 2003) was used to measure the participants’ trait mindfulness. It is a 15-item self-report Likert scale. Responses were scored on a six-point scale ranging from “1” (*Almost Always*), “2” (*Very Frequently*), “3” (*Somewhat Frequently*), “4” (*Somewhat Infrequently*), “5” (*Very Infrequently*) to “6” (*Almost Never*). Higher scores indicate higher mindfulness. A sample item reads “I find myself preoccupied with the future or the past.” The Chinese version of the MAAS translated by Zhang (2014) was used.

TABLE 1 | Example of the scoring format for cognitive distortions questionnaire (CD-Quest).

Frequency	No	Occasionally	Much of the time	Almost all of the time
Intensity				
I believe it. . .	0	–	–	–
A little	–	1	2	3
Much	–	2	3	4
Very much	–	3	4	5

Internal consistency reliability for the sample as measured by Cronbach’s alpha was 0.87.

Cornell Critical Thinking Test

A shortened version of the *Cornell Critical Thinking Test Level X* (CCTT; Ennis et al., 2005) was used to assess the critical thinking abilities of the participants. The test assessed four subscales of critical thinking: (1) Induction (Hypothesis Testing), (2) Credibility of Sources & Observation, (3) Deduction, and (4) Assumption Identification. Induction (Hypothesis Testing) refers to one’s ability to generalize from specific instances to form broad conceptual statements. Participants were asked in each item to judge if a fact supported a hypothesis, went against the hypothesis, or neither supported nor went against the hypothesis. Credibility of Sources & Observation measures the ability to decide whether or the extent to which one accepts an assertion without direct access to the basis of that assertion. In each of the items, participants were required to decide if one statement was more believable than the other or both were equally believable. Deduction is the ability to apply general rules to particular instances. Participants were asked to choose in each item the conclusion that followed necessarily from a given premise. Assumption identification is the ability to recognize assumptions which are the statements that fill the gaps in reasoning. Participants were asked in each item to identify an assumption which was taken for granted from a statement.

The original version of CCTT has 71 multiple-choice items and requires around 50 min to complete. Due to the time constraint imposed by the school for the data collection procedure, the use of the original version of CCTT was considered unfeasible. As a result, the CCTT was trimmed down to 33 items and the students were required to finish the items in 25 min. The full score for the test was 33 as each correct answer was scored one point. Five example questions with answers were provided to help the participants better understand the question format. Twenty-six undergraduate research interns (23% male and 77% female) were invited to complete the original 71-item CCTT in a pilot study (full score = 71). The internal consistency reliabilities of the overall CCTT score and those of the subscales of Induction, Credibility of Sources & Observation, Deduction, and Assumption Identification for the pilot sample as measured by Kuder–Richardson Formula 20 (KR-20) were 0.68, 0.63, 0.28, 0.54, and 0.31, respectively. The average score of the interns in the pilot was 48.08 ($SD = 5.99$, $Min = 34$, $Max = 58$). The interns’ quantitative performance and qualitative feedback were used to inform the difficulties of the items. The selection of the 33 items was guided by the original item-to-subscale ratio, the items’ level of difficulty, and resemblance to other items within the same subscale based on the professional judgment of the authors. Excluding example questions, the numbers of items in the subscales of Induction (Hypothesis Testing), Credibility of Sources & Observation, Deduction, and Assumption Identification were 10, 11, 7, and 5, respectively. The CCTT was translated by the first author into Chinese. A back-translation procedure was conducted to ensure the

accuracy of the translation. Internal consistency reliability for the CCTT as measured by KR-20 was 0.58. The KR-20 for the subscales of Induction, Credibility of Sources & Observation, Deduction, and Assumption Identification were 0.30, 0.35, 0.30, and 0.21, respectively.

Data Analysis

Structural equation modeling (SEM) was used to examine the hypothesized moderation and moderated mediation using IBM SPSS Amos version 25. Before testing the structural models, descriptive statistics and zero-order correlations of the study variables were computed. Proportions of missing data in the current study ranged from 0.1% (questionnaire data) to 0.8% (CCTT data). Little's test indicated that the questionnaire data ($\chi^2 = 939.53$, $df = 949$, $p = 0.58$) and CCTT data ($\chi^2 = 934.16$, $df = 953$, $p = 0.66$) were all missing completely at random (MCAR). It is a statistical test that employs maximum likelihood estimation to assess if the missing values are related to any variables under study. A non-significant result on Little's test indicates that there are no patterns in the missing data (i.e., MCAR). Mean imputation was used to replace the missing questionnaire data whereas missing data in the CCTT was scored as zero. SEM was used to test the proposed moderation and moderated mediation involving critical thinking and psychological distress as latent variables. Critical thinking was indicated by Induction, Credibility of Sources & Observation, Deduction, and Assumption Identification, whereas psychological distress was indicated by Depression, Anxiety, and Stress. Sum scores of the critical thinking subscales, cognitive distortions, mindfulness, and the subscales of psychological distress were entered as manifest variables. Model fit was assessed using chi-square test (χ^2), comparative fit index (CFI), and incremental fit index (IFI), and root-mean squared error of approximation (RMSEA). For the cut-offs of the fit indices, CFI and IFI values larger than 0.95 (Bollen, 1989; Bentler, 1990) and RMSEA values less than 0.05 (Kline, 2004) are generally believed to indicate good model fit. To compare the moderation and moderated mediation models with the main effect models, the Akaike information criterion (AIC) and Browne-Cudeck Criterion (BCC) were also examined. Lower AIC and BCC values suggest better model fit. The significances of the direct and indirect effects were evaluated using bias-corrected bootstrap confidence intervals based on 1000 bootstrapping samples (Hayes, 2013). To further explore the moderating effect of mindfulness in the hypothesized models, the participants were categorized based on the MAAS z-scores into low mindfulness (1 SD below mean; $n = 44$), mid mindfulness (between -1 SD to $+1$ SD; $n = 197$), and high mindfulness (1 SD above mean; $n = 47$) subgroups. Multigroup moderation analyses (Byrne, 2016) were conducted using AMOS to examine differences in the strength of prediction under low and high mindfulness conditions. The interaction effects of the moderated mediation models were illustrated using the Johnson-Neyman plots, which help visualize the linear relationship between the independent and dependent variables across low and high mindfulness conditions.

RESULTS

Descriptive Statistics

All raw data results are shown in **Supplementary Table S1**. The means, standard deviations, and the zero-order correlations among variables are shown in **Table 2**. Descriptive results showed that the overall CCTT score was modestly and positively correlated with anxiety ($r = 0.12$, $p = 0.02$) and stress ($r = 0.10$, $p = 0.045$). Cognitive distortions were found to be moderately and positively correlated with depression ($r = 0.51$, $p < 0.001$), anxiety ($r = 0.54$, $p < 0.001$), and stress ($r = 0.63$, $p < 0.001$) but negatively correlated with mindfulness ($r = -0.54$, $p < 0.001$). However, no significant correlations were observed between critical thinking and the measures of cognitive distortions, mindfulness, and depression. Gender was found to correlate significantly with anxiety ($r = 0.17$, $p < 0.01$) and stress ($r = 0.15$, $p < 0.01$). Age was found to correlate significantly with cognitive distortions ($r = -0.13$, $p < 0.05$). As such, gender and age were included as control variables in subsequent analyses.

Moderation Effect of Mindfulness on the Relation Between Critical Thinking and Psychological Distress

Figure 2 shows the structural equation model on the relation between critical thinking and psychological distress with age and gender controlled for. The model was a good fit to the data with $\chi^2 (26) = 32.73$, $p = 0.17$; CFI = 0.99; IFI = 0.99; RMSEA = 0.03; AIC = 88.73; BCC = 90.76. The relation between critical thinking and psychological distress was not significant ($B = 0.15$, $p = 0.08$). The alternative model with psychological distress predicting critical thinking showed a slightly weaker model fit, with $\chi^2 (26) = 37.99$, $p = 0.06$; CFI = 0.98; IFI = 0.98; RMSEA = 0.04; AIC = 93.99; BCC = 96.01.

Figure 3 shows the moderation effect of mindfulness. The interaction between mindfulness and critical thinking significantly predicted psychological distress ($B = -0.16$, $p = 0.01$), indicating a significant moderation effect of mindfulness on the relation between critical thinking and distress. Based on the multigroup analyses with mindfulness as the moderator, critical thinking was only significantly and positively associated with psychological distress when mindfulness was low ($B = 0.51$, $p = 0.01$). **Figure 4** shows the interaction effect in which the positive relation between critical thinking and psychological distress was stronger for low mindfulness than high mindfulness.

Moderation Effect of Mindfulness on the Relation Between Critical Thinking and Psychological Distress as Mediated by Cognitive Distortions

The structural equation model on the relation between critical thinking and psychological distress as mediated by cognitive distortions with age and gender controlled for is shown in **Figure 5**. The mediation model was an acceptable fit to the

TABLE 2 | Descriptive statistics and zero-order correlations for the variables.

Variable	<i>M (SD)</i>	Possible score range	Reliability measure	1	2	3	4	5	6	7	8	9	10	11	12
1. CD-Quest	23.88 (14.25)	0–75	0.90 (α)	—											
2. CCTT	16.71 (4.13)	0–33	0.58 (KR-20)	0.08	—										
3. CCTT induction (hypothesis testing)	5.12 (1.73)	0–10	0.30 (KR-20)	0.04	0.65**	—									
4. CCTT credibility of sources & observation	5.94 (1.90)	0–11	0.35 (KR-20)	0.06	0.76**	0.29**	—								
5. CCTT deduction	3.46 (1.45)	0–7	0.30 (KR-20)	0.11*	0.63**	0.16**	0.31**	—							
6. CCTT assumption identification	2.19 (1.20)	0–5	0.21 (KR-20)	−0.03	0.54**	0.14**	0.22**	0.24**	—						
7. MAAS	59.50 (12.12)	6–90	0.87 (α)	−0.54**	−0.03	−0.05	−0.05	0.04	−0.00	—					
8. DASS-21 depression	5.37 (4.23)	0–21	0.86 (α)	0.51**	0.07	0.06	0.05	0.05	0.02	−0.47**	—				
9. DASS-21 anxiety	5.09 (3.55)	0–21	0.76 (α)	0.54**	0.12*	0.05	0.07	0.08	0.12*	−0.50**	0.72**	—			
10. DASS-21 stress	6.66 (4.10)	0–21	0.81 (α)	0.63**	0.10*	0.07	0.03	0.11*	0.06	−0.52**	0.72**	0.76**	—		
11. Age	15.58 (.85)	—	—	−0.13*	−0.09	−0.16**	−0.02	−0.07	0.04	−0.05	−0.03	−0.02	−0.06	—	
12. Gender	—	—	—	0.05	0.00	−0.04	−0.02	0.07	0.02	0.07	0.07	0.17**	0.15**	0.07	—

CD-Quest, cognitive distortions questionnaire; CCTT, cornell critical thinking test; MAAS, mindful attention awareness scale; DASS, depression anxiety stress scales.* $p < 0.05$; ** $p < 0.01$.

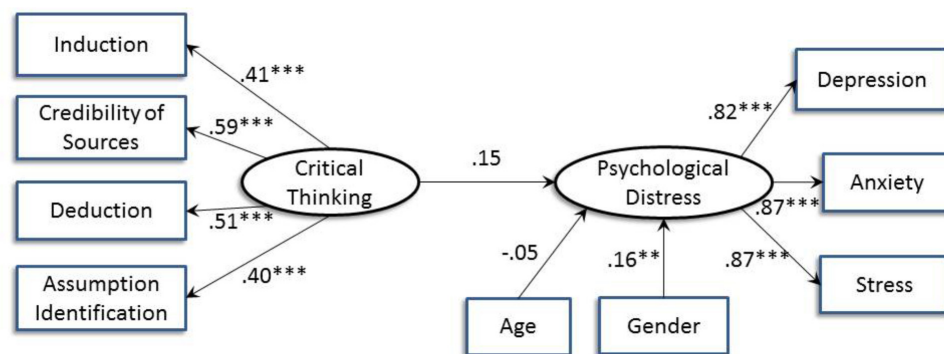


FIGURE 2 | Structural equation model indicating the relation between critical thinking and psychological distress after controlling for age and gender. Standardized path coefficients are shown (** $p < 0.01$; *** $p < 0.001$).

data with $\chi^2(34) = 55.04$, $p = 0.01$; CFI = 0.97; IFI = 0.97; RMSEA = 0.05; AIC = 117.04; BCC = 119.51. The indirect effect of critical thinking on psychological distress via cognitive distortions was non-significant [$B = 0.08$, BCCI (−0.02, 0.17)].

On testing the moderation effect of mindfulness (Figure 6), interaction of mindfulness and cognitive distortions significantly predicted psychological distress ($B = -0.11$, $p = 0.02$), whereas mindfulness X critical thinking marginally predicted cognitive distortions ($B = -0.10$, $p = 0.08$). The indirect effect of critical thinking on psychological distress via cognitive distortions was only significant at low mindfulness [$B = 0.21$, BCCI (0.09,

0.41)]. Figure 7 shows the moderated effect of mindfulness on the relation between critical thinking and psychological distress as mediated by cognitive distortions in low mindfulness condition. At low mindfulness, increases in critical thinking were significantly associated with increases in cognitive distortions, which in turn predicted higher psychological distress. As the direct effect of critical thinking on psychological distress [$B = 0.30$, BCCI (0.004, 0.54)] was significant, incomplete mediation via cognitive distortions took place. Johnson-Neyman plots demonstrating the cross-over interaction effect of critical thinking and mindfulness on cognitive distortions and that of

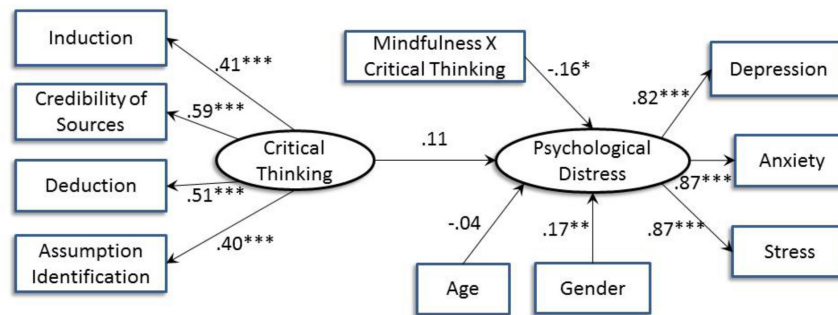


FIGURE 3 | Structural equation model indicating the relation between critical thinking and psychological distress with mindfulness as the moderator after controlling for age and gender. Standardized path coefficients are shown (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$).

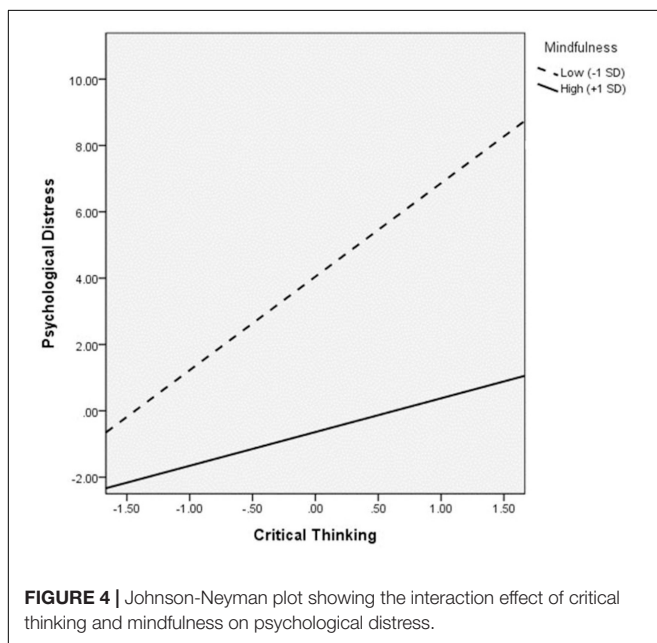


FIGURE 4 | Johnson-Neyman plot showing the interaction effect of critical thinking and mindfulness on psychological distress.

cognitive distortions and mindfulness on psychological distress are shown in **Figures 8, 9**.

DISCUSSION

The aim of the current study is to explore the interrelations between critical thinking, cognitive distortions, mindfulness, and psychological distress. We hypothesized that there existed a moderated mediation among the variables. Results from the current study supported Hypothesis 1 that mindfulness moderated the relation between critical thinking and measures of psychological distress. The findings relating to Hypothesis 2 showed that the relation between the study variables was more nuanced than the original hypothesis. In low mindfulness conditions, critical thinking was positively associated with cognitive distortions which could in turn give rise to psychological distress in the form of anxiety, depression,

and stress. The moderating roles of mindfulness tested in the hypotheses were clearly demonstrated.

What is of particular interest is one possible interpretation of the findings. Critical thinkers are believed to have good metacognitive knowledge (Kuhn, 1999). However, metacognitive knowledge is insufficient in itself in reducing cognitive distortions without effective metacognitive regulation. Mindfulness brings about mental shifts in perspective (Shapiro et al., 2006) which is thought to enhance metacognitive regulation (Wells, 2000). As such, though critical thinkers have good metacognitive knowledge, but when coupled with low mindfulness, they might still fall victim to cognitive distortions.

As suggested in the introduction, the reason why critical thinkers who are low in mindfulness might experience more overall cognitive distortions is because they are unaware that their good critical thinking ability only serves them well in monitoring but not in regulating their cognition. When critical thinkers fall into thinking traps, they might still continue to be self-assured in their judgment and believe in the cognitive distortions even more strongly, as their self-efficacy on critical thinking is high due to their previous successful experiences. Since the construct of cognitive distortions consists of both a frequency and an intensity component, increase in either component can inflate the overall level of cognitive distortions.

Both Hypotheses 1 and 2 predicted that at high mindfulness, the relation between critical thinking and psychological distress would be negative. As mentioned earlier, mindfulness was hypothesized to allow a critical thinker to step back from his or her own consciousness and view accurately his or her thoughts from a third person's perspective. However, our results revealed that the predicted negative relation between critical thinking and psychological distress at high mindfulness was not significant. We propose here three plausible explanations for the non-significant results observed which are related to the properties of the sample, the overconfidence and self-assuredness of critical thinkers, and the complexity of cognitive distortions.

First of all, the overall level of trait mindfulness among this sample of adolescents might not be sufficiently high for the effect of mindfulness to become apparent in the said relation. As seen from the moderation results, the positive associations of critical thinking with psychological distress indeed

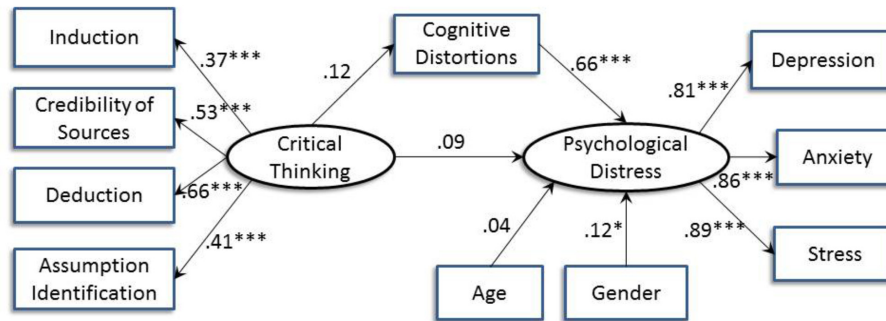


FIGURE 5 | Structural equation model indicating the relation between critical thinking and psychological distress as mediated by cognitive distortions after controlling for age and gender. Standardized path coefficients are shown (* $p < 0.05$; *** $p < 0.001$).

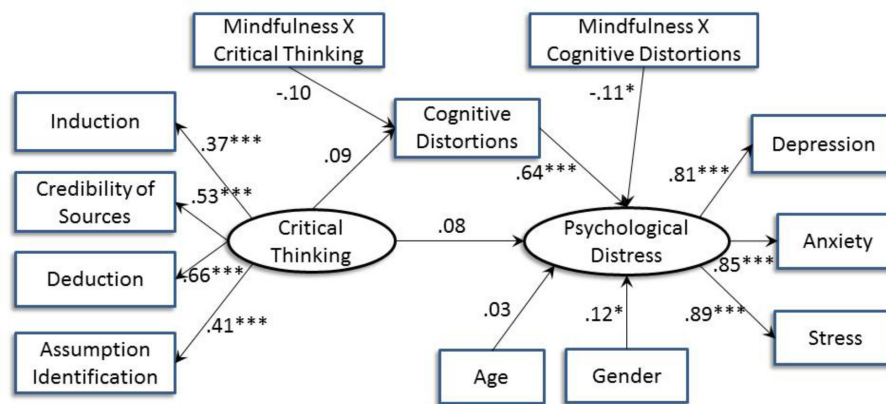


FIGURE 6 | Structural equation model indicating the relation between critical thinking and psychological distress as mediated by cognitive distortions with mindfulness as the moderator after controlling for age and gender. Standardized path coefficients are shown (* $p < 0.05$; *** $p < 0.001$).

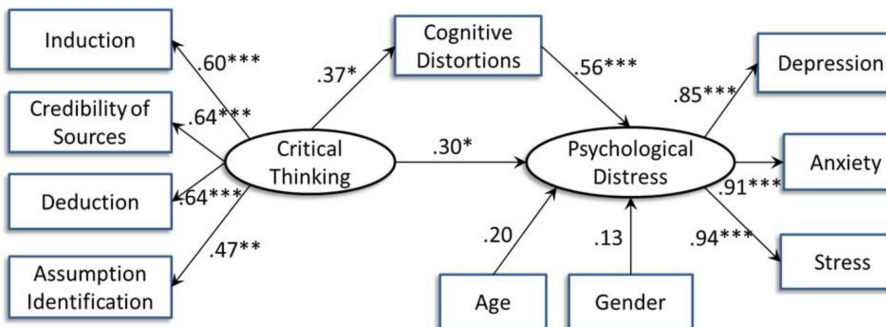
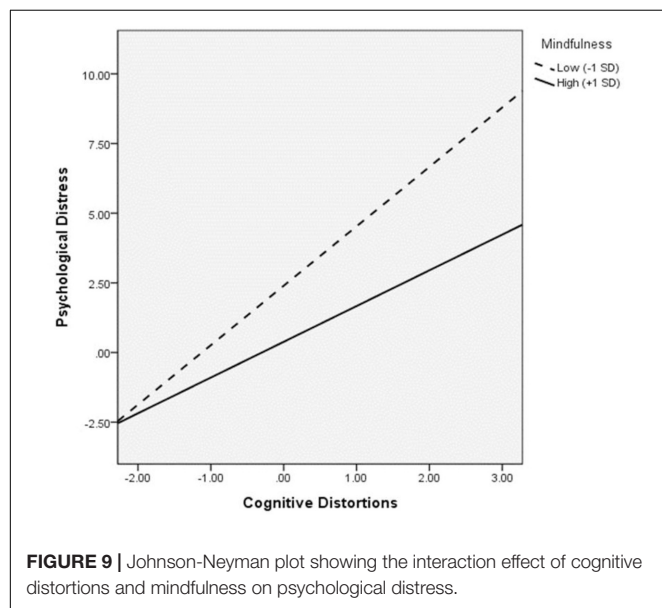
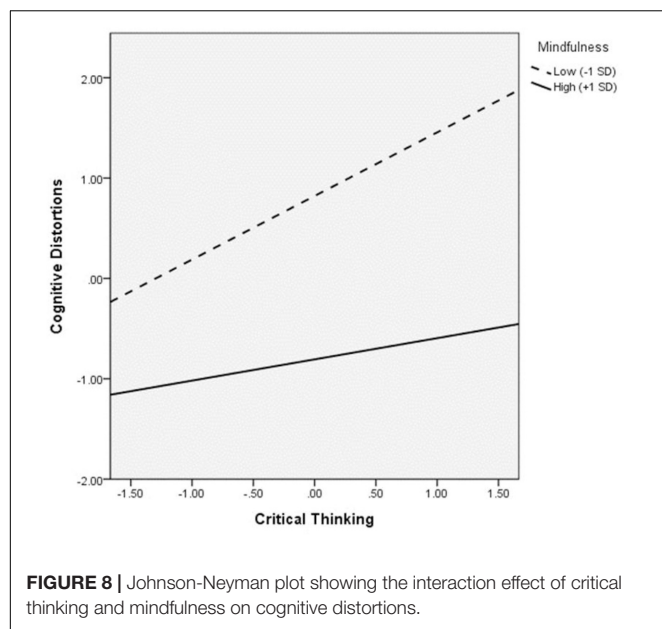


FIGURE 7 | Structural Equation Model indicating the relation between critical thinking and psychological distress as mediated by cognitive distortions at low mindfulness condition after controlling for age and gender. Standardized path coefficients are shown (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$).

weakened with increases in mindfulness. Similar decreases in the strength of correlations were also observed in the moderated mediation models. The Johnson-Neyman plot (Figure 8) shows that the positive relation between critical thinking and cognitive distortions declines with increases in mindfulness. It is possible that when the trait mindfulness level of the overall sample is high

enough, the relation between critical thinking and psychological distress could be significantly negative. However, as our sample was not representative of the population, we were unable to determine if the trait mindfulness measure of the sample is at a level comparable with that of the population. Trait mindfulness has been shown to increase with age (Shook et al., 2017). Future



studies may test the mindfulness-moderated effect of critical thinking on psychological well-being among older age groups using representative samples to further examine this postulation.

Second, the possible adverse effect of critical thinking on promoting cognitive distortions – which may be related to critical thinkers' overconfidence and self-assuredness – might have outweighed its beneficial effect in alleviating cognitive distortions through the identification of logical fallacies (Irwin and Bassham, 2003). Exercising critical thinking to correct logical fallacies could to some extent prevent cognitive distortions by enhancing metacognitive knowledge. However, its effect might be overshadowed by the plausible problem relating to critical thinkers' self-assuredness, which might further undermine metacognitive regulation in low mindfulness conditions. If

mindfulness is low, critical thinkers may not be aware that their metacognitive knowledge is insufficient to contribute to effective metacognitive regulation, but rather continue to be self-assured in their critical thinking due to their previous successful experiences.

Third, cognitive distortions do not exclusively represent logical fallacies. Having high critical thinking and high trait mindfulness might allow one to recognize and rectify the illogicality of cognitive distortions, but their underlying assumptions and beliefs might not be addressed. According to Beck (2011), cognitive distortions are the manifestation of people's rigid and unrealistic appraisal of themselves and others. If this is indeed the case, tackling logical fallacies *per se* might not suffice to eliminate cognitive distortions. For instance, the cognitive distortion called dichotomous thinking exemplifies the logical fallacy of false dilemma which presumes that only two alternatives exist when there are in fact more. However, the underlying assumption giving rise to dichotomous thinking might be due to a way of evaluating oneself or others in either all good or all bad terms with nothing in between. In this case, only resolving the logical fallacy might not be enough to challenge one's unrealistic appraisal of oneself or others.

Limitations and Future Directions

The current study has several limitations that are worth noting. First, the internal consistency of the critical thinking measures used in the study was low, with a KR-20 of 0.58. The findings in this study should be interpreted with caution. The low internal consistency might be due to the trimming down of the original 71-item scale into a 33-item one. Test performances of undergraduate research interns in the pilot study were used to inform the trimming down of the test items. Preferably, secondary school students should have been assessed instead. Moreover, the scale had not been validated in the local Hong Kong population. Further studies should adopt critical thinking scales with better reliability and validity to assess critical thinking. However, we wish to highlight that according to the test manual of the CCTT, Ennis et al. (2005) point out that critical thinking tests in general have lower internal consistencies than other constructs due to the heterogeneity of critical thinking. Verburgh et al. (2013) demonstrated in a validation study of the CCTT and Halpern critical thinking assessment (HCTA) that the internal consistencies of the full CCTT and HCTA were as low as 0.52 and 0.49 and that of the subscales of CCTT and HCTA were as low as 0.30 and 0.34, respectively.

Furthermore, the study of Scott (1983) was inconclusive in showing that anxiety might be the independent variable giving rise to impaired critical thinking. We are unable to rule out this alternative explanation due to the correlational nature of our study. Nevertheless, our results showed that the increases in psychological distress, as opposed to Scott's supposition, was associated with higher critical thinking performance. A possible explanation could be that a certain degree of psychological distress serves as a catalyst for self-reflection, keeps the brain alert (Kirby et al., 2013), and boosts cognitive performance. The causal relations among critical thinking, cognitive distortions,

and psychological distress await further investigation using experimental designs through critical thinking training.

Finally, although the definition of critical thinking makes it clear that it is different from “criticism” or “fault-finding,” there might exist a certain degree of overlap. After all, a good critical thinker is likely to be able to detect more faults in oneself or others than his or her less critical counterparts. The relations between critical thinking, self-criticism, and criticism toward others can be further explored.

Conclusion and Implications

Critical thinking is a highly sought after 21st century skill that allows people to make good judgment and decisions. Its benefits on people’s cognitive functioning have been well-documented. However, less is known about its impact on people’s affective functioning. This study revealed that high critical thinking skills were associated with high psychological distress in low mindfulness conditions. Cognitive distortions were shown to be the path through which critical thinking was associated with psychological distress in low mindfulness conditions. When trait mindfulness was low, high critical thinking was significantly associated with high cognitive distortions and high psychological distress.

The findings of the current study are impactful as they suggest that in low states of mindfulness, critical thinking might lead to cognitive distortions which in turn give rise to psychological distress. From an educational point of view, critical thinking skills are indispensable skills to be taught to students. The key here is to maximize the benefits of critical thinking on cognitive functioning while minimizing the negative associations critical thinking has on psychological well-being. From the results of this study, it can be seen that mindfulness might benefit critical thinkers in terms of their psychological well-being. Recent research has shown that trait mindfulness can be enhanced through mindfulness-based intervention such as the b (“Dot be”) Curriculum developed by the Mindfulness in Schools Project

(Kuyken et al., 2013). We therefore wish to argue that mindfulness-based training should perhaps become an integral part of students’ development of social-emotional competency in schools in order to enhance their overall psychological well-being.

ETHICS STATEMENT

All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the institutional research committee of The University of Hong Kong.

AUTHOR CONTRIBUTIONS

MS conceived the idea, carried out the implementation, and wrote the manuscript. KS supervised the project and helped in analyzing the data and writing the manuscript.

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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.2019.01455/full#supplementary-material>

TABLE S1 | Raw data results of the study.

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Social Support and Emotional Intelligence as Protective Resources for Well-Being in Moroccan Adolescents

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This study aimed to test a structural model to examine the protective role of psychosocial variables, such as social support, emotional intelligence and their interaction, on the cognitive dimension of subjective positive well-being (life satisfaction) and negative well-being (depression) in Moroccan adolescents. The participants consisted of 1277 students (571 men, 694 women and 12 missing values) with a mean age of 16.15 years ($SD = 2.22$; range = 9 to 23) who attended 26 public schools in different territories of Morocco. These students were in secondary education ($n = 893$) and high school ($n = 378$) (6 missing values). The scales for measuring the variables of interest had to be adapted and validated as a previous step for the further proposal of a model of relations. Statistical analyses were conducted using structural equation modeling (SEM) to test the proposed model. The model that optimally adjusted the data confirmed the protective role of social support in the well-being of Moroccan adolescents. Consistent with previous studies, social support was directly related to well-being. However, it also modulated levels of satisfaction with life. Likewise, the inclusion of emotional intelligence as an additional protective factor contributed to the explanation of the well-being mechanisms in adolescents. In addition to direct associations with the levels of social support, satisfaction with life and depression (negative in the latter case), emotional intelligence participated in a complex chain affecting life satisfaction and life satisfaction affecting depression. Moreover, the interaction of emotional intelligence with social support was confirmed to determine levels of life satisfaction in adolescents. Specifically, social support multiplied the effects of the relationship between satisfaction with life and emotional intelligence in cases of moderate and high levels in Moroccan adolescents. This study fills a gap in the literature by adapting and further analyzing several scales with Moroccan samples of

adolescents and by proposing and verifying a relational model that can help researchers and teachers to more precisely clarify these relations according to their context. The enhancement of protective factors, such as social support and emotional intelligence, will promote healthy youth development, thus creating healthier societies in the future.

Keywords: adolescents, emotional intelligence, life satisfaction, social support, depression

INTRODUCTION

Adolescence is generally considered a dynamic and complex age period. Furthermore, there are differences among countries depending on culture (Arnett, 2018), and thus, the results of studies about this period of life may not be generalized to all cultures. There is a wide body of research about adolescence and its implications for psychological boundaries in the United States and Europe (Jackson and Goossens, 2006), along with the relations among well-known psychological constructs in Western countries (such as emotional intelligence or well-being), whereas there is a dearth of studies in other cultures, such as those of northern Africa. In Morocco, adolescence (*sinn al-murahaqa*) is not a widely recognized stage of life. Only in recent decades is it usually associated with the years that coincide with high school education, and it is distinguished by the development of *aql*, a term referring to social responsibility (Davis and Davis, 2012). Typical behaviors of this stage begin with puberty in the mid-teens for both sexes (beginning earlier in girls than in boys) and extend until marriage, coinciding with the years of training in and learning adult roles; these years are also marked by a lack of economic independence (Gregg, 2005). In this period of life, youth development includes feelings of positivity or negativity and consideration of the consequences of one's actions in adulthood. Their satisfaction with life as a positive aspect of well-being or the absence of depression as a suppression of negative well-being could be affected by other variables. In general, the role of social support is accepted as a protective factor for well-being, but we propose the exploration of the protective role of emotional intelligence to further contribute to knowledge about their relations in Moroccan adolescents.

Definitions of subjective well-being distinguish an affective and a cognitive component (Diener et al., 1999). The affective component is an individual's (actual or perceived) hedonic balance (i.e., the balance between pleasant affect and unpleasant affect). The cognitive component is an individual's life satisfaction (i.e., global evaluations of one's life according to subjectively determined standards) (Pavot and Diener, 2008) and is related to health predictors such as favorable self-reported health, social support and positive health behaviors (Koivumaa-Honkanen et al., 2004). However, other empirical studies suggest that positive and negative components of well-being are influenced by different factors that are not simply the opposite ends of a continuum (Chamberlain, 1988). In fact, we posit that it is necessary to study both positive and negative components of well-being and the variables that could affect them. For example, life satisfaction as a positive component of well-being can be determined by diverse factors, such as self-esteem, income, social support, individualism versus collectivism, and cultural

homogeneity, among others (Diener and Diener, 1995). Thus, social support could predict life satisfaction, but we could also wonder about their relationship in adolescence. Studies on adolescence highlight that life satisfaction constitutes a relevant predictor of psychological adjustment variables such as depression (Evans et al., 2005; Proctor et al., 2009). Thus, previous empirical evidence suggests that having high levels of life satisfaction protects adolescents against the development of psychological disorders (Proctor et al., 2009). One of the disorders that has increased dramatically during adolescence and poses potential danger (i.e., from affecting academic performance to influencing decisions to commit suicide) is depression (Brière et al., 2013). According to the World Health Organization (WHO), depression is a medical disease related to negative psychosocial outcomes, characterized mainly by symptoms such as sadness, loss of interest or inability to experience pleasure, feelings of guilt and low personal worth, appetite and/or sleep disturbances or concentration problems (World Health Organization, 2017a). Depressive symptomatology constitutes one of the main threats to which teens around the world are exposed (World Health Organization, 2017b).

In the case of Arab adolescents, the Institute for Health Metrics and Evaluation (IHME) estimates that approximately 25% of cases of disability and premature death are due to mental and behavioral disorders, and depression ranks first (Institute for Health Metrics and Evaluation [IHME], 2013). In addition, depression is expected to become the main mental health problem among adolescents in Arab countries (Institute for Health Metrics and Evaluation [IHME], 2013). In fact, studies conducted in countries such as Jordan or Saudi Arabia find a prevalence of depression in adolescents between 30 and 38% (Al-Gelban, 2007; Raheel, 2015; Dardas et al., 2018). Although it is fundamental to explore risk factors that increase the probability of Arab adolescents experiencing depressive symptomatology (Dardas et al., 2018) and the cognitive variables that are responsible for the increase in depression experienced during the adolescence stage (Abela and Hankin, 2008), the tradition of investigating protective factors that attenuate or eliminate the influence of risk factors on depression is less developed (i.e., resilience, Carbonell et al., 2002 or life satisfaction, Lyons et al., 2014). There are several studies confirming an association between life satisfaction and depression in adolescents in Western countries (Gilman and Huebner, 2006) and among Arab teenagers (Abdel-Khalek, 2009; Abdel-Khalek and Eid, 2011). To further understand this relationship in depth, it is essential to clarify its directionality, both in young and adult populations (Lyons et al., 2014). In this sense, longitudinal studies have confirmed the predictive role of life satisfaction in depression in adult samples (Koivumaa-Honkanen et al., 2004;

Boyratz et al., 2014) and adolescents (Huebner et al., 2000; Haranin et al., 2007; Lyons et al., 2014). Based on these aspects, we propose the following:

Hypothesis 1. Life satisfaction is negatively related to depression in Moroccan adolescents.

Social support has long been known to exert considerable influence on wellbeing (Thoits, 2011). Social support is defined, in a broad sense, as the set of human and material resources available to an individual to help them overcome a certain crisis situation (Lin, 1986) and cope with stress (Cohen, 2004). These resources can be real or only perceived and are based on two types of social support: structural social support, which has to do with the closest quantitative resources (i.e., family and friends), and qualitative social support, whose purpose is to help the individual in their performance (i.e., work team, teachers, and counselors) (Cobb, 1976; Gottlieb, 1983).

Social support is hypothesized to protect well-being both directly, through the benefits of social relationships, and indirectly, as a buffer against stressful circumstances (Gariépy et al., 2016). The *direct approach* posits that positive perceptions of social support have a direct positive effect on health and well-being, regardless of stress (Berkman et al., 2000). Thus, the mere fact of being in a supportive social network of family and friends could directly improve general health and well-being (Uchino, 2004), contributing to life satisfaction, mainly the support received by family and friends (Castellá Sarriera et al., 2015). Furthermore, support from parents and classmates increases adolescents' well-being and school environment (Rueger et al., 2010).

However, despite the well-established importance of these sources of support for adolescents (Criss et al., 2009), they may also function in a different way. In fact, two meta-analyses aiming to shed light on this point found different results. Rueger et al. (2016) found that family and general peer support emerged as the strongest sources of support, followed by teacher and close friend support, whereas Chu et al. (2010) found that teacher support emerged as the strongest correlate of well-being, followed by family and peer support. Thus, regardless of the source of social support, it is important to perceive social support to have positive life satisfaction, and thus, the following hypothesis is proposed:

Hypothesis 2. Perceived social support is positively related to life satisfaction in Moroccan adolescents.

In the general population, the systematic review by Santini et al. (2015) provides some confirmation that perceived social support plays important protective roles against depression. Additionally, the systematic review by Gariépy et al. (2016) found that parents, teachers and family were sources of support who were most consistently found to be protective against depression in children and adolescents, whereas findings were less consistent for support from friends and general perceived support. Moreover, in adolescents, parental support is important to buffer the positive association between depression and adolescents' reports of suicidal ideation (Fredrick et al., 2018). In fact, the association between depression and suicidal ideation

was not significant for students with high parental support, regardless of gender. In sum, support from parents and family is, more than any other source, most consistently related to a youth's protection from depression (Gariépy et al., 2016), proving to be effective in the mitigation of stress perceptions and depressive symptomatology (Crutcher et al., 2018). Thus, we consider the following:

Hypothesis 3. Perceived social support is negatively related to depression in Moroccan adolescents.

In recent years, the emergence of positive psychology has promoted the study of emotional abilities that could impact life satisfaction or depression, such as emotional intelligence. Under the ability model paradigm, emotional intelligence comprises the individual differences that occur when meaning is given to the emotional patterns present in people's lives and how those patterns are used to reason and solve problems (Salovey and Mayer, 1990; Mayer and Salovey, 1997). It covers the abilities to perceive and express emotions, to take into account the emotions when thinking or making decisions, to understand and identify emotions and to regulate emotions in oneself and in others (Mayer and Salovey, 1997; Mayer et al., 2000). Although the personality and dispositional attributes targeted by the mixed/trait models also contribute to reasoning and problem solving, they should not be confused with emotional intelligence as a mental ability that is discrete and measurable (Mayer et al., 2008a).

Emotional intelligence plays a key role at the adaptive level, and its usefulness has been demonstrated in different contexts (social, academic, and labor) (Mayer et al., 2008b; Zeidner et al., 2008), showing solid relationships with levels of well-being (Zeidner et al., 2012). In the meta-analysis conducted by Sánchez-Álvarez et al. (2016) regarding the contribution of emotional intelligence to subjective well-being, the authors conclude that emotional intelligence is consistently and positively related to subjective well-being, and the effect sizes are higher when emotional intelligence is evaluated through self-report measures; this result coincides with those of previous review works, such as Martins et al. (2010). Moreover, the study by Sánchez-Álvarez et al. (2016) highlights a higher effect of emotional intelligence on the cognitive than on the affective dimension of well-being (Palmer et al., 2002), which could be justified by the higher temporal stability of both variables (emotional intelligence and the subjective well-being cognitive dimension) vs. the affective component (Sánchez-Álvarez et al., 2016), along with the implication of meta-cognition processes that would share the evaluations of emotional intelligence and cognitive judgments on the general subjective level (Mayer and Stevens, 1994). Thus, we propose the following:

Hypothesis 4. Emotional intelligence is positively related to life satisfaction (cognitive dimension of subjective well-being) in Moroccan adolescents.

Emotional intelligence also preserves the well-being of adolescents due to its relationships with depressive symptomatology (Balluerka et al., 2013; Resurrección et al., 2014). One explanation

is that emotional intelligence reduce the experimentation and duration of negative emotions (Mikolajczak et al., 2009a; Zeidner et al., 2009), and thus, these emotional abilities act as protective factors against the development of psychological maladjustment (Mayer and Salovey, 1997), enabling effective selection of coping strategies and conditioning their effectiveness (Davis and Humphrey, 2012). Thus, we propose the following:

Hypothesis 5. Emotional intelligence is negatively related to depression in Moroccan adolescents.

As previously mentioned, social support can provide a source of buffering of the negative effects that adverse conditions have on well-being. They also enhance the development of adolescents' well-being. In fact, young people at these ages depend to a large extent on different forms of social support and how they affect different spheres of life (Stanton-Salazar and Spina, 2005). For example, promoting adaptive career development by increasing their confidence in their emotional skills, which would impact their expectation of social support (Fabio and Kenny, 2012). Thus, it would be expected that emotional intelligence would allow young people to establish and maintain closer social relationships as well as obtain higher levels of social support (Saarni, 1999). In fact, studies using different procedures of evaluating emotional abilities have found similar results; that is, emotional intelligence is related to social support (Ciarrochi et al., 2001, 2002b) and to the quality of interpersonal relationships (Lopes et al., 2003). However, there is a lack of studies in Moroccan samples. Thus, we propose the following:

Hypothesis 6. Emotional intelligence is positively related to perceived social support in Moroccan adolescents.

Even when emotional intelligence consistently shows relationships with subjective well-being (Sánchez-Álvarez et al., 2016) and levels of depression in adolescents (Balluerka et al., 2013; Resurrección et al., 2014), there is a lack of knowledge about the mechanisms through which these relationships are established. The consideration of emotional intelligence as a variable that interacts with the perception of environmental elements in the explanation of health levels is a constant in research (Ciarrochi et al., 2002a; Slaski and Cartwright, 2003). For example, in work contexts, it has shown an invigorating role that allows for a better interpretation and understanding of the social keys and more positive and adaptive responses (Jordan et al., 2002). In areas other than work, Gallagher and Vella-Brodrick (2008) demonstrated in a sample of adults from the general population that emotional intelligence interacted with the levels of received social support by increasing the resulting levels of subjective well-being. However, in adolescents who are in an academic context, there are other variables that may affect the relationship between social support and well-being, for example, health variables such as social stress, anxiety or depression (Demaray and Malecki, 2002). In this sense, the second approach has focused on the *stress-buffering* hypotheses (Vaux, 1988), which posits that social support suppresses the deleterious effects of stress to promote or maintain good health (Glozah, 2013). The results under this paradigm show, in children and adolescents,

that social support is a buffer for stress and positively correlates with well-being (Malecki and Demaray, 2006). Furthermore, social support both directly and indirectly affects depressive symptoms and significantly mediates the effects of undesirable life events (Lin et al., 1999). Bearing these comments in mind and the above-mentioned result about the dramatically increased depression in adolescents that has affected a wide range of college students (Hunt and Eisenberg, 2010), we consider the possible protective effect of social support on depression. Stemming from these results, we could expect that Moroccan adolescents with high levels of emotional intelligence place greater value on the interaction experiences resulting from the social support received from different sources than do adolescents with lower emotional intelligence levels, further leading to greater life satisfaction (cognitive dimension of subjective well-being) and lower levels of depression. Thus, emotional intelligence would have an interaction role with social support in the final result of life satisfaction and depression. Specifically, we propose:

Hypothesis 7. Emotional intelligence interacts with social support in determining levels of life satisfaction in Moroccan adolescents.

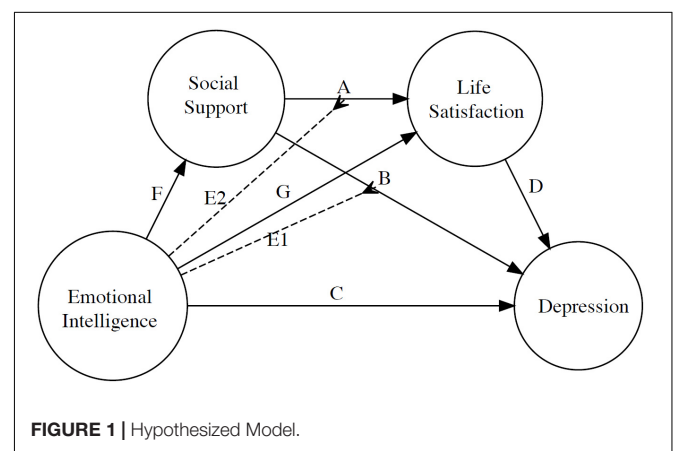
Hypothesis 8. Emotional intelligence interacts with social support in determining levels of depression in Moroccan adolescents.

In sum, our study pays attention to the protective role that social support, emotional intelligence and their interaction may have in life satisfaction and depression in Moroccan adolescents. This is a novel approach to a sample that has received little attention. The hypothesized model is schematized in **Figure 1**.

MATERIALS AND METHODS

Participants and Procedure

The participants in this study consisted of 1277 students (571 men and 694 women, and 12 missing values) with a mean age = 16.15 ($SD = 2.22$; range = 9–23 years old) who belonged to 26 public schools in different territories of Morocco. The sample comprised 69.9% secondary education students ($n = 893$; 15.3%



first course; 14.7% second course; 19.7% third course; and 20.2% fourth course) and 29.6% high school students ($n = 378$; 7.8% first course and 21.8% second course). The remaining 0.5% ($n = 6$) was missing values. The mean grade of the students in the previous year was 12.84 (over 20; $SD = 2.56$; range = 5.00–19.99). In the family context, the students had more than four siblings (18.1%), four siblings (19.3%), three siblings (23.3%), two siblings (24.7%), one sibling (12.6%), and no siblings (1%). The remaining 1.2% was missing values.

The mean age of fathers was 49.75 years ($SD = 8.10$; range = 30–89), whereas mothers' mean age was 42.07 years ($SD = 6.99$; range = 26–84). With respect to the parents' educational level, 20% of fathers had no education, whereas 22.4% completed primary studies, 15.4% graduated from secondary education, 20.3% graduated from high school, and 18.7% had university studies. The remaining 3.1% were missing values. For mothers, 36.6% had no education, and the distribution of mothers in the remaining educational levels was as follows: primary studies (17.8%); graduated from secondary education (16.4%); graduated from high school (14.3%); and completed university studies (12.6%). The remaining 2.3% were missing values. With respect to the parents' work, fathers were mostly self-employed (32.7%), worked as civil servants (22.5%), or were employees (12.2%), followed by working as farmers (7.3%), being unemployed (6.3%) or holding other unspecified jobs (15.5%), and 3.5% of missing values. Mothers were mostly unemployed but devoted to their houses (72.7%), followed by working as civil servants (8.2%), being self-employed (7%), being employed (4.3%), working as farmers (0.7%), or having unspecified work (5.4%). The remaining 1.7% was missing values.

As a previous step before administering the questionnaires, two processes were carried out. First, once the scales that conformed to the battery were decided, then based on the guidelines by Hambleton and De Jong (2003), all of the scales were revised by experts in the Arabic language and in psychology and were further analyzed in group discussions to test their adequacy among Moroccan adolescents, as suggested by Willgerodt (2003) or Vogt et al. (2004), among others. Due to the content analyses and considering the difficulties and limitations found in other studies with Moroccan samples (i.e., El Rhazi et al., 2009 or Hoopman et al., 2009), several modifications were included. Then, a pilot analysis with Moroccan adolescents was carried out, and other modifications were considered. First, all the scales reduced their number of anchors in the Likert scale. This decision pursued to eliminate the bias of the central response tendency or acquiescence. Thus, the instrument to assess social support was reduced to 2 points (*yes* or *no*), and the instruments for emotional intelligence and life satisfaction were reduced to 4- and 6-point Likert scales, respectively, from *totally disagree* to *totally agree*. Furthermore, several items were linguistically adapted to a simpler form of standard Arabic in all scales, except for the instrument evaluating satisfaction with life, which needed no further changes.

Ethical permission was obtained from the Department of Psychology and was approved by the Research and Ethics Committee at the Faculty of Letters and Human Sciences-Dhar el Mehraz of the University of Sidi Mohamed Ben Abdellah in

Fez (Morocco). Once the investigators were allowed to conduct the study, they applied for permission from the responsible parties of the Regional Academy of Education and Training to allow them access to the public schools. The administrative and education officials approved the questionnaire and procedure to be administered at the public schools and gave the investigators a letter to present at the schools. At each school, an internal committee composed of the school personnel, informed the families in a meeting by a written letter with the explanation of the study to obtain parental consent for all participants. Parents verbally consented when they agreed, in case they did not, they had to give the letter back with the petition to be excluded. All parents agreed to allow their children to participate and schools reported the researches with this information. The Ethics Committee approved all consent procedures and how to obtain the parental consent.

In total, twenty-six schools from the region participated in the study. A group of 26 collaborators (24 women and two men) were distributed into two groups (14 and 12 participants, respectively) to be instructed about the scales, the meaning of items and the procedure to administer the questionnaires. They were also instructed to follow the ethical procedure guidelines approved by the Ethic Committee and the Regional Academy of Education and Training. Each seminar lasted 2 h. Then, the collaborators went to the schools in two sessions to have all the scales completed during school hours. Pupils answered the questionnaires individually in the classroom. Students in Morocco are not accustomed to completing questionnaires, and collaborators had to read the questions and sometimes explain the items. Anonymity of the responses and voluntary participation were ensured.

Measures

Multidimensional Scale of Perceived Social Support-Arab American (MSPSS-AA). This is the adaptation of the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) to Arabic for Arab-American adolescent samples (Ramaswamy et al., 2009). This adaptation included some modifications to culturally adapt the scale: (a) the reduction of the Likert scale from 7 to 3 points; (b) the inclusion of school personnel as a source of social support; and (c) the omission of other significant people as a source of social support due to their romantic nature. As a result, the MSPSS-AA is composed of 12 items comprising three sources of support, namely, family, friends and school personnel, with three response options: *in disagreement*, *neutral*, and *in agreement*. The MSPSS-AA obtained adequate reliability indices for the three subscales: family ($\alpha = 0.63$; i.e., my family is close to me when I need them), friends ($\alpha = 0.75$; i.e., my friends try to help me), and school personnel ($\alpha = 0.72$; i.e., I talk with the school counselor about my problems) (Ramaswamy et al., 2009). Further modifications were included in our study (see procedure above).

Wong and Law Emotional Intelligence Scale (WLEIS; Wong and Law, 2002). The WLEIS is considered a short instrument comprising 16 items that are scored on a 7-point Likert scale and that measure four competencies with four items each: self-emotional appraisal (SEA), which refers to the

perception of own emotions; others' emotional appraisal (OEA), which refers to the perception of the emotions of others; use of emotions (UOE), which refers to the ability of individuals to make use of their emotions by directing them toward constructive activities and personal performance; and regulation of emotions (ROE), the ability of people to regulate their emotions, which will enable a more rapid recovery from psychological distress. The internal consistencies of the competencies in the original version are 0.87, 0.90, 0.84, and 0.83 Cronbach values, respectively (Wong and Law, 2002). The authors initially proposed this instrument for the study of emotional intelligence in the workplace. However, its use has spread to other contexts in which relationships occur (Lopez-Zafra and Gartzia, 2014). For example, it has been successfully adapted and used with Moroccan women by El Ghoudani et al. (2018). We use this adaptation to analyze its usefulness with Moroccan adolescents but further revise it for use among adolescents (see procedure above).

Satisfaction with Life Scale (SWLS; Diener et al., 1985). We revised the Arabic version of the SWLS by Ayyash-Abdo and Sánchez-Ruiz (2012) used with a sample of Lebanese undergrads. This scale comprised 5 items rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher values representing greater satisfaction. One example item is the following: In most ways, my life is close to my ideal. This measure is considered suitable for research and clinical purposes in Arabic-speaking communities showing an adequate alpha coefficient ($\alpha = 0.79$) in the adaptation study. Our Moroccan version included some adaptations (see procedure above).

Beck Depression Inventory-II (BDI-II; Beck et al., 1996). The BDI-II is a 21-item inventory that assesses depressive symptomatology. Each item is rated on a scale ranging from 0 (*normal*) to 3 (*most severe*), with summary scores ranging between 0 and 63. The BDI-II yielded high internal consistency ($\alpha = 0.93$ among college students; Beck et al., 1996). Adequate content and factorial validity have been demonstrated, and it

provides diagnostic discrimination. For this study, we use the version for Arab samples by Hamdi (2013). This scale has been used with the adult population; thus, we reviewed the scale for Moroccan adolescents (see procedure above).

Data Analysis

Statistical analyses were conducted using structural equation modeling (SEM) to test the proposed model. All were performed using GNU R software (R Foundation for Statistical Computing, 2019) with lavaan, semTools, semPlot, data.table, shiny, HH, irr, vegan, psychometric, psych, GPArotation, Rcsdp, corrpilot, parallel, crayon, non-nest2, ltm, CMC, matrixStats, and RMediation libraries. In all cases, a significant difference was determined with a probability = 0.05.

Given the presence of missing values, and in order to avoid interpretive problems related to the normality of the data, the estimation method was based on the *MLF* estimator (Maximum Likelihood Estimation based on the first-order derivatives) and *ml* missing methods (case-wise Maximum Likelihood estimation). In fact, all the conclusions were verified in a convergent manner with other robust estimation methods (e.g., maximum likelihood estimation asymptotically equal to the robust Yuan-Bentler test statistic) (see Rosseel, 2012).

For each model estimated, we report the following recommended goodness-of-fit indices: model chi-square (χ^2) with degrees of freedom (df) and probability; the ratio χ^2 value by its degrees of freedom; Hoelter's Critical N (CN); the Bentler comparative fit index (CFI); Bollen's incremental fit index (IFI); the non-normed fit index (NNFI, also known as the Tucker-Lewis index, or TLI); the standardized root mean square residual (SRMR); the Steiger-Lind root mean square error of approximation (RMSEA), and Confidence Interval of RMSEA; Akaike's information criterion (AIC); the sample-size-adjusted Bayesian information criterion (BIC); and the most recent indexes, the gamma hat index (γ -Hat) and the adjusted gamma hat index (adj γ -Hat), which have been shown to be resistant to

TABLE 1 | Descriptive statistics and reliability for all the instruments ($N = 1277$).

Scale	M (SD)	Range	%NA	Cronbach's α	OmegaT	OmegaH
MSPSS.F1 Family	7.16 (1.05)	4–8	2.3	0.61	0.62	0.62
MSPSS.F2 Friends	3.54 (0.68)	2–4	1.6	0.48	0.58	0.58
MSPSS.F3 School	5.66 (1.28)	4–8	3.7	0.61	0.62	0.62
MSPSS.TT	16.35 (2.03)	10–20	5.6	0.61	0.69	0.68
WLEIS.F1 Self	9.53 (1.79)	3–12	2.7	0.60	0.62	0.62
WLEIS.F2 Others	12.26 (2.41)	4–16	1.8	0.67	0.68	0.68
WLEIS.F3 Regulation	13.34 (2.20)	4–16	3.2	0.68	0.68	0.69
WLEIS.F4 Use	11.52 (2.91)	4–16	1.2	0.71	0.72	0.71
WLEIS.TT	46.64 (6.57)	18–60	6.8	0.79	0.84	0.83
BDI.F1 Cognitive	25.04 (7.52)	15–57	13.4	0.87	0.88	0.88
BDI.F2 Somatic	7.98 (2.68)	5–20	6.3	0.69	0.67	0.65
BDI.Total	32.85 (9.42)	20–77	15.8	0.89	0.90	0.90
SWLS	21.62 (5.36)	5–30	2.7	0.80	0.80	0.80

MSPSS, Multidimensional Scale of Perceived Social Support; WLEIS, Wong and Law Emotional Intelligence Scale; BDI, Beck Depression Inventory-II; SWLS, Satisfaction With Life Scale; F, name of the factor; TT, total score; NA, no answer/lost values. The α -values < 0.7 obtained for some scales are considered acceptable in the initial phases of research and the development of evaluation instruments (Guilford, 1954).

sample size, model complexity, and model misspecification (Fan and Sivo, 2007). A reasonable guideline is to examine the RMSEA (see below) for the null model (null or independence, e.g., all the variables in the model to have variation but no correlation) and make sure that is not smaller than 0.158, which is especially useful for high sample sizes. This rule allows for the decision of whether incremental (or relative) measures of fit (e.g., IFI, TLI, and NFI) may be informative (Kenny, 2015). The details on the recommended thresholds for each of the goodness-of-fit statistics are included in the **Tables 3, 4**.

Furthermore, modification indices analysis and their power approach for model fit evaluation were run through the library miPowerFit to debug the final model. This library starts from the estimates of modification indexes of the library lavaan and allows us to include two approaches in a convergent way, namely, that of Saris et al. (2009) from power changes and that based on the confidence intervals of the expected parameter changes (Kelley and Pornprasertmanit, 2016). In the analysis of the moderating effects, we opted for probing latent interaction from products of indicators using residual centering (see Geldhof et al., 2013). In the mediational analysis, the bias-corrected bootstrap method was used to detect mediated effects in SEM to avoid the problems arising from the assumptions about the distribution of the coefficient of interest (Valente et al., 2015).

RESULTS

Descriptive Statistics

Means, standard deviations and reliability coefficients for the psychometric measures are presented in **Table 1**. Pearson product correlations among variables included in the current study are presented in **Table 2**.

Measurement Model

Despite all the scales had adequate initial psychometric properties, due to the adaptation to the Moroccan culture, basic analyses of their properties at the item level were carried out. Mainly an analysis of discrimination (item-test correlation) and reliability of each item were performed, as well as the analysis of saturation from McDonald's omega estimates (see Zinbarg et al., 2005). The latter did not allow assuring that all the items contributed to the measurement model, that is, to load at least to one of the factors that compounded the original factorial structure and / or to contribute to a general dimension. This analysis led us to omit items 7 (When the situation gets worse, I rely on my friends) and 12 (I can talk with my friends about my problems) of the MSPSS scale to measure social support. Also item 13 (I always know if I am happy or not) of the WLEIS scale to measure emotional intelligence and item 21 regarding to sex relations of the BDI-II scale for depression were eliminated.

In order to estimate the reliability of the scales, given the categorical format of the items, we opted for the omega index; which has also shown conceptual advantages over the alpha index (see Revelle and Zinbarg, 2008; Sijtsma, 2008). More specifically, **Table 1** collects both the total, that is, the greatest lower bounds as estimates of a reliability of a test, (see omegaT column) and

TABLE 2 | Correlations among dimensions/items.

Dimensions/items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(1) MSPSS.F1 Family	1																
(2) MSPSS.F2 Friends	0.09**	1															
(3) MSPSS.F3 School	0.22**	0.06*	1														
(4) MSPSS.TT	0.70**	0.42**	0.77**	1													
(5) WLEIS.F1 Self	0.25**	0.09**	0.17**	0.27**	1												
(6) WLEIS.F2 Others	0.00	0.13**	0.08**	0.09**	0.26**	1											
(7) WLEIS.F3 Regulation	0.31**	0.06	0.17**	0.29**	0.46**	0.26**	1										
(8) WLEIS.F4 Use	0.28**	0.02	0.16**	0.25**	0.46**	0.12**	0.41**	1									
(9) WLEIS.TT	0.30**	0.11**	0.20**	0.32**	0.73**	0.58**	0.74**	0.76**	1								
(10) BDI.F1 Cognitive	-0.41**	-0.08**	-0.17**	-0.34**	-0.31**	-0.02	-0.33**	-0.31**	-0.35**	1							
(11) BDI.F2 Somatic	-0.26**	-0.05	-0.17**	-0.26**	-0.24**	0.01	-0.25**	-0.22**	-0.25**	0.64**	1						
(12) BDI.TT	-0.40**	-0.07*	-0.19**	-0.35**	-0.30**	-0.01	-0.32**	-0.30**	-0.34**	0.98**	0.79**	1					
(13) SWLS.1	0.25**	0.01	0.18**	0.24**	0.27**	0.01	0.19**	0.22**	0.24**	-0.29**	-0.20**	-0.28**	1				
(14) SWLS.2	0.47**	0.07*	0.19**	0.39**	0.29**	0.04	0.29**	0.28**	0.32**	-0.43**	-0.30**	-0.42**	0.44**	1			
(15) SWLS.3	0.38**	0.07*	0.15**	0.32**	0.34**	0.08**	0.35**	0.30**	0.37**	-0.43**	-0.42**	-0.42**	0.38**	0.62**	1		
(16) SWLS.4	0.35**	0.04	0.22**	0.34**	0.22**	0.09**	0.26**	0.23**	0.28**	-0.34**	-0.23**	-0.33**	0.37**	0.54**	0.55**	1	
(17) SWLS.5	0.25**	0.02	0.22**	0.28**	0.17**	-0.01	0.16**	0.21**	0.19**	-0.27**	-0.17**	-0.26**	0.32**	0.41**	0.43**	0.48**	1
(18) SWLS.TT	0.45**	0.05	0.26**	0.42**	0.33**	0.06*	0.33**	0.32**	0.36**	-0.47**	-0.32**	-0.45**	0.64**	0.79**	0.78**	0.79**	0.74**

MSPSS, Multidimensional Scale of Perceived Social Support; WLEIS, Wong and Law Emotional Intelligence Scale; BDI, Beck Depression Inventory-II; SWLS, Satisfaction With Life Scale; F, name of the factor; TT, total score, in the case of SWLS is each of the items; * $p \leq 0.05$ and ** $p \leq 0.01$.

the hierarchical (amount of variance attributable to one common factor for all of the items, see omegaH column) variants of the omega index. However, we also provide the Cronbach alpha index, in order to facilitate comparability with other studies (see **Table 1**). The reliability estimates for our Moroccan sample showed values similar to those observed in the original studies (see section “Measures”). Despite some of the scales have alpha values between 0.6 and 0.7, reflecting a questionable internal consistency (Hair et al., 2014; DeVellis, 2017), these values could also be a consequence of the small number of items that compose these scales (Cortina, 1993).

Once the adequacy of all the measures was verified, it was found that the measurement model that included all the constructs enunciated as latent variables (social support, depression, emotional intelligence, and satisfaction with life) showed a good fit to the data (see **Table 3**).

In addition, all the parameters associated with the definition of latent variables were significant, thus confirming their statistical relevance from the indicator variables. On the other hand, when the measurement model was estimated, the freedom to freely intercorrelate all the latent variables allowed us to rule out the presence of extreme interrelations among the latent traits (the interrelation of greater magnitude was 0.754 with an average of 0.590), thus avoiding possible problems of multicollinearity (see Byrne, 2009). In the original studies on which the present study is based, all the measures that showed factorial structure exhibited non-orthogonal factors (see section “Materials and Methods”), and those of the global measurement model, mentioned above, were programmed to allow the factors to be oblique. In this way, potential problems of interpretation of the structural model due to item parceling were discarded (see Bandalos and Finney, 2001).

Structural Model

To analyze the effect of emotional intelligence on well-being measures, life satisfaction and depression, we started with a general structural model that assumes the possible modulating effect through the interaction of emotional intelligence with social support (see **Figure 2**). The pathways that allowed us to test our hypotheses, with direct pathways as well as two-way pathways for moderation, were then added to this model.

The chi-square difference test indicated that model specifications significantly improved model fit [$\chi^2(2) = 7.32$, $p = 0.03$] compared to the initial measurement model. In addition, the parameters associated with modulation (see E.1 and E.2 pathways, **Figure 2**) also led to significantly improved model fit [$\chi^2(2) = 8.34$, $p = 0.02$] compared to the reference model that lacked such parameters. This starting model (**Figure 1**) provided a good fit to the data (see **Table 4**).

The results support the core idea of the statistical relevance of the possible modulating effects of emotional intelligence with social support. However, as shown in **Figure 2**, only the pathway from interaction to life satisfaction was significant (E2: $\beta = 0.125$, $se = 0.040$, $z = 3.120$, $p = 0.002$) but not the pathway to depression (E1: $\beta = -0.030$, $se = 0.037$, $z = -0.802$, $p = 0.422$). See details on the interactions in **Figures 3, 4**. A final model identical to the original model was defined, except for the omission of the non-significant emotional intelligence and support social interaction

TABLE 3 | Goodness of fit indices for the measurement models.

	χ^2 (df)	p	Ratio (<2)	Hoelter CN (>200)	CFI, IFI (>=0.95)	TLI, NNFI (>=0.95)	SRMR (<=0.08)	RMSEA [95% CI of RMSEA] (<=0.06)	Baseline RMSEA (>0.158)	AIC	Adj BIC	γ -Hat (>=0.95)	Adj γ -Hat (>=0.95)
MSPSS-3-Factor model	77.59 (32)	<0.001	2.42	768+	0.96+	0.95+	0.03+	0.03 [0.02–0.04]*	0.1471	12510	12575	0.99+	0.99+
WLEIS-4-Factor model	304.62 (86)	<0.001	3.54	455+	0.94	0.93	0.04+	0.045 [0.04–0.05]*	0.1719+	44189	44286	0.98+	0.97+
SWLS- Unidimensional	42.43 (5)	<0.001	8.49	332+	0.98+	0.96+	0.02+	0.08 [0.06–0.10]	0.3910+	20355	20384	0.99+	0.96+
BDI-II-2-Factor model	304.62 (86)	<0.001	3.54	455+	0.94	0.93	0.04+	0.045 [0.04–0.05]*	0.1719+	44189	44286	0.98+	0.97+
General model	298.15 (85)	<0.001	3.51	461+	0.95+	0.95+	0.04+	0.045 [0.04–0.05]*	0.1987+	64091	64158	0.98+	0.97+

MSPSS, Multidimensional Scale of Perceived Social Support; WLEIS, Wong and Law Emotional Intelligence Scale; SWLS, Satisfaction With Life Scale; BDI, Beck Depression Inventory-II; χ^2 , chi square; df, degrees of freedom; p, level of significance; CN, critical N; CFI, comparative fit index; IFI, incremental fit index; TLI, Tucker Lewis index; NNFI, non-normed fit index; SRMR, standardized root mean square residual; RMSEA, root mean square error of approximation; CI, confidence interval; AIC, Akaike information criterion; γ -Hat, gamma hat index; adj γ -Hat, adjusted gamma hat index. *Indicative that the RMSEA is significant at 0.05. In all variants, “+” is indicative that the statistic meets the recommended thresholds of good fit: $p(\chi^2) \geq 0.05$, $\chi^2/df \leq 2$, [GFI CFI, IFI, NNFI] ≥ 0.95 , SRMR ≤ 0.08 , and RMSEA ≤ 0.06 (Hu and Bentler, 1999), [γ -Hat, adj γ -Hat] ≥ 0.95 (Fan and Sivo, 2007), Hoelter CN > 200 (Kenny, 2015). These threshold values have been included together with the indices themselves to facilitate their interpretation.

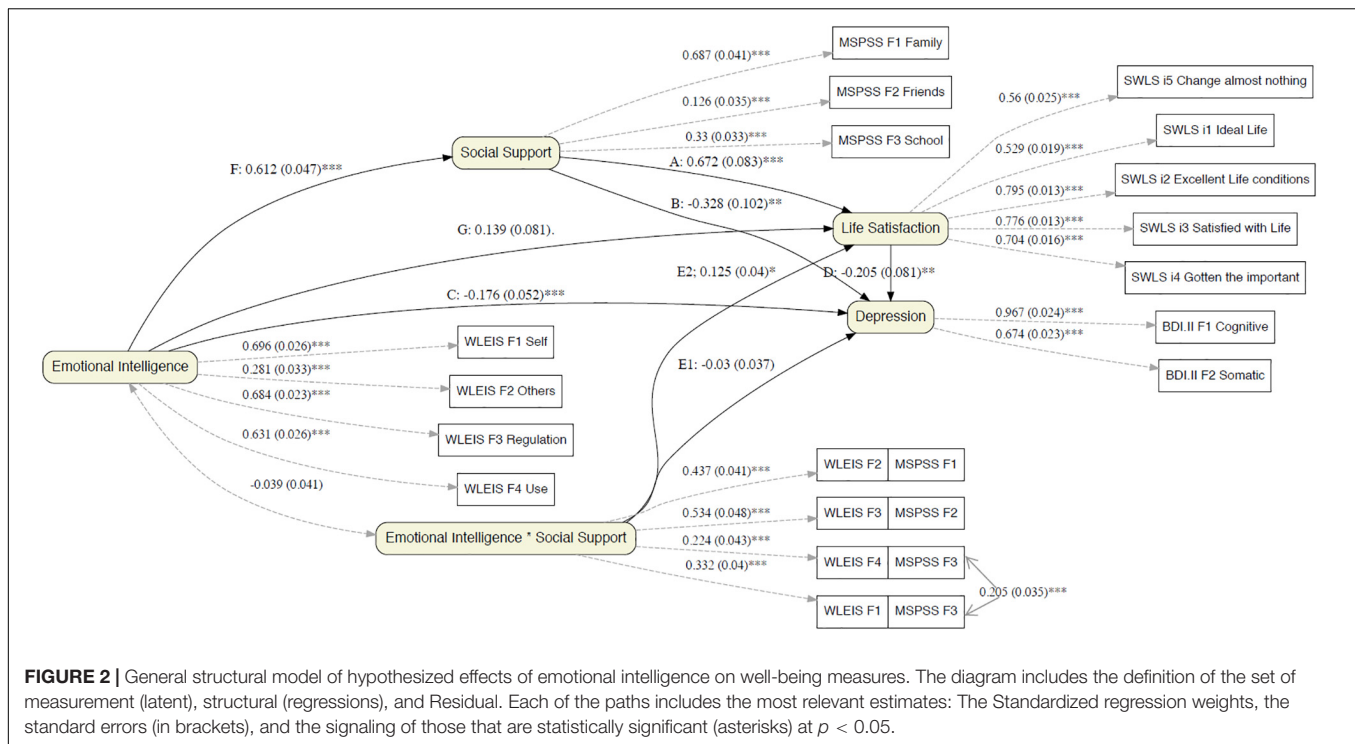


FIGURE 2 | General structural model of hypothesized effects of emotional intelligence on well-being measures. The diagram includes the definition of the set of measurement (latent), structural (regressions), and Residual. Each of the paths includes the most relevant estimates: The Standardized regression weights, the standard errors (in brackets), and the signaling of those that are statistically significant (asterisks) at $p < 0.05$.

in the prediction of the levels of depression (see **Figure 5**). This final model produced a good fit (see **Table 4**).

The final model adjustment is equivalent to the starting model of the interaction; if anything, general indicators improve. The analysis based on modification confirmed that there is no misspecification in any of the parameters included in the final model.

In sum, the results show that emotional intelligence has an effect on life satisfaction, both direct (despite not strictly significant but rather approaching significance; G pathway, $\beta = 0.144$, $se = 0.078$, $z = 1.847$, $p = 0.065$) and indirect (interacting with social support; E pathway, $\beta = 0.123$, $se = 0.039$, $z = 3.189$, $p < 0.001$). See effect in **Figure 3**. When emotional intelligence is low, the relationship between social support and life satisfaction is practically null and in fact the slope is not statistically significant ($\beta = 0.065$, $se = 0.219$, $z = 0.297$, $p = 0.767$), whereas with an intermediate value in emotional intelligence, a positive relationship emerges ($\beta = 0.594$, $se = 0.113$, $z = 5.232$, $p < 0.001$), and maximum levels of emotional intelligence enhance this relationship ($\beta = 1.122$, $se = 0.229$, $z = 4.894$, $p < 0.001$). The pathways between emotional intelligence and life satisfaction have the strongest effects. The results show both the influence of emotional intelligence on social support (F pathway, **Figure 5**: $\beta = 0.609$, $se = 0.046$, $z = 13.224$, $p < 0.001$) and of social support on life satisfaction (see A pathway, **Figure 5**: $\beta = 0.665$, $se = 0.080$, $z = 8.317$, $p < 0.001$).

Moreover, emotional intelligence also has an effect on depression, but it is exclusively a direct effect (C pathway, **Figure 5**: $\beta = -0.176$, $se = 0.050$, $z = -3.490$, $p < 0.001$). As mentioned above, a modulating effect was ruled out, but a timely mediational analysis allowed us to discard a mediation effect from

social support to the relation between emotional intelligence and depression ($\beta = -0.189$, $se = 0.820$, $z = -0.230$, $p = 0.818$). In fact, the graph in **Figure 4** reveals the parallelism between the slopes for the social support depression regression at different levels of emotional intelligence. The net effect of emotional intelligence is to decrease levels of depression (see the parallel negative regression functions of **Figure 4**). For the prediction of depression, it also affects social support (B pathway, **Figure 5**: $\beta = -0.309$, $se = 0.090$, $z = -3.443$, $p < 0.001$) according to a moderately high value. Finally, the two well-being variables are directly related (D pathway, **Figure 5**: $\beta = -0.223$, $se = 0.069$, $z = -3.261$, $p < 0.001$). In this sense, we ruled out the possible mediated effect of the association between EI and depression through satisfaction with life, as it was not significant ($\beta = -0.032$, $se = 0.138$, $z = -0.233$, $p = 0.816$), and the mediation effect from social support to depression through satisfaction was discarded ($\beta = -0.149$, $se = 0.586$, $z = -0.254$, $p = 0.800$). That is, all types of mediation from satisfaction to depression were discarded, either from EI or from social support.

DISCUSSION

Due to the importance that social support has on the prediction of satisfaction with life and depression in other subsamples, the interest of testing a model of relations in Moroccan adolescents is clear. Moreover, this study contributes by adding emotional intelligence as a protector variable for positive well-being (life satisfaction) and negative well-being (depression). For the sake of clarity in the following, we revise the results according to each hypothesis.

TABLE 4 | Goodness of fit indices for the measurements for the structural model.

	χ^2	df	p	Ratio (<2)	Hoelter CN (>200)	CFI, IFI, TLI, NNFI (>0.95)	SRMR (<0.08)	RMSEA [95% CI of RMSEA] (<0.06)	Baseline RMSEA (>0.158)	AIC	Adj BIC	γ -Hat (>=0.95)	Adj γ -Hat (>=0.95)
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χ^2 , chi square; df, degrees of freedom; p, level of significance; CN, critical N; CFI, comparative fit index; IFI, incremental fit index; TLI, Tucker Lewis index; NNFI, non-normed fit index; SRMR, standardized root mean square residual; RMSEA, root mean square error of approximation; CI, confidence interval; AIC, Akaike information criterion; BIC, Bayesian information criterion; γ -Hat, gamma hat index; adj γ -Hat, adjusted gamma hat index. *Indicative that the RMSEA is significant at 0.05. In all variants, "+" is indicative that the statistic meets the recommended thresholds of good fit: $p(\chi^2) \geq 0.05$, $\chi^2/df \leq 2$, [GFI CFI, IFI, NNFI] ≥ 0.95 , SRMR ≤ 0.08 , and RMSEA ≤ 0.06 (Hu and Bentler, 1999), [γ -Hat, adj γ -Hat] ≥ 0.95 (Fan and Sivo, 2007), Hoelter CN > 200 (Kenney, 2015). For details see note on Table 3.

Starting model 328.87 (143) 0.001 2.30 667+ 0.96+ 0.03+ 0.035 [0.03–0.04]* 0.1598+ 86326 86417 0.98+ 0.98+

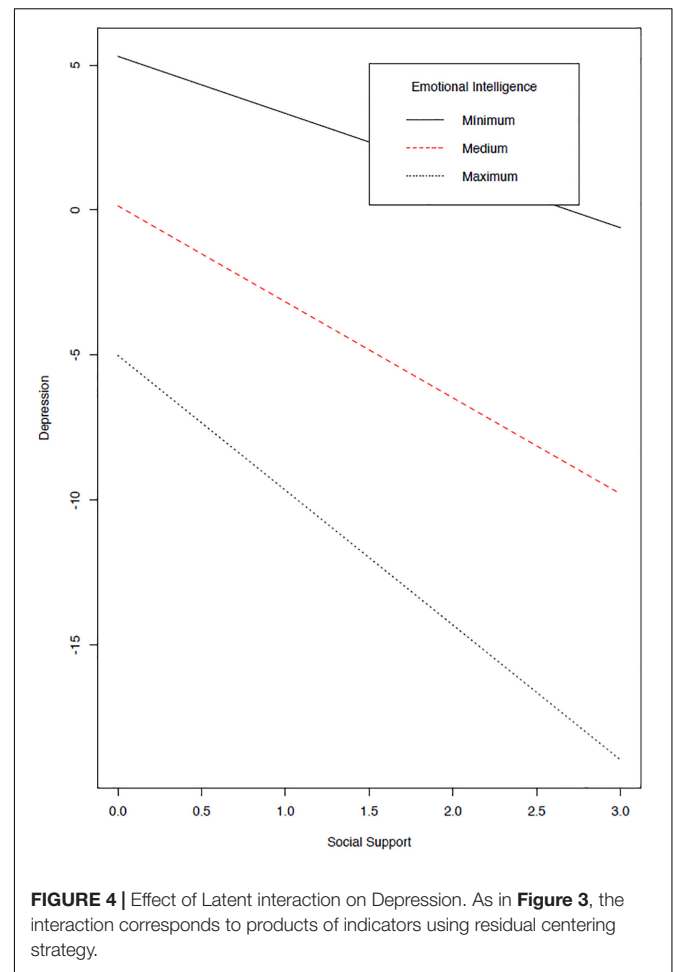
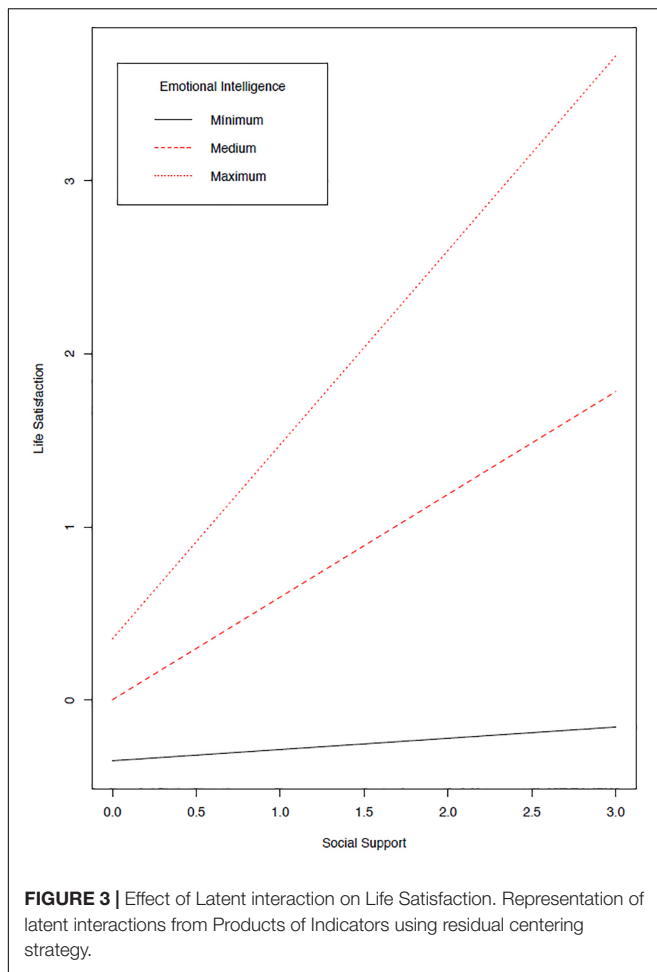
Final model 329.36 (144) 0.001 2.29 671+ 0.96+ 0.03+ 0.035 [0.03–0.04]* 0.1598+ 86325 86414 0.98+ 0.98+

Hypothesis 1, in which an inverse relationship between life satisfaction and depression was proposed, was supported by our results. Thus, in line with previous results in adults (Koivumaa-Honkanen et al., 2004; Boyraz et al., 2014) and adolescents (Huebner et al., 2000; Haranin et al., 2007; Lyons et al., 2014), our results show that levels of life satisfaction inversely predict levels of depression in Moroccan adolescents. The logic of this relationship could be based on the postulates of Beck's cognitive theory of depression (Beck, 1976), which asserts that the maintenance of a series of negative cognitive self-schemas (beliefs about oneself, life and the future), together with the presence of cognitive biases (i.e., attention, memory), increases an individual's vulnerability to depression in the future (Beck and Dozois, 2011). Thus, given that life satisfaction constitutes a global cognitive assessment (positive or negative to a greater or lesser degree) of individuals' lives, it is logical that adolescents who maintain negative vital evaluations are those with greater depressive symptomatology and vice versa. Some authors suggest that it would be during the first years of life when these self-schemas would be established as adverse events are experienced, thus determining, along with other variables, one's vulnerability to depression (Evans et al., 2005). This perspective would highlight the relevance of promoting adequate levels of life satisfaction to mental health in children and adolescents.

In hypotheses 2 and 3, we considered the relationship of social support with life satisfaction (positively) and depression (in a negative way). These relations are confirmed by the structural model obtained. Well-being is promoted by relations with other relevant people. This well-being implies a higher life satisfaction and a lower level of depression when social support is high. This is in agreement with previous results in other samples finding that social support increases the perceptions of well-being (Thoits, 2011) both directly and indirectly by reducing stress and other negative symptoms. Regarding depression, perceived social support protects against depression in adults (Santini et al., 2015), as well as in children and adolescents (Gariépy et al., 2016), but this study is the first to analyze this relation in a sample of Moroccan adolescents.

As for hypothesis 4, in which we predicted a positive relation between emotional intelligence and life satisfaction, the structural model confirms a significant positive relation. Our results coincide with previous works that have shown consolidated relationships between both constructs (Sánchez-Álvarez et al., 2016) and between emotional intelligence levels and the well-being of people in general (Zeidner et al., 2012). Adolescents with higher levels of emotional intelligence use adaptive strategies when dealing with uncomfortable or difficult situations (Mikolajczak et al., 2009b), which lead them to experience positive emotions when these strategies are appropriate and, similarly, to the management of negative emotions, which finally favors the preservation of a positive cognitive assessment of life in general (Palmer et al., 2002). As Schutte et al. (2002) stated, "those who are able to understand and regulate their emotions should be able to generally maintain a better outlook on life" (p. 770).

Regarding hypothesis 5, in which we predicted a negative relationship between emotional intelligence and depression, the results related to the adjustment of the model also confirm this



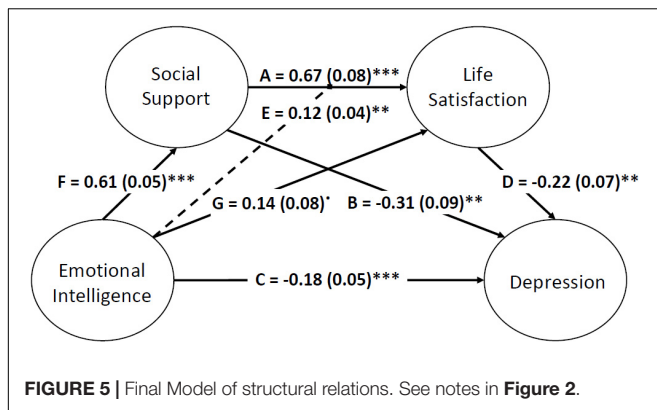
hypothesis and therefore coincide with previous studies carried out with adolescents (Balluerka et al., 2013; Resurrección et al., 2014). Surely, the most emotionally intelligent adolescents use more effective coping strategies, which would lead them to lower levels of depression (Davis and Humphrey, 2012). In addition, they cushion the negative effect that critical vital events have on psychological maladjustment (Cha and Nock, 2009).

Our results also confirm hypothesis 6, in which a positive relationship between emotional intelligence and social support was predicted. Different studies have found similar results (Ciarrochi et al., 2001, 2002b; Balluerka et al., 2013), showing the importance of emotional intelligence in the processes of social adaptation and in the development of interpersonal relationships (Lopes et al., 2003). In fact, it has been found that both self-report and performance measures of EI contributed to the explanation of social support beyond the effects of personality (Fabio and Kenny, 2012).

Results showed a significant interaction of emotional intelligence with social support in determining levels of life satisfaction was predicted in Moroccan adolescents, thus supporting hypothesis 7. This moderating role of emotional intelligence, in interaction with different environmental variables, has already been shown in previous studies (Ciarrochi et al., 2002a;

Slaski and Cartwright, 2003). Moreover, our results are in agreement with Gallagher and Vella-Brodrick (2008). They showed, in adults, that high levels of emotional intelligence contributed to the maintenance of high levels of well-being. Emotional intelligence, taking into account that social support is a buffer for stress and positively correlates with well-being (Malecki and Demaray, 2006), would contribute to the development of coping strategies that would ultimately preserve and enhance levels of life satisfaction.

The results of the adjustment of the model do not confirm an interaction of the emotional intelligence with the levels of social support in the explanation of the levels of depression in Moroccan adolescents. This implies that hypothesis 8 was not supported. Thus, alternative ways of action to those proposed by Gallagher and Vella-Brodrick (2008) should be considered. Beyond the effect that emotional intelligence can exert on levels of depression from its direct effects on levels of satisfaction with life, a mediational model in which emotional intelligence acts directly and indirectly (through its effect on levels of social support) on the levels of depression of adolescents is neither confirmed by the structural model tested in this study. This mediational model has been successfully tested in other studies (Zeidner and Matthews, 2016), confirming the key role of social support as a factor that



mediates the relationships between emotional intelligence and mental health. Moreover, it distinguishes the social function that emotional intelligence has (Zeidner et al., 2016). However, the adjustment of our data to the structural model does not confirm the mediational role of social support.

In sum, our hypotheses are mainly supported. As shown in **Figure 5**, life satisfaction and depression, as well as social support and depression, are negatively related. Thus, the higher one's life satisfaction and social support are, the lower his or her depression. Moreover, emotional intelligence has a direct effect on life satisfaction and interacts with social support. This finding implies that higher levels of emotional intelligence are related to a higher level of social support, and the greater the social support is, the greater the life satisfaction. Furthermore, emotional intelligence and social support separately also have direct effects on depression. Finally, social support also buffers depression, but there is no interaction effect.

These results are in agreement with those found in other samples showing that social support and emotional intelligence play a protective role in depression and the cognitive component of subjective well-being (life satisfaction). However, the analysis of their behavior in Moroccan adolescents is of great interest due to the contributions that these results have on the development of the educational Moroccan system. Education has been one of the main concerns of Moroccan authorities, given its impact on the formation of future generations and their access to an active life, along with their contribution to the growth of the country. As an example of this importance of education, the percentage of illiteracy has dropped from 54.9% in 1982 to 36.7% in 2012. Furthermore, the budget for education comprised 22.5% of the total budget in 2018, which was an increase of 9% from 2017 (Ministère de l'Economie et des Finances, 2018). These advances must be accompanied by improvements in quality. These improvements can be made in two major areas: cognitive and emotional development. The former has received a special emphasis to the detriment of the latter, which has been almost forgotten by educational practitioners. However, despite the need for the international recognition of emotional abilities in educational programs (Organisation for Economic Co-operation and Development, 2018), the lack of training of Moroccan teachers in this regard makes it impossible to implement them.

Furthermore, the absence of standardized instruments in Arabic to evaluate the variables of interest makes it difficult to know how the variables relate. This study fills this gap by adapting and further analyzing several scales with Moroccan samples of adolescents and by proposing and verifying a relational model that can help researchers and teachers to more precisely clarify these relations according to their context. For example, for interventions in families and in schools, social support may be a fruitful goal, as research on the mediating role that depression can play in academic outcomes suggests important secondary benefits to depression prevention programs in school settings (Rueger et al., 2016). The same can be said about interventions that include emotional intelligence, as both variables have shown to be protective resources against depression, in addition to their beneficial effects on life satisfaction. The enhancement of protective factors, such as social support and emotional intelligence, promotes healthy youth development, thus creating healthier societies in the future.

However, despite the contribution of this study related to its analysis of a Moroccan sample of adolescents and its testing of a model of relations in which we prove that social support and emotional intelligence are protective factors of well-being, positively in increasing life satisfaction and in reducing depression, this study is not absent of limitations. The data collection process occurred much more slowly than expected. The participants were not accustomed to responding to questionnaires, and thus, they had difficulty in understanding the response procedure. To reduce the impact of this lack of knowledge, surveyors were instructed to remember the manner of response to Likert scales and the meaning of the anchors. Moreover, the neutral anchors were suppressed to reduce the acquiescence response style, as suggested by previous studies (i.e., El Rhazi et al., 2009). Another limitation is related to the absence of control of other dimensions as personality or cognitive abilities that have been related to emotional intelligence. In fact, we tried to control the influence of cognitive abilities (see Brackett and Mayer, 2003) by including the test RAVEN widely used to assess general intelligence. However, in this study, results discarded the possibility of interpreting the results observed in structural models through variation with cognitive factors.

Finally, our study is the cross-sectional design. Thus, in the future, longitudinal studies could allow for the examination of the benefits of the development of these personal variables, such as social support and emotional intelligence, to increase life satisfaction and to reduce depression in adolescents.

DATA AVAILABILITY

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

ETHICS STATEMENT

Ethical permission was obtained from the Department of Psychology and approved by the Committee at the Faculty of

Letters and Human Sciences-Dhar el Mehraz of the University of Sidi Mohamed Ben Abdellah in Fez (Morocco). Once the researches received the permission to conduct the study, they applied for permission to the responsible of the Regional Academy of Education and Training, to allow the access to public schools. The administrative and education officials approved the questionnaire and procedure to be administered at public schools and gave the researches a letter to be presented at schools. In each school an internal committee composed by the school personnel informed the families and obtained their verbal consent.

AUTHOR CONTRIBUTIONS

EL-Z, MP-M, KE, JA-L, and BZ conceived and designed the study. BZ, KE, and SA adapted the scales to Moroccan, trained the surveyors, and collected the data. DC-D processed the data and helped with the references. MMR-Á carried out the measurements and data analyses, contributed to the conceptual

model, and interpreted the data. EL-Z, MP-M, MMR-Á, JA-L, KE, OL-R, and DC-D drafted the manuscript. EL-Z integrated and coordinated the study. All authors provided substantial contributions to the work and critically revised the manuscript, approved its final version, and agreed to be accountable for all aspects of this work and its integrity.

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Bullied Adolescent's Life Satisfaction: Personal Competencies and School Climate as Protective Factors

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Although adolescence has been defined as a stage of vulnerability, due to the biopsychosocial changes that happen throughout this developmental stage, it is also one of growth. Some of the core personal competencies that have been identified to promote positive development at this stage while simultaneously preventing risks are: (1) a positive sense of self, (2) self-regulation, (3) decision-making skills, (4) a moral system of belief, and (5) prosocial connectedness. There are many factors and contexts that influence adolescent development. The school climate, for example, has the capacity to promote positive development and life satisfaction, yet on the other hand, it is a context within which different forms of violence, such as bullying, can occur. The principal aim of this study, therefore, is to analyze the influence that bullying has on one's life satisfaction, while taking into account participants' socio-demographic characteristics (i.e., gender and developmental stage), their core personal competencies (i.e., problem solving strategies, empathy, emotional repair, self-esteem, and values), and the school climate. To obtain data, a hierarchical regression analysis was conducted with a sample of 647 Spanish students (53.3% female), ranging in age from preadolescence (10–13 years old; 60.3%) to mid-adolescence (14–18 years old; 39.7%), and belonging to diverse socio-economic contexts (15.3% rural) and schools (32.1% public). After gaining informed consent from both the participants and their parents, students completed the survey voluntarily, and under anonymity. Initially results show that gender, developmental stage, and having been bullied were predictors of participants' levels of life satisfaction. When the core personal competencies were also considered in data analysis process, self-esteem, emotional repair, and social values were those demonstrating significant effects on one's life satisfaction; moreover, being bullied was a significant predictor too. Finally, after taking school climate into account, only this variable as well as self-esteem and emotional repair were significant predictors of life satisfaction: the other assessed variables were no longer found to be significant predictors (i.e., gender, developmental stage, being bullied, and social values). These results have important implications for education objectives, methodologies, and school functioning: school climate, self-esteem and emotional repair seem to be particularly important for promoting student life satisfaction and for preventing the negative consequences associated with being bullied.

Keywords: life satisfaction, bullying, personal competencies, school climate, adolescence, self-esteem, emotion regulation, well-being

INTRODUCTION

There is a certain consensus in the consideration of subjective well-being as a complex and multidimensional construct created from perceptions, evaluations, and aspirations about one's own life (Casas, 2011; Kaye-Tzadok et al., 2017). It includes cognitive and affective assessments of people in respect to their own lives, the circumstances affecting them, and the contexts in which they live (Savahl et al., 2018). Subjective well-being can be measured across multiple domains (Campbell et al., 1976; cited in Casas et al., 2014). Among these, life satisfaction expresses the most cognitive component (Kaye-Tzadok et al., 2017), with subjective well-being being the facet on which most research has been focused (Ben-Arieh et al., 2017). Such cognitive and affective evaluations are affected by life circumstances and the social context in which people are living (Savahl et al., 2018).

Despite the increase in publications in recent years about subjective well-being, the amount of research conducted on adolescents is far from the volume of evidence collected on adults (Casas, 2011; Ben-Arieh et al., 2017); also worth noting is that when researching adolescence, more attention has been paid to deficits, risks and problems than to positive development, and growth at this stage (Gademann et al., 2010). Nonetheless, available data consistently show negative relationships between personal well-being and life satisfaction with respect to adolescent problem behaviors, aggressive behavior, or adaptation to school (Lent et al., 2009; Valois et al., 2009). Although the previous studies' results are inconclusive, a significant decrease in reported levels of life satisfaction between the ages of 11 and 16 (Casas, 2011) can be noted. This could be related to the multiple changes that occur throughout this developmental stage. Females report lower levels of life satisfaction than males, particularly in reference to appearance, bodies, health, free time, and self-confidence (Kaye-Tzadok et al., 2017).

There are various approaches to the relationship among subjective adolescent well-being, personal or social competencies, and the school context. For instance, Guerra and Bradshaw (2008) state that adolescent healthy adjustment is related to five core personal competencies: a positive sense of self, self-control, decision-making skills, a moral system of belief, and prosocial connectedness; in addition, they point out that their promotion "provides a connection between positive youth development and risk prevention programming" (p. 1). Along the same line, previous studies framed in the context of adolescent positive development or in the study of their strengths (see Scales et al., 2016) tend to identify internal and external factors labeled strengths or assets, which play a protective role by increasing the probability of developing healthy trajectories in adolescence (Curran and Wexler, 2017). Internal factors include future expectations, self-control and decision-making (Curran and Wexler, 2017), social competence, positive values, self-esteem, and self-regulation (Calmeiro et al., 2018). The relationship between empathy and well-being has scarcely been demonstrated in studies with youth (Shanafelt et al., 2005) and adolescent subjects. In their work regarding assets and subjective quality of life, Valois et al. (2009) indicate that adolescents with lower levels of empathy present lower

levels of life satisfaction. Recently, Taylor et al. (2017) have organized these competencies more systematically into self-awareness (e.g., recognition of emotions and values), self-management (e.g., emotional regulation), social awareness (e.g., empathy), relationship skills, and responsible decision making. These competencies appear to be related to success in both school and life in general. Some of these variables have come to light in studies on resilience as well, highlighting factors that could facilitate adolescent adaptation despite their having lived through extreme risk situations, such as violence (Hinduja and Patchin, 2017). Few studies, however, explore the relationship between these competencies and life satisfaction (Valois et al., 2009). Among the contextual variables, we know that school climate is considered to be one of the most significant predictors of student psychological adjustment in general (Voight and Nation, 2016), specifically related to the social climate. Schools that promote the positive development of their pupils are characterized by their ability to facilitate positive links between pupils and teachers. This is done by promoting a climate of affection and security with clear rules and limits via affective proximity in interpersonal relations, and finally by fostering student participation and a feeling of belonging to the center, thereby generating opportunities for the development of personal, and social-emotional skills (Oliva et al., 2011b; Portugal and Hernando, 2015). It is associated with adolescent well-being, academic outcomes, lower levels of bullying behavior, and positive attitudes toward interpersonal violence (Bradshaw et al., 2013; Espelage et al., 2014; Low and Van Ryzin, 2014; Benbenishty et al., 2016; Konishi et al., 2017; Rezapour et al., 2019). In turn, the results show that improvements made to the school climate correspond to greater awareness of the issue of bullying (Waasdorp et al., 2012), whereas a perceived hostile school climate corresponds to less intervention in bullying situations (Yoon et al., 2016).

We are aware, on the other hand, that subjective well-being can be affected by various situations experienced by adolescents, including school victimization (Savahl et al., 2018; Zych et al., 2018; Varela et al., 2019). Bullying is defined as "a phenomenon of intentional aggression by one or more persons upon another or others in a way that is both repeated and maintained over time, and in which a power imbalance exists between the aggressor and the victim" (Olweus, 1993, p. 9). There are developmental variations in bullying behaviors: its prevalence seems to increase in late elementary school, peak in middle school, and decline in high school, although certain forms, such as cyberbullying may increase in high school (Olweus, 1993; Bradshaw et al., 2007). Research carried out in recent decades shows that bullying significantly affects the health of victims. Menesini and Salmivalli (2017) have reviewed a number of studies carried out in different countries: the results show negative physical, psychological, relational and general well-being consequences, and highlight the relationship between these and poor school achievement, loneliness, and the internalization of problems. The deterioration of mental health in victims of bullying is especially reflected by an increased risk of anxiety and depression (Ttofi et al., 2011; Evans and Smokowski, 2015), as well as behavioral difficulties such as increased criminal behavior (Sapouna and Wolke, 2013).

The study of bullying in relation to perceived life satisfaction has only recently begun to be addressed. Available results show that bullying tends to have a negative impact on subjective adolescent well-being: lower levels of life satisfaction tends to be observed in adolescents who have suffered cyberbullying as opposed to those who have not been bullied (Arnarsson et al., 2019), as well as lower average levels of well-being in preadolescent bullying victims, with victimization being the variable posing the greatest negative impact to well-being (Alcántara et al., 2019). Similarly, Savahl et al. (2018) show the negative relationship between subjective well-being and bullying in preadolescents from different countries.

Recently, some studies have incorporated the analysis of the protective role that contextual and personal variables play on the well-being of bullied adolescents, as stated in the review study carried out by Zych et al. (2019). Among the personal variables studied, Casas et al. (2015) point out to the role of emotional intelligence as a possible protective factor against face to face bullying, finding that high levels of emotional attention and low levels of clarity and reparation are able to anticipate victimization. Likewise, Elipse et al. (2012) found that victims exhibited higher levels of emotional attention and lower levels of emotional reparation. These results do not appear to be conclusive given that subsequent studies found no significant differences with respect to clarity and emotional reparation, though greater emotional attention was in fact observed among victims of bullying (Beltrán-Catalán et al., 2018). Personal factors such as prosocial connectedness, self-esteem, self-concept, and decision-making skills are pointed out as protector variables against victimization in the review study of 18 meta-analyses (Zych et al., 2019). Jackson et al. (2017) point out the complex relationship between protective factors and victimization, emphasizing the interaction that exists between individual, and contextual factors. Factors such as gender and personality type could mediate the relationship between individual protective factors and being bullied. Overbeek et al. (2010) highlight the protective role that self-esteem plays in victims of bullying, though this is mediated by the personality type of the adolescent – presenting as a predictor for over-controlling adolescents. The results of Sapouna and Wolke (2013) indicate that a high self-esteem and a high social connection are related to emotional and behavioral resilience in adolescent victims of bullying; in addition, males demonstrate greater emotional resilience while females demonstrate greater behavioral resilience. There are even fewer results regarding the protective role that empathy could potentially play among victims of bullying. The results regarding the association between empathy and the role of the aggressor have been contradictory (Jolliffe and Farrington, 2006), although most studies conclude that there is no relationship between representing high levels of empathy and being bullied (Zych et al., 2019). Moreover, while there are more studies focused on risk factors that lead to bullying, studies attempting to highlight the core personal competencies as protective factors against bullying in adolescence are rather limited in current literature (Méndez et al., 2017; Zych et al., 2018).

Among the contextual variables, the protective role of the school climate as it relates to the well-being of adolescent victims

of bullying has been addressed. Miranda et al. (2019) show how the support received from adults within the context of the home and school allows for improved levels of well-being in adolescent victims of bullying, as opposed to those who perceive less support. This is especially true when the support, or lack thereof, stems from the family nucleus. Other results show that regardless of the school climate, being a victim of bullying in adolescence is associated with lower levels of well-being as compared to those who have not experienced this situation, although general well-being is lower in adolescents who perceive the school climate to be worse (Alcántara et al., 2019). The complex relationship between school climate and bullying does, nevertheless, need to be clarified (Bradshaw et al., 2013; Acosta et al., 2019).

In conclusion, although the personal competencies and school climate can play an important role in fostering well-being, at present there are still very few results on the extent of the protective role they play in the subjective well-being of adolescent bullying victims. In this paper we explore the approach to core personal competencies based on Guerra and Bradshaw's (2008) proposal, which defines five basic competencies essential for healthy adjustment in adolescents: a positive sense of self, self-regulation, decision-making skills, a moral system of belief, and prosocial connectedness. The central assumption is that those who are more skilled in self-management and interpersonal relationships would be less willing to be involved in risky behaviors throughout childhood and adolescence (Tolan et al., 2016). Although school climate dimensions may be organized differently in the various theoretical approaches (Konishi et al., 2017), in this study it will be considered from a more social perspective, including only the most common dimensions that have been found to be closely related to academics, sociability, physical security and affective bonding, and well-being in early adolescence (Lester and Cross, 2015).

Currently, it is not yet clear what role school climate may have on the subjective well-being of adolescent bullying victims, particularly when taking into account the personal competencies of adolescents. Research underlines, on the one hand, that academic proficiency is important for positive adolescent development, yet on the other hand, it highlights that such proficiency is negatively associated with greater internalized, and externalized problems throughout this stage (Perteval et al., 2010). Despite this, few studies look specifically at these findings in relation to subjective well-being and school violence, or more specifically, in relation to bullying. Existing research does not consider, furthermore, what happens during preadolescence. That is to say that early adolescence and preadolescence are not incorporated into the research, which is especially remarkable considering that research on bullying and cyberbullying is extensive both nationally and internationally.

Taking the background into account, this research aims to analyze the impact that being bullied has on the life satisfaction of a sample of students between 10 and 18 years old. In addition, given that they would undoubtedly influence life satisfaction, certain variables will be also taken into account: the socio-demographic characteristics (i.e., gender and developmental stage) of select participants, certain personal factors (i.e., the core personal competencies: problem solving strategies, empathy,

emotional repair, self-esteem, and values), as well as one contextual factor (i.e., the school climate).

MATERIALS AND METHODS

Participants

A total of seven Spanish schools selected by incidental sampling participated in the study with the following socio-economic environments taken into consideration: rural (15.3% of the sample), semi-urban (42.1%), and urban (42.6%). The sample is composed of a total of 693 students (mean age: 12.98, SD: 1.78) from the last cycle of primary education (10–13 years; 60.3% preadolescents) and secondary education (14–18 years; 39.7% adolescents), balanced by gender (women: 53.3%; men: 43.8%).

Instruments

Socio-Demographic Questionnaire

Gender, course, and date of birth were first asked to fill.

European Bullying Intervention Project Questionnaire (EBIPQ; Ortega-Ruiz et al., 2016)

This is an instrument composed by 14 items to measure bullying: half evaluate aggressions suffered as a victim (bullied) and the other half those committed as an aggressor (buller). The items refer to aggressions such as hitting, insulting, threatening, stealing, profanity, exclusion, or the spreading of rumors. The elements present a response modality that graduates the frequency of occurrence of the behaviors that took place in the last 2 months (0 = Never; 1 = Yes, once or twice; 2 = Yes, once or twice a month; 3 = Yes, about once a week; and 4 = Yes, more than once a week). In this work we have only used the victim variable. The reliability of this instrument in the validation study was adequate as it was in this study ($\alpha = 0.80$).

Social Attitudes and Cognitive Strategies (SACS; Moraleda et al., 2004)

This instrument evaluates 9 social attitudes and 10 social thinking strategies among 12–17 year old students. Within the strategies of social thinking, we have used a comprehensive score to measure decision making skills, more specifically, problem solving strategies, which is derived from four subscales corresponding to the four steps of the process: observation and retention of relevant information regarding social situations, search for alternative solutions to resolve social conflict, anticipation, and understanding of the consequences that may result from social behavior, and selection of appropriate means for the ends pursued in social conduct. The adolescents indicated via a 7-point likert scale the extent to which they agree with the content of the sentence. The original study showed adequate reliability across the board as it did here ($\alpha = 0.82$).

Basic Empathy Scale (BES; Jolliffe and Farrington, 2006)

In order to assess prosocial connectedness, the scale selected for this study is the 9-item shortened version of the original 20-item scale, that was validated for use in the Spanish adolescent

population by Oliva et al. (2011a). The items are distributed in two scales, one corresponding to affective empathy, comprised of four items; and another corresponding to cognitive empathy with the remaining items. Adolescents responded on a 5-point likert scale based on the extent to which they agree with the proposed statements. The internal consistency of the validation complies with satisfactory psychometric properties, here the reliability to affective empathy ($\alpha = 0.77$) and cognitive empathy ($\alpha = 0.73$), and to full scale ($\alpha = 0.79$) seem adequate.

Trait Meta Mood Scale (TMMS; Salovey et al., 1995)

This twenty-four-item questionnaire is designed to assess the behavioral trends and perceptions that people have regarding their ability to deal with emotions, the clarity with which they perceive those emotions, and their ability to repair their emotional states. In this study we have used only the reparation of negative emotional states subscale (e.g., "Although I feel bad, I will do my best to think happy thoughts") to assess self-regulation competence. Subjects had to assess each assertion about themselves with a likert scale of 1–5 that represents their level of agreement with each item. The scale has been adapted and validated for a Spanish adolescent population (Salguero et al., 2010), and it has demonstrated adequate internal consistency. The alpha reliability of emotional repair subscale in this study was 0.84.

Rosenberg Self Esteem Scale (RSS; Rosenberg, 1965)

The Spanish teen adaptation of Atienza et al. (2000) has been used, exhibiting adequate psychometric properties. It consists of 10 items which evaluate the overall assessment of positive sense of self, specifically self-esteem as it relates to feelings of respect, and acceptance of oneself (e.g., "I am capable of doing things as well as other people") which are scored using a 4-point likert scale according to the extent of accordance. Its reliability in this study, as well as in the original version, was adequate ($\alpha = 0.83$).

Values for Adolescent Positive Development Scale (VAPDS; Antolín et al., 2011)

This scale assesses participants' moral system of belief through asking the importance that adolescents attach to a set of values associated with positive development at this stage. It consists of 24 items grouped into 8 subscales: social commitment, prosociality, justice and equality, honesty, integrity, responsibility, social recognition, and hedonism. These are further grouped into three scales: social values, personal values, and individualistic values. The students had to answer by means of a 7-point likert scale indicating the degree of importance they attach to each sentence (1 = not at all important, 7 = extremely important). In the original study, adequate reliability and validity of the scales was achieved, as well as in this study (α were 0.88, 0.84, and 0.77, respectively).

School Climate and Functioning Scale (SCFS; Oliva et al., 2011a)

The version which measures student perception has been used. This likert-7 scale (i.e., 1 = totally false, 7 = totally true), is made

up of 30 items that measure four factors related to the climate and functioning of the school: climate, which includes the degree to which pupils perceive the relationships among peers as good, and the perception of the school climate as safe (e.g., "there is a good rapport among everyone in this school"); links, which, on the one hand, assess the degree to which students have a feeling of belonging and satisfaction with their school and, on the other hand, assess perceived teacher support (e.g., "teachers are available to address each student's individual doubts"); clarity of norms and values that, on the one hand, analyses the degree to which students perceive the limits to be clear with regard to existing school norms, and, on the other hand, quantifies the perception of coherence in the promotion of school values on the part of teachers (e.g., "all students know the limits and rules that must be respected in this centre"); and empowerment and positive opportunities, which involves valuing the school's resources and facilities as opportunities, offering activities aimed at the students along with their perception of the influence these activities have on the life of the school, or of participation being fostered (e.g., "when there is a conflict, students have an opinion and participate in its resolution"). The instrument allows the use of either a global score (i.e., the average of scores across the four factors), or multiple scores applied from the individual factor: in this work the former was chosen. In its original version, the said global factor obtained high reliability as it is in our study ($\alpha = 0.79$).

Personal Well-Being Index (Cummins et al., 2003)

This scale is made up of seven items of which a person uses an eleven-point scale (where 0 = completely dissatisfied and 10 = completely satisfied) to evaluate, in a relatively generic and abstract way, degree of satisfaction with a given aspect of life. A global life satisfaction factor is obtained, in this case by averaging the scores. It has been tested with a Spanish population beginning at 12 years of age, and demonstrates good psychometric properties (see Casas et al., 2011) as it was in this study ($\alpha = 0.86$).

Procedure

The study was carried out in accordance with the Declaration of Helsinki. Ethics approval was obtained from the University of Cantabria Research Projects Ethics Committee. Data was collected upon obtaining informed and written consent from all participating student's parents and the students themselves. Throughout the course of a 50-min classroom session and in the presence of a researcher, the students were reminded of the study objectives and were asked to voluntarily and anonymously fill in the various questionnaires, acknowledging that they would be free to withdraw from the study at any time. All the instruments used have proved to be valid and reliable within the Spanish population, both in their original version and in their adaptations, when applied.

Data Analysis

A correlational study was carried out with the aim of finding results according to the proposed objectives. We first proceeded to dichotomize the variable of the victim of bullying to distinguish

the students who had not suffered bullying (71.6%) from those who had (28.4%). This variable has been categorized using the third quartile, which implies that it has been scored at least in two items and in the case of one of them, with high frequency (4 or 5), or in five items with minimal frequency (2), in line with expert consensus on frequency of occurrence (Nansel et al., 2001; Solberg and Olweus, 2003; Volk et al., 2006; quoted in Díaz-Aguado et al., 2013). We then proceeded to standardize those variables measured with Likert scales using the z-score formula. Comparing scores is easier in this way, given that different scales were used in their measurement. Cohen et al. (2003), furthermore, have recommended this procedure to carry out hierarchical regression analysis in order to maintain unambiguous interpretations of the effects. After the descriptive analyses, we carried out correlation analyses depending on the type of variable used, identifying correlations among the variables being studied that proved significant (**Table 1**). Of the correlation analyses selected were: Pearson (relationship between linearly related variables), Biserual-punctual (conducted with the Pearson correlation formula with the exception that one of the variables is dichotomous) or Phi (relationship between two dichotomous variables). A hierarchical step-by-step regression analysis was then carried out (Gelman and Hill, 2006) to determine the effects the different variables studied had on life satisfaction (criterion variable). In the first step, developmental stage, gender, and being bullied were introduced. In the second step, the core personal competencies were inserted: problem solving strategies, empathy (affective and cognitive), emotional repair, self-esteem, and values (social, personal and individualistic). Finally, school climate was entered in the third step.

RESULTS

Preliminary Analysis

Table 1 presents the correlations among the variables of the study. As expected, life satisfaction correlates positively and significantly with the core personal competences with the exception of affective empathy, with which no significant relationship was found. As for the correlations between the variables that make up the core personal competences (i.e., problem solving strategies, cognitive, and affective empathy, emotional repair, self-esteem, social, personal, and individualistic values), all were found to relate positively and significantly to each other, with the exception of problem solving strategies which was found to be negatively related to affective empathy and individualistic values, and had no relation to cognitive empathy, social, or personal values. Affective empathy showed no association with self-esteem, nor was a relation established between cognitive empathy, and individualistic values.

On the other hand, the stage presents a significant and negative relationship with that of problem solving strategies, emotional repair, self-esteem, social values, climate, and personal well-being: older participants present lower scores in these variables. Gender, on the other hand, is significantly and positively related to problem solving strategies, affective and cognitive empathy, and social and personal values. This means

TABLE 1 | Correlations and descriptive statistics of study variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Developmental stage													
2. Gender	0.09*												
3. Bullied	-0.05	0.02											
4. Problem solving	-0.08*	0.10*	-0.17***										
5. Affective empathy	-0.03	0.28***	0.05	-0.08*									
6. Cognitive empathy	0.03	0.15***	0.08*	-0.04	0.41***								
7. Emotional repair	-0.19***	-0.10*	-0.07*	0.09*	0.17***	0.28***							
8. Self-esteem	-0.16***	-0.06	-0.27***	0.25***	-0.01	0.10*	0.44***						
9. Social values	-0.17***	0.14***	-0.05	0.04	0.36***	0.33***	0.34***	0.10**					
10. Personal values	-0.05	0.13**	-0.09*	-0.01	0.23***	0.28***	0.28***	0.20***	0.67***				
11. Individualistic values	-0.02	-0.01	0.09*	-0.30***	0.10**	0.07	0.15***	0.11**	0.29***	0.37***			
12. School climate	-0.26***	-0.06	-0.23***	0.12**	0.09*	0.13**	0.34***	0.37***	0.32***	0.34***	0.11**		
13. Life satisfaction	-0.15***	-0.08*	-0.22***	0.12**	0.07	0.14***	0.42***	0.56***	0.22***	0.22***	0.15***	0.46***	
Mean	0.40	0.55	0.28	0.00	0.00	0.01	-0.00	-0.01	0.01	0.01	0.01	0.01	-0.00
SD	0.49	0.50	0.45	0.99	1.00	1.00	0.99	0.98	1.00	0.99	1.00	1.00	0.98

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Developmental stage (0, preadolescence; 1, adolescence), gender (0, male; 1, female) and bullied (0, not bullied; 1, bullied) are dichotomized variables, the scores of the other variables were rescaled using the z-score formula. These standardized variables have a mean of zero and a SD of 1.

that females score higher in these variables. Gender showed a significant and negative relationship as well with emotional repair and life satisfaction; with males scoring higher in both variables in this case. As for being a victim of bullying, the significant and negative correlation with problem solving strategies, emotional repair, self-esteem, personal values, school climate and personal well-being can be seen, with those who have suffered bullying being the ones who score the lowest among these variables. In addition, being a victim of bullying correlates significantly and positively with cognitive empathy and with individualistic values; that is, bullying victims score higher on cognitive empathy, and individualist values.

Regression Analysis

A hierarchical regression analysis has been performed to predict life satisfaction. The main effects of this stage, gender and bullying, were the predictor variables in the first step. In the second step, variables related to personal competencies (i.e., problem solving strategies, cognitive and affective empathy, emotional repair, self-esteem and personal, social, and individualistic values) were added to the regression. In step 3, the school climate variable was introduced. The results are presented in **Table 2**.

Step 1 shows that greater life satisfaction is predicted by not having been bullied, being preadolescent, and being male. The variables in step 2 explain an additional 28% of the variance in life satisfaction: both emotional repair and self-esteem as well as social values have the expected positive effect on life satisfaction. Finally, the results of step 3 indicate that, when the school climate is taken into account in the life satisfaction prediction, only the positive effects of emotional repair and self-esteem remain consistent, while the effects of the stage in question, gender, not having been bullied, and even social values appear to have

TABLE 2 | Hierarchical multiple regression analysis: Standardized regression coefficients.

Predictor variable	Life satisfaction		
	Step 1	Step 2	Step 3
Developmental stage (0, preadolescence; 1, adolescence)	-0.15***	-0.04	-0.01
Gender (0, male; 1, female)	-0.07*	-0.06	-0.05
Victim (0, not bullied; 1, bullied)	-0.22***	-0.10**	-0.06
Problem solving		-0.01	-0.02
Affective empathy		0.02	0.01
Cognitive empathy		0.02	0.02
Emotional repair		0.14***	0.11**
Self-esteem		0.43***	0.38***
Social values		0.11*	0.08
Personal values		0.01	-0.04
Individualistic values		0.05	0.05
School climate			0.26***
R^2	0.03	0.36	0.41
R^2 change	0.08	0.29	0.05

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

vanished. The complete model explains 41% of the variance in life satisfaction.

DISCUSSION

This paper was focused on predicting life satisfaction of students (male and female) enrolled in compulsory education (the last cycle of primary education, preadolescents; and secondary education, adolescents), who could have suffered from bullying. With this purpose, the predictive power of some personal factors (i.e., five core personal competencies: problem solving strategies, empathy, emotional repair, self-esteem, and values) and some contextual ones (i.e., the school climate), was analyzed. All these factors are known to be essential to healthy adjustment (Guerra and Bradshaw, 2008; Voight and Nation, 2016). Nonetheless, as previously stated, no strong line of research exists in regards to the multidimensional approach proposed by Guerra and Bradshaw (2008). For instance, there little research has been conducted on the core personal competencies invariance across age groups, the interrelations among these competencies, or their predictive power in specific situations such as having been bullied (Tolan et al., 2016; Zych et al., 2018).

The main results of this study demonstrated that a negative impact on life satisfaction (i.e., a key component of subjective well-being) is more likely if you: have been a victim of bullying (vs. not having been a victim), are an adolescent (vs. preadolescent), and are female (vs. male). When the core personal competencies were taken into consideration to account for changes in life satisfaction, being bullied remained as a significant predictor, while self-esteem, emotional repair and social values emerged newly as significant predictors, too. Finally, after introducing school climate in the regression analysis, self-esteem and emotional repair continued being predictors of life satisfaction, and school climate emerged as a predictor too.

Previous literature pointed out that individuals with high core personal competencies might present higher levels of life satisfaction due to the frequency of having experienced pleasant or positive emotions, that is to say, people with better core competencies are more satisfied because they experience positive emotions more frequently than those who do not (Extremera and Rey, 2018). In addition, the core personal competencies are foundational to a wide array of positive developmental processes and are essential to healthy development and thriving (Metzger et al., 2018). School climate is one of the most relevant aspects for psychological health in students (Voight and Nation, 2016), associated not only with well-being, but also with bullying behavior and attitudes against it (Benbenishty et al., 2016; Konishi et al., 2017).

These results are consistent with those recently presented regarding the negative impact that being bullied has on one's well-being (Arnarsson et al., 2019). Previous studies have identified a decrease in life satisfaction throughout adolescence (Harris et al., 2018), with an even greater impact among those who have been a victim of violence (Olweus and Breivik, 2014), and especially those who are female. With respect to this last conclusion, it has been determined that among females, life satisfaction depends

more on having a quality social support (Saphire-Bernstein and Taylor, 2013). It has been found, furthermore, that girls who were bullied tend to show lower levels of well-being than boys (Siegel et al., 2009). Therefore, the results of this work seem to point out a situation of intersectionality in the explanation of life satisfaction.

In reference to subjective well-being, generally speaking, the positive relationship between this variable and the personal core competencies is supported by previous studies (Valois et al., 2009; Curran and Wexler, 2017). In present research the relationship is more vague in the case of empathy, which does not appear to be related to life satisfaction (i.e., affective empathy) or in which the correlation is weak (i.e., cognitive empathy) (Table 1). In the few studies that have taken this variable into account when assessing adolescent or youth life satisfaction, those participants who were perceived as less empathetic also demonstrated lower levels of life satisfaction (Valois et al., 2009; Lachmann et al., 2018). Nevertheless, it has been suggested that empathy could predict adolescents' life satisfaction only indirectly through positive and negative emotions (Lu et al., 2019), variables that were not assessed in this study. When core competencies are not activated, however, and when one resorts, for example, to the use of preventative (and not proactive) coping strategies during hardship, satisfaction with life tends to be lower (Lyons et al., 2016).

Regarding the core personal competencies and consistent with previous works (Sánchez-Álvarez et al., 2015; Calmeiro et al., 2018), self-esteem, emotional repair, and social values demonstrated the expected positive effect on life satisfaction; however, as previously stated, social values cease to be significant when the school climate is introduced in the regression. It is interesting to note that some core personal competencies did not prove to be predictors of life satisfaction in the sample studied (i.e., problem solving strategies, cognitive empathy, affective empathy, personal values, and individualist values). Given that previous studies have determined these relationships (Bobowik et al., 2011; Cenkseven-Önder and Çolakadioglu, 2013; Schipper and Petermann, 2013; Choi et al., 2016; Lachmann et al., 2018), it could be deduced that emotional repair, self-esteem and social values prevail over the explanatory contribution of other variables. In particular, self-esteem presents the greatest positive relationship with subjective well-being; in fact, the relationship between adolescent self-esteem and satisfaction with life has been the object of recurrent study, with a solid positive relationship having been established between the two (Campbell, 1981; Palacios et al., 2015). Emotional repair and social values are also important predictors of life satisfaction among the sample studied; perhaps this is due to the fact that adolescent life satisfaction is more closely related to the use of adaptive strategies such as the ability to regulate one's emotional state, and social values (e.g., other-oriented goals), as has been previously suggested (Sánchez-Álvarez et al., 2015; Blau et al., 2018; Rey et al., 2019). However, this assertion should be verified via additional studies.

Finally, in previous studies school climate and life satisfaction were found to be negatively related to victimization (Martínez-Ferrer et al., 2011), and our results seem to confirm that the perceived school climate is an aspect of particular relevance

of students life satisfaction (Suldo et al., 2013), including in situations in which someone is being bullied; the help and support of peers and teachers could prevent incidences of bullying, and as well as diminish the negative effect that bullying has on well-being (Flaspohler et al., 2009; Miranda et al., 2019; Rezapour et al., 2019; Varela et al., 2019; Zych et al., 2019).

On a practical level, these findings suggest the importance of considering the overall context and not just individual aspects, interpreting it as a network of elements that work in synergy, though at the same time poses some challenges. In this respect, the results of this work illustrate the importance of taking care of minors' self-esteem and their capacity for emotional recovery without disregarding the role that school climate plays. Lastly, the importance of teachers, parents and peers in preventing and/or stopping bullying experiences, as well as in mitigating the negative impact of being bullied on life satisfaction (Sung et al., 2018; Miranda et al., 2019; Zych et al., 2019) is recognized; as Savahl et al. (2018) pointed out, "practitioners, teachers, and caregivers of children need to be aware that even though children may demonstrate reasonable levels of life satisfaction, they may be victims of bullying, and thus at risk for the associated negative outcomes" (p. 15). Finally, having effective social support might directly result in increased levels of well-being. Development of emotional skills increases not only current, but also future well-being, given that having more personal resources tends to result in an increase of social support, as was concluded in previous research dealing with older populations (Rey et al., 2019).

Limitations and Future Directions

In interpreting the results of this work, certain limitations need to be taken into account. The use of self-reports as a method of data collection may increase response bias, though this is the most common form of information collection in this area, and among this population (Gilman and Huebner, 2003). While the use of multiple sources of information (e.g., teachers, parents, and peers, etc.) would address this constraint, though this analytical strategy was not possible given the design of the current study. Moreover, in this research the core personal competencies were measured separately by different instruments and without calculating the total score in the construct, as has been done previously (e.g., Denham et al., 2009): design of an instrument to assess the core personal competencies as a construct would accordingly be beneficial in future studies. In addition, transversal design prevents us from being able to make explanatory causal statements over time; it does, however, allow us to establish relationships at a given point in time between variables that have not yet been explored. Likewise, the type of sampling carried out dictates that potential generalizations of these results must be made with caution: it is unclear if these findings are applicable to other samples of students or autonomous communities of Spain. Finally, not having qualitative data makes in-depth analysis of some of the results obtained quite difficult, especially with respect to their origin. All these issues should be addressed through additional studies.

Despite its limitations, this work contributes to the scientific literature in that (1) it establishes a connection between the core personal competencies, the school climate, and life satisfaction,

both for those who are victims of bullying and those who are not, as well as for both males and females in their final cycle of primary school (preadolescents) and secondary school (adolescents); (2) it emphasizes the importance of emotional repair and self-esteem in the explanation of life satisfaction, which thereby offers vital information for the development of educational actions; and (3) it highlights the role of the school climate, evidencing the important function of the school as a community for the promotion of life satisfaction from within the school climate.

These results point to future trends insofar as they emphasize the need to promote a positive school climate, which inevitably involves the entire educational community, while meanwhile calling on institutions to make policy decisions that point in this direction. This would contribute not only to healthier environments, but also to more satisfied citizens. In keeping with the above, it would be beneficial to develop work that incorporates other voices, such as those of teachers, administrative staff, management teams, and families in order to have a more comprehensive view of the educational community. At the same time, longitudinal studies would make it possible to explore the way such a community functions over time.

DATA AVAILABILITY

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

ETHICS STATEMENT

This study was carried out in accordance with the Declaration of Helsinki. Ethics approval was obtained from the University Research Ethics Committee. Data was collected upon obtaining informed written consent from participating centers, families, and the students themselves. Throughout the course of a 50-min classroom session and in the presence of a researcher, the students were reminded of the study objectives and were asked to voluntarily and anonymously fill in the various questionnaires, acknowledging that they would be free to withdraw from the study at any time.

AUTHOR CONTRIBUTIONS

All authors were involved in data acquisition. SL-V and RP carried out the work. SL-V wrote and revised the first draft of the manuscript. RP and EB analyzed and described the data. AF-F and NF-R explained the results. All authors revised the work critically for important intellectual content, and approved the final version to be published.

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Forgiving Adolescents: Far From Depression, Close to Well-Being

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Forgiveness has been proven to be an effective way of regulating negative affect and decreasing depression. This study aimed at examining the relationship among constructs particularly relevant to adolescents' well-being, including forgivingness (dispositional forgiveness) anger, depression and Hedonic Balance (HB). Specifically, using a structural equation modelling approach, the fully mediational role of the different facets of anger in the relationship between forgiveness and depression was tested in 773 adolescents, of which 69% girls. Results showed that forgivingness was positively and negatively related to, respectively, HB and depression, through a general effect of anger, suggesting that more forgiving adolescents had higher HB and lower depression as they reported a lower general tendency to experience anger. Forgivingness was also positively related both to HB and to depression through the mediation of all the facets of Anger. Moreover, only for HB, a specific effect of Anger-control was found, suggesting that more forgiving adolescents had higher HB as they reported higher strategies to control anger in a functional manner. The model invariance was supported across gender. Our results suggest that forgiveness is a significant protective factor against depression for adolescents, helping them to effectively control and manage anger, thus fostering emotional health. An important clinical implication of our study regards the potential of forgiveness as a resource for well-being in therapy: among the various possible protective factors in adolescence, forgiveness has the added advantage that it can be fostered in clinical settings, and working on forgiveness in psychotherapy or in counselling could decrease adolescent depression and improve well-being.

Keywords: depression, forgiveness, anger, adolescence, well-being

INTRODUCTION

Adolescence is a critical period for the emergence of depressive symptoms, which can be viewed as a failure to accomplish the developmental task of regulating emotions (Cummings and Davies, 1996; Ahmed et al., 2015; Allen and Tan, 2016). This task is a particularly important one in light of the fact that adolescents have been found to experience more intense mood swings and emotional reactions to social stimuli than people of other ages, because of the hormonal changes associated with this developmental stage of life (Nelson et al., 2005). According to their ability to regulate emotions,

they can have normal mood swings, or in some cases, they can experience moods and behaviours characterised by destructive anger and depression (Garnefski et al., 2005; Eysenck and Derakshan, 2011).

Regarding anger, Brunner and Spielberger (1979) consider it a multifaceted construct, implying several components. Trait Anger is a stable tendency to experience anger; State Anger corresponds to the intensity of angry feelings at a particular time; Anger Expression-Out implies the expression of angry feelings towards other persons or objects in the environment, whereas Anger Expression-In implies the maladaptive suppression of angry feelings. Anger encompasses also an adaptive component, Anger-Control, i.e., the capacity to control angry feelings by preventing the expression of anger or regulating angry feelings by calming down. In adolescence research, anger has been positively correlated to depression in both normal (Deffenbacher et al., 1996; Balsamo, 2010) and clinical populations (Fava and Rosenbaum, 1999; Koh et al., 2002). A strong association has been found between Anger Expression-Out/Anger Expression-In and depressive manifestations (Bridewell and Chang, 1997). Also, according to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) (American Psychiatric Association, 2013), a diagnosis of a major depressive episode “requires that a child or adolescent exhibits one of the two key features: depressed or *irritable mood* and a loss of interest or pleasure” (Goldstein and DeVries, 2017, p.153).

According to the attachment theory, the link between anger and depression seems to be related to the perception of having been hurt by another person, where one initially experiences anger, sometimes causing them to break the relation with that person, and subsequently experiences depression as a result of the ruptured relationship (Bowlby, 1979; Horwitz, 2004).

As damage to interpersonal relationships is related to anger and depression, the ability to repair relationships through forgiveness could be related to well-being and to the reduction of anger and depression (Akhtar and Barlow, 2016). Enright et al. (1998, pp. 47–48) defined forgiveness as “a willingness to abandon one’s right to resentment, negative judgement and indifferent behaviour towards one who has unjustly hurt us.” State-forgiveness (forgiving a specific offence) can be distinguished from trait-forgiveness, or *forgiveness*, an enduring tendency to forgive transgressions across situations and over time (Roberts, 1995). Across all ages, higher forgiveness is associated with lower levels of depression (Burnette et al., 2009) and anger (Fehr et al., 2010) and with higher levels of well-being (Toussaint and Webb, 2005).

Forgiveness has been proven to be an effective way of regulating negative affect (Worthington and Scherer, 2004; Barcaccia et al., 2018b). When people forgive, there is both a reduction of angry and resentful emotions, thoughts and behaviours, and an increase of the positive and benevolent ones towards the offending person (Wade et al., 2014). Affect regulation implies Hedonic Balance (HB), i.e., the balance between negative and positive emotions, the affective component of subjective well-being (Kahneman, 1999; Diener, 2000; Schimmack et al., 2002; Kahneman and Krueger, 2006).

The relationship between forgiveness, depression, and well-being is well-established (e.g., Toussaint and Webb, 2005; Burnette et al., 2009; Fehr et al., 2010). Increasing forgiveness leads to a reduction in depressive manifestations (e.g., Akhtar and Barlow, 2018). It has also been reported that promoting forgiveness increases Anger-Control and reduces Trait Anger and Anger Expression-Out/Anger Expression-In (Fitzgibbons, 1986; Gambaro, 2003; Harris et al., 2006; Wilkowski et al., 2010; Akhtar and Barlow, 2018).

There is a small number of studies investigating gender covariations in the relationship between forgivingness and psychological health outcomes (Miller and Worthington, 2015). According to meta-analyses (e.g., Fehr et al., 2010), females are typically more forgiving than males, whereas males are more vengeful than females.

Regarding gender differences in anger regulation strategies among adolescents, mixed results have been reported, with some studies showing no differences (e.g., Eschenbeck et al., 2007) and other studies showing females to have lower anger control strategies (Wong et al., 2018).

Study Aims and Hypotheses

Therefore, it is important to investigate how one’s difficulty to forgive could be related to anger and depression: the inability to forgive increases anger, and persistent anger can, in turn, destroy interpersonal relationships, exposing one to feelings of failure and isolation, facilitating the onset of depressive symptoms. Based on these considerations, we intend to test a model that encompasses forgivingness, anger, depressive symptomatology and HB. While some authors have found an inverse relationship between forgivingness and depression (Burnette et al., 2009), forgivingness and anger (Watson et al., 2017), and between depression and anger (Balsamo, 2010), surprisingly no study has investigated, so far, the mediational role of anger in the relationship between forgivingness and depression.

Given that the inability to forgive is related to anger, and anger is related to depression, it is reasonable to posit that an unforgiving attitude is related to depression, with the mediational role of anger, and that forgivingness is related to HB, with the mediational role of anger control. To provide a more rigorous test of the hypothesised associations among the variables, we tested two alternative models as recommended by Quintana and Maxwell (1999), where depression/HB and anger facets, respectively, were considered as the independent variables.

It may be hypothesised that the inability to forgive others may increase Trait Anger and dysfunctional strategies like either expressing anger towards other persons or suppressing it.

On one hand, expressing anger towards other persons/objects or suppressing/holding anger in may lead to a range of cognitive, emotional and behavioural depressive responses like loneliness, hopelessness, feelings of guilt, low self-concept, self-blame and social withdrawal. On the other hand, the ability to forgive others may increase the capacity to control anger through functional cognitive, emotional and behavioural coping strategies; this may reduce depressive responses and increase HB by enhancing self-confidence and self-esteem, interpersonal adjustment and trust in others (Wai and Yip, 2009). Due to the small number

of available studies and the mixed literature findings about gender covariations in the relationship between forgivingness and psychological health, we also tested whether the model was invariant across gender.

MATERIALS AND METHODS

Participants and Procedure

The current study included 773 middle- and high-school students (69% females), ranging in age from 12 to 18 ($M_{age} = 15.6$ years, $SD = 2.00$). This study has been approved by the ethics committee of the Department of Developmental and Social Psychology, Sapienza University of Rome, and it has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All the students completed the self-report questionnaires collectively during classes. Permission was obtained from the institutional school committees. In conformity with the Italian law, written informed consent was collected from students of legal age and from parents of underage students.

Measures

The *Trait Forgivingness Scale* (TFS; Berry et al., 2005) assesses dispositional forgiveness. It contains 10 items (sample item: *I try to forgive others even when they don't feel guilty for what they did*) to which participants report their agreement on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The psychometric properties of the Italian TFS have been recently validated (Barcaccia et al., 2018a), suggesting a 7-item scale. Cronbach's alpha for our study was 0.71.

The *State Trait Anger Expression Inventory-2 Child and Adolescent* (STAXI-2 C/A; Brunner and Spielberger, 1979) is a 35-item self-report scale. The State Anger Scale measures the intensity of angry feelings at a particular time (sample item: *I feel I am angry*), whereas the Trait Anger Scale measures individual disposition to experience anger as a personality characteristic (sample item: *I am a hot-headed person*). Anger Expression-Out measures the expression of anger toward other people or objects in the environment engaging in verbal or physically aggressive behaviours (sample item: *I show my anger*). Anger Expression-In measures the extent to which angry feelings are held in or suppressed (sample item: *I get mad inside, but do not show it*). Anger-Control assesses the ability to control the inward or outward expression of angry feelings (sample item: *I try to calm my angry feelings*). Participants respond using a 4-point scale, ranging from 1 (Hardly ever) to 3 (Often). Alpha coefficients ranged from 0.68 to 0.85 for the total and the subscales, similar to the original version (Brunner and Spielberger, 1979).

Hedonic Balance (HB) was assessed using the PANAS (Watson et al., 1988), a 20-item scale developed to measure two higher-order dimensions of self-rated positive and negative affect. The Positive Affect section includes terms such as “active,” “enthusiastic,” whereas the Negative Affect section includes terms such as “afraid,” “hostile.” Participants reported the intensity in which they have generally experienced each emotion on a 5-point scale, from 1 (never/not at all) to 5 (always/very much).

Intensity of HB was evaluated by subtracting the negative affect score from the positive affect score. Intensity of HB is considered an indicator of subjective well-being, as suggested by findings on affect measurement and well-being (Schimmack et al., 2002).

The *Children's Depression Inventory* (CDI; Kovacs, 1992) is a 27-item scale evaluating depressive symptoms in children and adolescents from 8 to 17 years old. Participants rate themselves based on how they feel and think, with each statement being identified with a rating from 0 to 2. Cronbach's alpha for our sample was 0.84.

STATISTICAL ANALYSES

Preliminary correlational analyses were calculated through the SPSS 25 software. Correlation coefficients values were interpreted according to Cohen et al. (2014) as follows: $0 < r < |0.30|$ = weak; $|0.30| < r < |0.50|$ = moderate; $|0.50| < r < |0.70|$ = strong; $r > |0.70|$ = very strong.

Structural Equation Analysis

In the present study, Mplus Version 8.1 (Muthén and Muthén, 1997–2017) was used to estimate the hypothesised model.

All variables were included in the model as single indicator latent variables by estimating the error terms from the reliability of the measures (Kline, 2015). The following indices were applied to evaluate the fit of the tested models: χ^2 statistic, Tucker and Lewis Index (TLI), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). We accepted TLI and CFI values higher than 0.95 (Hu and Bentler, 1999) and RMSEA lower than 0.06 (Browne and Cudeck, 1993) as thresholds for good fit. We also used Akaike Information Criterion (AIC) to evaluate model fit, with lower values indicating a better fit (Kline, 2015). Burnham and Anderson (2004) suggested “as a rule of thumb” that models with $\Delta AIC_i \leq 2$ have substantial support; models with $4 \leq \Delta AIC_i \leq 7$ have considerably less support; models with $\Delta AIC_i \geq 10$ have essentially no support.

In order to test the moderating effects of gender, we used multiple-group structural equation modelling (Muthén and Muthén, 2008). The equivalence between male and female groups was evaluated by imposing identical unstandardized estimates for paths (we refer to this model as the gender-constrained model). Finally, as suggested by Bollen (1989), we tested the plausibility of these equality constraints with the chi-squared difference test ($\Delta \chi^2$) between nested models (i.e., the gender-constrained model vs. the unconstrained model).

Mediation Analysis

In order to estimate mediation effects, we adhered to the procedures suggested by MacKinnon et al. (2004) using the Asymmetric Confidence Interval Method (ACI). We examined the hypothesised pattern of influences by estimating the following paths: (1) from forgivingness to Trait-Anger, Anger Expression-Out, Anger Expression-In and Anger

Control; (2) from Trait-Anger, Anger Expression-Out, Anger Expression-In and Anger Control to HB; (3) from Trait-Anger, Anger Expression-Out, Anger Expression-In and Anger Control to depression. In addition, the four dimensions of anger were allowed to covary as were HB and depression.

RESULTS

Descriptive and Correlational Analyses

Results of one-way ANOVA by gender are reported in **Table 1**.

Correlational analyses are reported in **Table 2**. In both males and females Forgiveness is negatively correlated to Trait Anger and Expression anger-out and depression, positively with Anger control and HB. Trait anger and Anger Expression-out are negatively correlated with HB and positively with depression. Anger control is positively correlated with HB and negatively with depression.

Structural Equation Modelling

We preliminarily tested a model encompassing the path of gender and age on forgiveness and we found that the model did not show a good fit: $\chi^2_{(14)} = 209.462$, $p < 0.001$, CFI = 0.83, TLI = 0.58, RMSEA = 0.13 (95% CI:0.12–0.15), AIC = 30304.119. Thus, this model is not influenced by gender and age.

Subsequently, we tested a multi-group model (**Table 3**) encompassing both direct and indirect effects $\chi^2_{(0)} = 0$, $p = 0.00$, CFI = 1.00, TLI = 1.00, RMSEA = 0.00 (95% CI:0.00–0.00), AIC = 30129.38. Thus, the direct effect of forgiveness on depression and HB was not significant.

The gender-unconstrained model without the direct effects showed a good fit: $\chi^2_{(4)} = 3.569$, $p = 0.46$, CFI = 1.00, TLI = 1.00, RMSEA = 0.00 (95% CI:0.000–0.073), AIC = 30124.950. We examined the gain in fit achieved by imposing equality constraints across genders. This model fitted the data well, $\chi^2_{(22)} = 33.07$, $p = 0.06$, CFI = 0.99, TLI = 0.98, RMSEA = 0.036 (95% CI:0.000–0.060), AIC = 30118.451. However, the change in fit between the gender-unconstrained versus the constrained model was

not significant: $\Delta\chi^2_{(18)} = 29.500$, $p = 0.05$, $\Delta\text{CFI} = 0.01$ (Cheung and Rensvold, 2002).

We removed the equality constraints across genders in the correlation between Anger-Out and Anger Control, supporting the tenability of the constraints imposed across male and female groups.

In **Figure 1** we show the best fitting constrained model.

The anger facets were all related to each other, except for Trait-Anger with Expression Anger-In. HB and depression were also significantly and negatively related.

Mediation Effect Modelling

The total indirect effect of the STAXI dimensions was statistically significant (the 95% asymmetric lower and upper CI limits did not include zero), thus supporting mediation of the conjoint effect of the STAXI subscales. A significant specific indirect effect was found only for Anger Control. Regarding depression, a significant total indirect effect of the STAXI dimensions was found, whereas indirect specific effects were not found (see **Figure 1**).

All the mediated paths were found to be equal for males and females. The model accounted for a similar proportion of variability for males and females. Specifically, for males, R -squared were 7% for Trait-anger, 4% for Anger Control, 5% for Expression Anger-In, 13% for Expression Anger-Out, 30% for depression and 34% for HB; for females, R -squared were 7% for Trait-anger, 2% for Anger Control, 8% for Expression Anger-In, 12% for Expression Anger-Out, 15% for depression and 34% for HB.

Alternative Models

Two alternative models (AM) were tested. Since the two AMs were not nested in the hypothesised model, ΔAIC was used to compare their fit. In AM1, we considered depression and HB as independent variables, the four anger facets as mediators, and forgiveness as the outcome. This model showed acceptable fit: $\chi^2_{(22)} = 68.477$, $p < 0.001$, CFI = 0.95, TLI = 0.91, RMSEA = 0.07 (95% CI:0.05–0.09), AIC = 30.153.858; however, lower CFI and TLI values and higher RMSEA and AIC values than the hypothesised model ($\Delta\text{AIC} = 35.407$) indicated that it was a worse approximation to the data. In this model, HB predicted all four anger facets, while depression predicted Trait-anger and Expression anger-out in males and Anger-control also in females; at the same time only Trait-anger predicted Forgiveness.

In AM2, we considered the anger facets as independent variables, forgiveness as the mediator, and depression and HB as the outcomes. The AM2 showed a worse fit than the hypothesised model as suggested by the fit indices: $\chi^2_{(28)} = 307.345$, $p < 0.001$, CFI = 0.71, TLI = 0.57, RMSEA = 0.16 (95% CI:0.14–0.18), AIC = 30.380,726, and by a higher AIC ($\Delta\text{AIC} = 262,275$). In this model, only the path linking Forgiveness to depression was statistically significant. For all the two AMs, the information deriving from the ΔAIC indicated that they had poor empirical support ($\Delta\text{AIC} \geq 10$) compared to the hypothesised mediational model.

TABLE 1 | Means, standard deviations, and sex differences for forgiveness, anger, HB and depression for males and females.

Variable	Males		Females		$F(1,773)$	p
	M	SD	M	SD		
1. Forgiveness	22.12	5.36	21.73	5.22	3.50	0.34
2. Trait Anger	18.27	3.72	19.65	3.67	22.91*	0.000
3. Anger Expression-Out	8.00	2.30	8.38	2.41	4.27*	0.039
4. Anger Expression-In	9.60	2.31	9.36	2.49	1.60	0.207
5. Anger Control	11.35	2.38	10.94	2.48	4.50*	0.034
6. Hedonic Balance	11.70	9.24	7.14	9.72	37.54*	0.000
7. Depression	39.74	7.07	45.24	6.98	101.56*	0.000

* $p < 0.05$. $F = F$ ratio from one-way analyses of variance; within the parentheses are the degrees of freedom and the number of participants.

TABLE 2 | Zero-order correlations among measures of TFS, STAXI, HB, and CDI for males and females.

	1	2	3	4	5	6	7
1. Forgivingness	1	−0.31**	−0.28**	0.08	0.27**	0.16*	−0.23**
2. Trait Anger	−0.31**	1	0.52**	0.04	−0.14*	−0.26**	0.26**
3. Anger Expression-Out	−0.33**	0.54**	1	−0.34**	−0.29**	−0.26**	0.18**
4. Anger Expression-In	0.13**	−0.04	−0.31**	1	0.28**	−0.03	0.06
5. Anger Control	0.19**	−0.18**	−0.35**	0.22**	1	0.21**	−0.19**
6. Hedonic Balance	0.17**	−0.36**	−0.27**	−0.19**	0.30**	1	−0.46**
7. Depression	−0.24**	0.45**	0.30**	0.12**	−0.16**	−0.56**	1

The correlation coefficients above the diagonal are for males; the correlation coefficients below the diagonal are for females. ** $p < 0.01$; * $p < 0.05$.

TABLE 3 | Path coefficients of the full mediational model.

		Dependent variable: Hedonic Balance (Y)							
		Direct effect (b_i)							
Independent variable	Mediators	Coefficient		SE		p			
		Males	Females	Males	Females	Males	Females		
Forgivingness		−0.073	−0.068	0.043	0.040	0.091	0.091		
		Specific indirect effects ($a_i b_i$)							
		Coefficient		p		Lower		Upper	
		Males	Females	Males	Females	Males	Females	Males	Females
Forgivingness	Trait-Anger	0.140	0.140	0.696	0.696	−0.450	−0.450	0.731	0.731
	Anger Expression-In	−0.182	−0.182	0.338	0.338	−0.495	−0.495	0.130	0.130
	Anger Expression-Out	0.063	0.063	0.913	0.913	−0.888	−0.888	1.014	1.014
	Anger Control	0.162	0.162	0.024	0.024	0.044	0.044	0.280	0.280
		Total indirect effect ($a_i b_i$)							
	Anger facets	0.183	0.183	0.012	0.012	0.063	0.063	0.302	0.302
		Dependent variable: Depression (Y)							
		Direct effect (b_i)							
Independent variable	Mediators	Coefficient		SE		p			
		Males	Females	Males	Females	Males	Females		
Forgivingness		0.011	0.008	0.052	0.039	0.837	0.837		
		Specific indirect effects ($a_i b_i$)							
		Coefficient		p		Lower		Upper	
		Males	Females	Males	Females	Males	Females	Males	Females
Forgivingness	Trait-Anger	−0.224	−0.224	0.584	0.584	−0.899	−0.899	0.450	0.450
	Anger Expression-In	0.056	0.056	0.801	0.801	−0.312	−0.312	0.425	0.425
	Anger Expression-Out	0.061	0.061	0.929	0.929	−1.068	−1.068	1.190	1.190
	Anger Control	−0.031	−0.031	0.651	0.651	−0.143	−0.143	0.081	0.081
		Total indirect effect ($a_i b_i$)							
	Anger facets	−0.138	−0.138	0.019	0.019	−0.235	−0.235	−0.041	−0.041

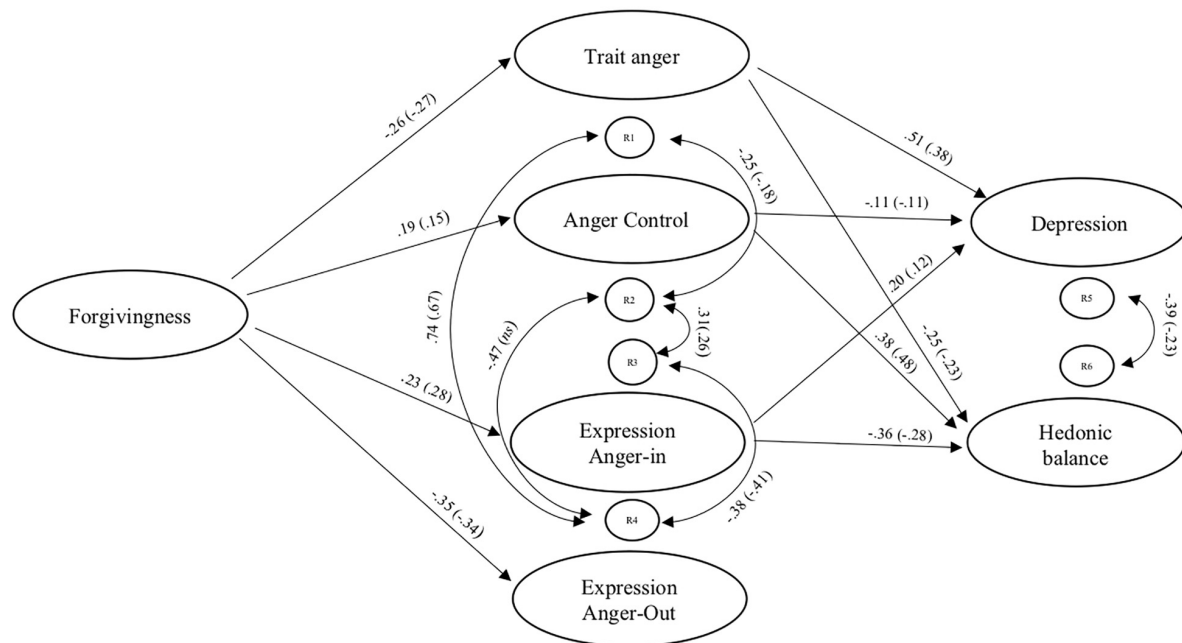


FIGURE 1 | Standardised path coefficients for males and females (females in parentheses).

DISCUSSION

The present study was the first investigation examining the relationship among forgivingness, anger, HB and depression in adolescents. Using a structural equation modelling approach, our results showed that forgivingness was positively and negatively related, respectively, to HB and depression, through a general effect of anger facets, suggesting that adolescents with higher forgivingness had higher HB and lower depression as they reported a lower general tendency towards anger. These results are consistent with previously reviewed literature highlighting the association between forgivingness and both depression (Brown, 2003; Burnette et al., 2009; Barcaccia et al., 2017, 2018b) and anger (Watson et al., 1988; Fehr et al., 2010; Barcaccia et al., 2018a). In addition, our findings expand on the existing literature in that they evidence a mediational model encompassing the relationship between forgivingness and HB and depression, with the general mediational effect of anger.

Another key-finding of our study was that forgivingness was positively related only to HB, through a specific effect of Anger-Control, suggesting that more forgiving adolescents had higher HB, as they had more functional strategies to control anger effectively. Thus, adolescents who have a higher ability to forgive others might report a higher subjective well-being (i.e., HB) because they have functional cognitive, emotional and behavioural strategies to regulate anger. This result was consistent with experimental data showing that increasing forgiveness leads to an increase in anger cognitive control skills, which in turn increases well-being (Wilkowski et al., 2010).

The lack of a mediational effect of all the other anger facets is, however, in contrast with our hypotheses; the present data

also suggest that forgiveness might foster HB, specifically by increasing the ability of adolescents to regulate anger in a functional way, and not specifically by reducing Trait-Anger, or dysfunctional anger regulation strategies such as suppressing it or expressing it out towards other people/objects. Another result in contrast with our hypotheses was the lack of a direct effect of forgivingness on HB and depression. This evidence was not consistent with previous literature about the relationship between forgivingness and HB/depression suggesting that the capacity to forgive others may directly protect adolescents from depression and promote his/her wellbeing through a more functional mode of anger regulation.

We also found no evidence about the effect of gender in the model as the multigroup analysis supported gender invariance. This result is in line with those studies reporting no evidence of gender differences in the covariations between anger regulation and psychological health (e.g., Eschenbeck et al., 2007).

Our findings can be explained by hypothesising that dispositional forgiveness reduces the general effect of anger on HB helping individuals to refrain from negatively and depressively judging their inner experiences, such as emotions and thoughts (Barcaccia et al., 2019). Forgivingness may act as a protective factor against the detrimental effects of dysfunctional behaviours triggered by anger, such as aggressive acting-outs, outbursts of anger (Paciello et al., 2017), severing ties with friends, and ruminating about others as dangerous, which in turn can lead to depressive feelings of loneliness and guilt regarding the disruption of interpersonal relations (Deffenbacher et al., 1996). Moreover, given the association between inflated responsibility beliefs and depression (Pozza and Dèttore, 2014), forgivingness may be hypothesised to reduce depression by attenuating

adolescents' inflated sense of duty/obligation/responsibility about the necessity of expressing vigorously one's rage and frustration, thus helping adolescents to let go of anger rather than holding onto it. Consistent with previous research, the fact that forgivingness is inversely related to depression and directly to HB when anger is well regulated, suggests that dispositional forgiveness may include a set of emotional regulation skills such as emotional intelligence and perspective-taking (Rizkalla et al., 2008; Carvalho et al., 2010). The lack of an indirect effect of forgivingness on depression/HB through the other dysfunctional anger facets may suggest that the model could be improved by including other dysfunctional anger regulation strategies as mediators such as angry rumination, which has been found to be related to lower forgivingness and lower affect regulation (Berry et al., 2005). Future studies could include other dysfunctional strategies to cope with anger as mediators in the pathway from forgivingness to HB/depression.

Our findings offer several implications for the well-being of adolescents. First, school-based programs on forgiveness could promote a more benevolent attitude in confronting with slights and interpersonal ruptures, thereby preventing depression and increasing well-being. Such programs could promote functional regulation skills, such as emotional intelligence, empathy, and perspective taking (Onal and Yalcin, 2017); they can be easily delivered in group settings, making them particularly suitable for school contexts (Worthington et al., 2016). An important clinical implication of our study regards the potential of forgiveness as a resource for well-being in therapy: among the various possible protective factors in adolescence, forgiveness has the added advantage that it can be fostered in clinical settings, and working on forgiveness in psychotherapy or in counselling could decrease adolescent depression and improve well-being.

Our study presents some limitations, firstly regarding the use of self-reported measures, and secondly because of the cross-sectional nature of our data. Nevertheless, regarding the first limitation, it must be noted that forgivingness, anger, and depression are private cognitive-emotive states that are necessarily accessible through report by the individuals who hold these beliefs and experience these emotional tonalities. However, it is certainly true that future studies could strengthen the investigation of these topics by relying upon multiple methods and informants across different situations, to minimise possible biases due to self-reporting and reputation. Regarding the cross-sectional nature of this study, future research could also investigate whether forgivingness is a protective factor for the onset of depression from a longitudinal perspective. On this basis, educational programs aimed at increasing adolescents' capacity to forgive by productively processing their feelings of anger, could act as preventive strategies for depression. In fact, forgivingness education programs have been proven effective in increasing forgivingness and decreasing anger and depression (e.g., Enright et al., 2007). Our findings are based on a large sample of Italian adolescents, thus future studies could explore these dimensions also in other cultural contexts.

Obviously, depression has more facets than those considered in this study: one cannot exclude the possibility that other personal or situational factors moderate or mediate the

relationship between forgivingness and depression. Future studies could also take into account the quality of the interpersonal relationships in which the offences occurred, and to what extent the individual feels helpless and impotent in the face of such offences, given the debate on the importance of helplessness and hopelessness in both the genesis and the maintenance of depression (Bastounis et al., 2016).

Overall, these results offer notable indications for mental health professionals, as well as for educators: helping young people to forgive is not to be considered strictly as a facet of moral education, as it can represent a useful contribution in enhancing emotional and psychological health in adolescents, preventing the onset of depression by helping them to effectively manage anger. Forgivingness implies a balanced consideration of oneself and the other, and the consequent balance is not solely cognitive, but mainly emotional. In this perspective, emotional regulation and a balanced consideration of self and others appear to be two sides of the same coin.

DATA AVAILABILITY

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

ETHICS STATEMENT

This study has been approved by the Ethics Committee of the Department of Developmental and Social Psychology, Sapienza University of Rome, and all procedures have been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments, and in conformity with the Italian law. We gathered written informed consent from all participants. All the students completed the paper-pencil self-report questionnaires collectively during classes. Permission was obtained from the institutional school committees. In conformity with the Italian law, informed consent was collected from students of legal age and from parents of underage students. Pupils were assured that participation was optional and that their responses would remain anonymous.

AUTHOR CONTRIBUTIONS

BB had the initial idea, collected data, and drafted the manuscript. SP gave substantial contribution to the design of the work and revised it critically for its intellectual content. AP contributed to the conception and design of the study and assisted in the statistical analysis. MM assisted in the statistical analyses. RB organised the database. FM revised the work. GV performed the statistical analyses and co-wrote the first draft of the manuscript. BB, SP, AP, MM, RB, and GV wrote sections of the manuscript. All authors contributed to manuscript revision, read and approved the submitted version.

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Psychological Well-Being During Adolescence: Stability and Association With Romantic Relationships

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The concept of well-being is complex and is in common use not only in the area of health but also in the field of human development. Well-being depends on both the individual and the environment, and during childhood and adolescence, the environmental factor can be decisive. Family, school, and peers are widely recognized as significant contexts for successful development, but romantic context is also undoubtedly important. Romantic relationships constitute a new dimension in the adolescent's social life, but little attention so far has been paid to their importance in well-being. Defined as developmental tasks, they have been associated both positive and negative outcomes, although their impact on well-being has not yet been clarified. This study uses a eudaimonic approach to evaluate four dimensions of psychological well-being: self-acceptance, positive interpersonal relationships, autonomy, and life development, and has a two-fold objective: (1) to analyze adolescents' levels of psychological well-being and their stability over time, and (2) to analyze the association between romantic relationships and adolescents' psychological well-being. Using a longitudinal design, we analyzed data from a sample of 747 adolescents from Andalusia (Spain) between 13 and 17 years old (50.5% girls, mean age wave 1 = 14.55, SD = 0.84). The results revealed medium to high levels of psychological well-being, which remained stable throughout the time of the study, and an increase in wave 2 only in positive interpersonal relationships dimension. The Structural Equation Modeling analysis showed romantic relationships as a predictor of psychological well-being, having a positive link with positive interpersonal relationships and with life development, and a negative link with autonomy and self-acceptance. These results are discussed in terms of the need to use approaches focused on the specific characteristics and evolution of well-being during adolescence, as well as on the importance of considering romantic relationships as developmental assets which have the potential to influence well-being during these years.

Keywords: self-acceptance, positive interpersonal relationships, autonomy, life development, longitudinal study, structural equation modeling

INTRODUCTION

Psychology has traditionally conceptualized individuals in terms of psychopathology, dysfunction, and failure (Seligman and Csikszentmihalyi, 2000). It has been focused on repairing damage following a disease model of human functioning, paying little attention to the building of positive qualities (Seligman and Csikszentmihalyi, 2000). In this sense, adolescence has not been an exception. Since it was established as an empirical field of study at the beginning of the twentieth century, it has been normally viewed as a period of life beset with problems and difficulties (Steinberg and Morris, 2001), collecting research large amount of data related to risk factors, problem behavior, and prevention formulas (Oliva et al., 2010; Dvorsky et al., 2018). As a result, knowledge about aspects related to optimal functioning and positive development during these years is significantly smaller (Huebner et al., 2009), contributing to the conception that a healthy adolescence is one without problems (Oliva et al., 2010). However, different perspectives have emerged and advocate understanding it from a broader and more balanced perspective, considering that optimal functioning during adolescence is more than the absence of problems, difficulties or pathologies (Lerner et al., 2005; Seligman, 2008). These include positive psychology, which considers the potential of adolescents to achieve a healthy and successful development, adopting a well-being-oriented approach (Seligman et al., 2009).

CONCEPTUALIZATION OF WELL-BEING

The emergence and growth of positive psychology has led to an increase in well-being research, which has produced two theoretical approaches: hedonic and eudaimonic (Ryan and Deci, 2001). The hedonic view reflects the notion of well-being as an outcome, consisting of an internal state of pleasure or happiness, and focuses on subjective well-being (Ryan and Deci, 2001; Pavot and Diener, 2008; Ryan et al., 2008). From this perspective, well-being is defined in terms of experiencing high levels of positive affect, low levels of negative affect, and a high degree of satisfaction with life (Deci and Ryan, 2008). The eudaimonic view, on the other side, posits that well-being consists of more than just happiness. Eudaimonic theories consider that not all desires – outcomes that a person might value – would lead to well-being when they are achieved (Ryan and Deci, 2001). From this point of view, well-being is not an outcome or final state, but a process of fulfilling human potentials (Deci and Ryan, 2008). It concerns to positive functioning and to the development of capacities and virtues (Ryan and Deci, 2001; Ryan et al., 2008). In this field, Ryff's multidimensional model of psychological well-being has received the most empirical support (Ryff, 2014). According to this approach, well-being is made up of six dimensions: (1) *autonomy*, or the ability to regulate our own behavior, resist social pressure, and follow our convictions, even if they go against the general opinion; (2) *environmental mastery*, or the ability to manage the context and daily activities; (3) *personal growth*, which includes a continuous process of developing our own potential, the ability to be open to new experiences and

the feeling of improving over time; (4) *positive relationships with others*, defined as the establishment of close, trusting and meaningful bonds with others, as well as showing concern for the well-being of others, and the expression of empathy, affection, and intimacy; (5) *purpose in life*, or setting objectives and goals which give meaning and direction to our lives; and (6) *self-acceptance*, or the ability to have a positive attitude and feelings of satisfaction and acceptance of ourselves, including both our good and bad qualities. Each of these dimensions represents what it means to be healthy, well and fully functioning, and articulates the different challenges that people face in their effort to achieve positive functioning (Ryff and Singer, 2008). In other words, people try to view themselves positively although they are aware of their own limitations (self-acceptance), seek to maintain satisfactory interpersonal relationships (positive relations with others), develop a sense of self-determination and personal authority in their interaction with the context (autonomy), make the most of their own talents and abilities to achieve their goals (personal growth), manage their environment to meet their needs (environmental mastery), and find meaning in the effort they make and the challenges they encounter in life (purpose in life) (Keyes et al., 2002).

According to previous studies analyzing the effects of hedonic and eudaimonic activities on well-being, eudaimonic seem to produce more long-term effects than hedonic (Steger et al., 2008; Huta and Ryan, 2010). Research suggests that hedonically motivated activity makes people feel good at the immediate or short-term time scale; that is, it may increase levels of pleasure or satisfaction perceived while it is being carried out, but it may not lead to positive affect or high life satisfaction in the long run (Huta and Ryan, 2010). On the contrary, eudaimonic activity may have more cumulative and enduring effects on well-being (Steger et al., 2008; Huta and Ryan, 2010). For example, cultivating trusting and healthy relationships can create a resource that increases people's quality of life (Gable et al., 2004). As people build resources such as feelings of mastery, competence or better relationships, they are more likely to perceive their life as satisfying and meaningful (Steger et al., 2008). In other words, eudaimonic activity is especially likely to build durable resources, leading to more fulfilled people with stable levels of well-being (Steger et al., 2008).

THE STUDY OF ADOLESCENT WELL-BEING

Previous research, mainly focused on the adult population, has shown that psychological well-being is a reliable predictor of health and long-term positive adjustment (Ryff, 2017). People with higher levels of well-being suffer fewer illnesses, have an increased life expectancy and engage in more healthy behavior (for a review, see Ryff, 2017). However, longitudinal studies have also shown that dimensions such as personal growth and purpose in life tend to decline as we get older (Clarke et al., 2000; Springer et al., 2011). Although research focused on adolescence is limited, a number of longitudinal studies have been found providing evidence about the evolution of well-being

in this period. The World Health Organization (WHO), through the *Health Behaviour in School-aged Children* (HBSC) study, collects data every 4 years about children aged 11, 13, and 15 in over 40 North American and European countries, understanding well-being in terms of satisfaction with life (Inchley et al., 2016). As regards gender, the results of this research showed that well-being in adolescents decreased with age in both sexes, and that boys generally showed better levels of satisfaction with life than girls (Inchley et al., 2016). One of the conclusions of HBSC study stresses the importance of interpersonal relationships in adolescent well-being and states that peers and parents play a key role as protective assets in young people's lives. Along the same lines, the research carried out by Patalay and Fitzsimons (2018) in a sample of 9,553 adolescents aged 11 and 14, found well-being to be highly unstable, and suggested that girls were more likely to experience a decline in well-being over time. Well-being was measured in terms of satisfaction with different domains of life, including school, family, friends, schoolwork, appearance, and life as a whole (Patalay and Fitzsimons, 2018). Important predictors of these results were lower family income, a poorer relationship with parents, lower school connectedness, and greater cognitive ability. Booker et al. (2018) also found a decline in well-being over time, especially among girls. To measure well-being, authors used happiness with six domains of life (i.e., friends, family, appearance, school, schoolwork, and life as a whole) as a key variable and included a measure of emotional and behavioral problems (Booker et al., 2018). According to these authors, girls as they grow up tended increasingly to compare themselves socially with others and perceive that the others are better than them, which could lead to lower levels of well-being compared to boys (Booker et al., 2018). In contrast, Lerkkanen et al. (2018), examining patterns and dynamics of pattern change of 1,666 students' psychological well-being, found that the different profiles of well-being (e.g., high, average, low well-being profile) tended to improve over time, and that future expectations or aspirations were a critical variable. Although this study claims to analyze psychological well-being, it is necessary to clarify that it does not follow a eudaimonic approach. Well-being was operationalized to consist of school enjoyment, future educational aspirations, (absence of) school burnout, self-esteem, and (absence of) externalizing and internalizing problems. Meade and Dowswell (2016) also reported that the general well-being of adolescents, in terms of Health-Related Quality of life (HRQoL), usually remained relatively stable over time, although, again, gender differences were found, with worse predictions for girls. According to the authors, the change in personal standards used to self-assess quality of life accounts for these differences. The HRQoL construct represented the overall well-being of the participants, measured through five dimensions: physical well-being, psychological well-being, autonomy and parents' relations, social support and peers, and school environment. Focusing on psychological well-being, it was assessed using hedonic elements, such as positive emotions, satisfaction with life, and the absence of loneliness and sadness. Finally, from a sociodemographic point of view, Ottová-Jordan et al. (2015), analyzing data from HBSC study, found different tendencies depending on the country. For example, in countries

such as Spain, Croatia or Greece, the cohorts showed a steady decrease in well-being (satisfaction with life); in Denmark, Finland or Norway, there was a linear increase, while in Austria, Canada or Scotland, there was a clear U-shaped trend (Ottová-Jordan et al., 2015). The authors attribute these results to circumstances such as concerns about the future, high expectations set by their context (family, school, and peers), school pressure, or country-specific characteristics (e.g., economic situation, unemployment rates, social insecurity), which can result in higher levels of perceived stress.

Despite this evidence, it can be observed that these studies mainly adopt a hedonic perspective. As far as we know, there are only a few cross-sectional studies which adopt a eudaimonic approach to the study of adolescent well-being. Fernandes et al. (2010) developed a validation of the Ryff's scales for Portuguese adolescents, achieving a new version with good adjustment indices. The age of the participants was between the ages of 10 and 18 years old, and their well-being levels were medium-high in all the dimensions in study 2; however, lower scores were obtained in study 1. In another work (Fernandes et al., 2011), researchers focused on the relationship between school satisfaction and psychological well-being of 698 adolescents between 12 and 18 years old, finding a positive correlation between both variables. Psychological well-being was measured using Ryff's scales. Well-being scores showed medium-high levels, with the highest corresponding to positive relationships with others and personal growth. Loera-Malvaez et al. (2008) also adapted Ryff's scales for Mexican adolescents, while Oprea et al. (2018) did the same for children ages 8–12, finding medium scores in all dimensions. Ruini et al. (2009) tested the efficacy of a school program for the promotion of psychological well-being in adolescent with a mean age of 14.4 years. The results showed medium scores in all dimensions prior to intervention, finding an increase in personal growth in the follow-up. Finally, Vescovelli et al. (2014) described the psychological well-being of 150 adolescents aged 13–19, and its relationship to distress and prosocial behavior. Well-being was again measured with Ryff's scales, obtaining participants medium scores in all dimensions. No significant differences emerged according to gender and age did not show a significant effect as well.

Notwithstanding the foregoing, it has been previously established that research regarding the judgements of children and adolescent about their life satisfaction has received an increasing amount of attention (Huebner, 2004), but that psychological well-being at these stages remains an unexplored field of research (Oprea et al., 2018) which has gathered less empirical effort (Ryff, 2014). For these reasons, to obtain a rigorous scientific knowledge of how well-being operates during adolescent years, empirical research must include not only perceptions about global satisfaction with life or affective balance, but also the role of the quest for meaning, self-realization and the efforts young people make to thrive, flourish, and achieve optimal development (Ryff, 2014). To this end, this study focuses on four of the six dimensions of Ryff's psychological well-being model: self-acceptance, positive relations with others (renamed *positive interpersonal relationships*), autonomy, and personal growth (renamed *life development*) (see Viejo et al., 2018, for a review).

THE IMPORTANCE OF ROMANTIC RELATIONSHIPS FOR ADOLESCENT WELL-BEING

The establishment of mutually beneficial relationships between adolescents and their context is an important component for positive development and well-being during this period (Geldhof et al., 2013). Up to now, great efforts have been made to analyze how the relationships adolescents have with their school, family, neighborhood or their peers, in general, can contribute positively to their development (Benson and Faas, 2014), and it has been suggested that an optimal healthy development can be achieved if the strengths which adolescents possess can be matched by the resources existing in these contexts (Geldhof et al., 2013). However, another more specific social context has received little empirical attention: romantic relationships (Steinberg and Morris, 2001).

Romantic relationships are a key component and prevalent part of social development (Carver et al., 2003; Connolly and McIsaac, 2009). Fully embedded in the adolescents' context (Collins and Van Dulmen, 2006) are dyadic in nature and distinctive in character. Unlike other types of relationships, such as friendships, they are commonly marked by mutual expressions of affection, a unique intensity and generally involve powerful attraction and a sexual component between their protagonists (Collins, 2003; Collins et al., 2009; Furman and Collins, 2009). Previous studies have shown that adolescents have clear conceptions of the properties that distinguish romantic relationships from friendships (Connolly et al., 2004); in other words, whereas romantic relationships are conceived in terms of passion and commitment, friendships are characterized by affiliation (Connolly et al., 1999). Defined as "on-going voluntary interactions that are mutually acknowledged, rather than identified by only one member of a pair", the term "romantic relationships" refers to romantic status, and to the connection between two partners (Collins, 2003; Collins and Van Dulmen, 2006; Collins et al., 2009; Connolly and McIsaac, 2009).

In the change from early adolescence to late adolescence, romantic relationships play an increasingly important role (Furman, 2002) and provide an important context of support, companionship, and intimacy (Bouchey and Furman, 2003; Shulman et al., 2011), with romantic partners becoming one of the main emotional bonds (Collins and Van Dulmen, 2006; Collins et al., 2009; Connolly and McIsaac, 2009). Some studies have identified romantic relationships as contexts with a strong potential to promote positive adaptation and high levels of well-being (Collins and Van Dulmen, 2006; Furman et al., 2009; Kansky and Allen, 2018). Romantic involvement, the quality of the relationship or the positive sexually related experiences within a romantic relationship, all seem to promote lower rates of alienation and isolation, a better self-image, better future expectations, higher levels of self-esteem, and a greater level of commitment in later relationships (Ciairano et al., 2006; Viejo et al., 2015; Hensel et al., 2016). High levels of well-being are also associated with the ability to maintain beneficial interpersonal relationships, have a greater number of friends or take part in more social

activities (Diener and Seligman, 2002). However, it is also necessary to admit that they can be a challenge (Larson et al., 1999; Davila, 2008), in the sense that they represent new contexts in which adolescents have no previous experience and for which they may lack the strategies needed to manage them successfully. Research suggests that the influence of romantic relationships on well-being depends largely on the level of competence and skills which these adolescents already possess (Davila et al., 2017), as well as on the way the learning process evolves; in other words, how adolescents response to a task improves each time it is repeated (Miller and Geraci, 2011).

Given this evidence, it seems certain that empirical interest in adolescent romantic relationships has increased in the last decade, as stated previously by some authors (e.g., Furman and Collins, 2009). Nevertheless, there are two main difficulties when the research goal is to understand their association to adolescent well-being: on the one hand, most of the research about this topic has been addressed in adult population (e.g., Kamp Dush and Amato, 2005; Demir, 2010). On the other hand, existing research focused on adolescence has been mainly guided by a deficit perspective, linking romantic relationships to a whole range of negative outcomes, such as emotional disorders, substance use, poor school performance or internalizing, and externalizing behaviors (e.g., Zimmer-Gembeck et al., 2001; Ackard and Neumark-Sztainer, 2002; Callahan et al., 2003; Cui et al., 2012; Viejo et al., 2015). Although there has been an increase in the amount of studies analyzing well-being during adolescence and its association with romantic relationships, it is not possible to state unequivocally that they adopt the framework provided by positive psychology regarding to the empirical approach to well-being. Studies analyzing subjective well-being seem to be aligned with positive psychology postulates, since it can be observed the use of satisfaction with life or positive and negative affect as measurement constructs (e.g., Moksnes and Haugan, 2015; Kansky et al., 2016). However, research focusing on psychological well-being has frequently used symptoms of depression and anxiety as indicators of well-being (e.g., Callahan et al., 2003; Bauermeister et al., 2010; Baams et al., 2014; Miller, 2014). These data suggest that accurate scientific knowledge about the role of romantic relationships in adolescent well-being is still sparse and reveal the need for a more balanced approach to the study of this developmental task, given its potential to influence well-being of boys and girls (Kansky and Allen, 2018). At the same time, bring to light the need to make rigorous empirical efforts in the study of well-being, especially psychological well-being, usually understood as the absence of clinical symptoms.

THE PRESENT STUDY

Given the lack of empirical research on adolescent well-being, especially in relation to longitudinal data, the first aim of this work was to analyze adolescents' level of psychological well-being and its stability over time. In addition, since there are

no studies, as far as we know, that analyze the relationship between romantic relationships and well-being including an eudaimonic approach, the second aim of this study was to analyze the association between romantic relationship status and adolescents' psychological well-being. Based on the literature presented in previous sections, two hypotheses were proposed:

Hypothesis 1: Participants will show moderate levels of psychological well-being at time 1, with no significant gender differences. At time 2, scores for all dimensions will decrease, and participants will show gender differences.

Hypothesis 2: Romantic relationships will significantly predict adolescent psychological well-being, showing a positive association with self-acceptance, positive interpersonal relationships and life development dimensions, and negative with autonomy.

MATERIALS AND METHODS

Participants

At wave 1, the sample consisted of 747 adolescents (50.5% girls, 49.5% boys), attending both public and private schools in the Autonomous Community of Andalusia (Spain), whose age ranged from 13 to 17 years old (mean age = 14.55; SD = 0.84) ($N_{\text{wave 2}} = 743$; age range 13–18 years; mean age = 15.12; SD = 0.87).

The schools which took part were selected using random probabilistic sampling, stratified by conglomerates, single-stage and with proportional affixation (Cea D'Ancona, 2004). The strata established were the geographical area (Eastern or Western Andalusia), the school ownership (private or public), and the inhabitants (<10,000 inhabitants, 10,001–100,000 and >100,000). To measure the number of schools needed, the total sample obtained was divided by the formula proposed by Cea D'Ancona (2004), between the average number of students per group given in the statistics provided by the Andalusian Government's Ministry of Education, choosing only one class per course and taking into account the fact that towns with under 3,000 inhabitants only had one class per academic course. The final total was 28 schools, with an assumed sampling error of 2.5% and an additional 15% to compensate for any data losses. Finally, the schools were randomly selected.

Measurements

Psychological Well-Being

Psychological well-being was measured through the Brief Scale of Psychological Well-Being for Adolescents (BSPWB-A) (Viejo et al., 2018). This instrument consists of and adaptation for adolescents of the psychological well-being scales developed by Ryff (2014), validated in Spanish. The scale contains 20 items evaluated on a Likert scale of six points (1 = completely disagree to 6 = completely agree), which measures the degree

of agreement with different questions relating to four dimensions: self-acceptance (e.g., *In general, I feel confident and positive about myself*) ($\alpha_{\text{wave 1}} = 0.85$; $\alpha_{\text{wave 2}} = 0.89$); positive interpersonal relationships ($\alpha_{\text{wave 1}} = 0.68$; $\alpha_{\text{wave 2}} = 0.76$); autonomy (e.g., *I often change my mind about decisions if my friends or family disagree*) ($\alpha_{\text{wave 1}} = 0.79$; $\alpha_{\text{wave 2}} = 0.80$); and life development (e.g., *I think everything we experience is an opportunity to grow and to become a better person*) ($\alpha_{\text{wave 1}} = 0.79$; $\alpha_{\text{wave 2}} = 0.82$). It is required to highlight that *positive interpersonal relationships* dimension does not perform any measure related to romantic relationships. It is focused in friendships and relationships in general (e.g., *I know that I can trust my friends, and they know that they can trust me; I do not have many people who want to listen when I need to talk*).

Romantic Relationship Status

Participants' romantic relationship status was measured using one item from an adapted version of the Dating Questionnaire developed by Connolly et al. (2004). This instrument has been previously used with Spanish adolescents (Ortega et al., 2008; Sánchez et al., 2008; Viejo et al., 2015). Adolescents were asked to indicate their romantic relationship status (current romantic relationship; past romantic relationship, but not current; never had a romantic relationship) by specifying which of the responses best described their current status (i.e., *In this moment I have a partner; Currently I do not have a partner, but I have had a partner in the last 2 months; Currently I am not dating with anyone, but I have had a partner more than 2 months ago; I have never been dating with anyone*).

Procedure

Ethical approval for the study was obtained from the Comité de Bioética y Bioseguridad de la Universidad de Córdoba (Bioethics and Biosafety Committee of the University of Cordoba) and developed in accordance with the considerations of the Declaration of Helsinki and the Spanish Society of Psychology. The study was approved by the school boards, and the consent obtained from the parents of the participants was both written and informed. Participants were visited and the anonymous, confidential and voluntary nature and the objective of the study were explained before the survey was taken. The data were collected in two waves, with the first in October 2015 and the second in May 2016. The questionnaire was conducted during school hours and filled in individually by each participant. The average time required to complete the questionnaires was approximately 20 min. For both waves, the data collection process was conducted by specialized personnel from outside the schools, who followed a strict procedure in the administration, processing, and use of the collected data.

Data Analysis

Descriptive analysis and comparison of means were carried out using SPSS 20.0 statistical software. Regarding the first

research aim, these analyses took into account the participants' gender, and Student's *t*-test for related samples was used, as this test is robust in cases of non-compliance with normality (Schmider et al., 2010). In relation to the second aim, comparisons of means were performed according to romantic relationship status, therefore Chi-Square test was applied.

Due to the characteristics of the questionnaires, some of them were not fully completed. Because missing data or attrition may lead to parameter bias (Nicholson et al., 2015), it is necessary to know why these data are missing. A distinction is made between three general processes that may cause missing data: missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR) (Rubin, 1976; Little and Rubin, 1989; Little, 1992). According to Nicholson et al. (2015), Little's MCAR test distinguishes whether missing observations are MCAR or dependent on other variables (MAR), providing a global test statistic by simultaneously testing for mean differences across all variables. This test uses a chi-squared statistic to summarize the standardized mean difference between each variable's subgroup means and the overall mean. A significant chi-squared would suggest a significant deviation in mean differences on one or more variables between subgroups, and consequently a rejection of the null hypothesis that the data are MCAR (Nicholson et al., 2015).

In order to analyze the association between romantic relationship status and psychological well-being, the second aim was addressed by carrying out an analysis of Structural Equation Models (SEM) using the EQS 6.2 software. Here, following the recommendations of Springer and Hauser (2006), the items were identified as categorical, in order to estimate the model more accurately. Taking into account the nature of the variables and the absence of normality, the Least Squares (LS) estimation method with robust correction was used (Bryant and Satorra, 2012). In addition, the Lagrange Multiplier Test (LM Test) was performed to evaluate the statistical feasibility of specifying restrictions in the model (Byrne, 2006). One of the applications of this test is to assess the appropriateness of establishing error covariances, previously freely estimated, to identify which parameters would lead to a significantly better-fitting model (Byrne, 2006). To do that, if any of the univariate tests yield statistically significant results, LM test proceeds with a multivariate test of fixed parameters. As such, it uses a forward stepwise procedure that selects, through a series of incremental univariate tests, the next parameter to be added to the multivariate test, that is, the next fixed parameter that provides the largest increase in the multivariate χ^2 statistic (see Bentler, 2006 for a review). To evaluate the model, the Satorra-Bentler parameter values were used, corrected by a robust covariance matrix, since these have been proven to provide the best adjustment indices (Bentler, 2006). In addition to the Satorra-Bentler Chi-square and its probability value (*p*), other fit indices used were the CFI (Comparative Fix Index), NFI (Normality Fix Index), NNFI (Non-Normality Fix Index) (≥ 0.90 suitable, ≥ 0.95 optimum), and RMSEA (Root Mean Square Error of Approximation) (≤ 0.08 adequate, ≤ 0.05 optimal) (Hu and Bentler, 1999).

RESULTS

Attrition Analyses

At wave 1, Little's MCAR test showed a non-significant chi-squared [$\chi^2 = 233$ (1), $p = 0.63$]. Regarding wave 2, similar results were obtained [$\chi^2 = 859$ (3), $p = 0.83$]. These results confirm completely at random nature of the missing data and it was therefore decided not to exclude them from the analyses.

Psychological Well-Being During Adolescence: A Longitudinal Analysis

The first aim of this work was to analyze the level of psychological well-being during adolescence and its stability over time. As regards the overall scores, the correlations of paired samples reflected a positive association between both waves for all the dimensions, with moderate values ranging from 0.39 (positive interpersonal relationships) to 0.57 (self-acceptance) (Table 1). In all dimensions, the scores obtained represented medium-high levels of psychological well-being, given that they were greater than four points on a scale of 1–6. In both wave 1 and 2, the highest values corresponded to life development, and the lowest to autonomy (Table 2); the only significant differences were found in positive interpersonal relationships, which increased in time 2 [t (670) = -2.26 , $p = 0.024$]. As regards the participants' gender, the results showed the same tendency. The correlations found between both times showed a moderate, positive relationship between all the dimensions, with values ranging from 0.38 (positive interpersonal relationships in girls) to 0.60 (self-acceptance in girls) (Table 1). Both boys and girls showed higher levels of positive interpersonal relationships, autonomy and life development in wave 2, as well as lower levels of self-acceptance. Again, the results indicated medium-high values of well-being in all dimensions; in both wave 1 and 2, boys and girls had the lowest scores in autonomy, and the highest scores in self-acceptance (boys) and in life development (girls) (Table 2). The *t*-test for related samples showed that there were no significant differences between measurements in the first and second waves in boys, and so the scores were stable over time. In girls, significant differences were only found with respect to positive interpersonal relationships [t (344) = -1.99 , $p = 0.048$].

TABLE 1 | Psychological well-being correlations for paired samples.

	Self-acceptance		Positive interpersonal relationships		Autonomy		Life development	
	<i>r</i>	sig	<i>r</i>	sig	<i>r</i>	sig	<i>r</i>	sig
Wave 1- Wave 2								
Overall	0.57	0.000	0.39	0.000	0.41	0.000	0.40	0.000
Boys	0.52	0.000	0.41	0.000	0.31	0.000	0.39	0.000
Girls	0.60	0.000	0.38	0.000	0.51	0.000	0.42	0.000

The Association Between Romantic Relationships and Psychological Well-Being in Adolescence

The secondary aim of this work was to analyze the association between romantic relationships and the psychological well-being of adolescents. To do this, the data corresponding to wave 1 were used. Romantic relationship status was recoded and identified by the labels *current romantic relationship*, *past romantic relationship*, and *never romantic relationship*. The results showed that 27% of the participants had a current romantic relationship, 36.9% had a relationship in the past, but did not have it in the present, and 30.9% had never had a romantic relationship (missing cases = 5.1%). Descriptive statistics of psychological well-being according to romantic status can be observed in **Table 3**. The results of Chi-Square test showed no significant differences between the means of psychological well-being dimensions in relation to participants' romantic relationship status.

Regarding to SEM analyses, the results obtained enabled us to establish a model in which romantic relationship status was found to be a reliable predictor of adolescent psychological well-being. Relationships between psychological well-being dimensions were established starting from a saturated model, in which correlation indices between all the dimensions were examined. Thereafter, introducing the predictor variable (romantic relationship status), several models were tested. Finally, we obtained a model in which direct associations between life development and self-acceptance, self-acceptance and positive interpersonal relationships, and positive interpersonal relationships and autonomy were the only ones that led to an adjusted model. Additionally, the Lagrange Multiplier Test (LM Test) was performed to explore the restrictions which could improve the model. Following the results provided for the stepwise procedure of this test and focusing on univariate

increment statistics, that is, χ^2 values that stood apart from the rest and probabilities <0.05 , eight covariances were finally established between the measurement errors of the items 11, 12, 13, 14, 15, 16, 17, 18, and 22.

A Mardia coefficient value of 121.9652 indicated that the data did not comply with the assumption of multivariate normality. The final model showed good adjustment indices, χ^2 S-B = 757.0835; df = 174; $p < 0.001$; NFI = 0.941; NNFI = 0.951; CFI = 0.959; RMSEA = 0.059 [90% CI (0.053, 0.064)] (**Figure 1**). The results showed that there was a direct relationship between romantic relationship status and the four measurements of well-being assessed. A positive association with positive interpersonal relationships ($\beta = 0.34$; $p < 0.05$) and life development ($\beta = 0.50$; $p < 0.05$) was found and a negative one with self-acceptance ($\beta = -0.47$; $p < 0.05$) and autonomy ($\beta = -0.47$; $p < 0.05$). Likewise, it was found that life development was directly and positively related to self-acceptance ($\beta = 0.77$; $p < 0.05$), self-acceptance to positive interpersonal relationships ($\beta = 0.64$; $p < 0.05$), and positive interpersonal relationships to autonomy ($\beta = 0.74$; $p < 0.05$). These data showed that the dimensions where romantic relationship status had a greater impact were self-acceptance, autonomy, and life development, while its influence on positive interpersonal relationships was significant, but weaker. According to these results, adolescents who had a current or past romantic relationship were more likely to experience lower levels of autonomy and self-acceptance, but higher levels of life development and positive interpersonal relationships, compared to those who had never had a romantic relationship. In addition, higher levels of life development were associated with greater self-acceptance, higher levels of self-acceptance with better interpersonal relationships, and better interpersonal relationships with greater autonomy. As for the magnitude of the relationships

TABLE 2 | Means (SD) of psychological well-being.

	Self-acceptance	Positive interpersonal relationships	Autonomy	Life development
Wave 1				
Overall ($n = 747$)	4.77 (0.89)	4.69 (0.96)	4.03 (1.07)	4.87 (0.95)
Boys ($n = 367$)	4.90 (0.83)	4.67 (0.93)	4.03 (1.07)	4.76 (0.99)
Girls ($n = 375$)	4.64 (0.94)	4.71 (0.99)	4.03 (1.08)	4.97 (0.89)
Wave 2				
Overall ($n = 747$)	4.73 (0.99)	4.79 (1.01)*	4.08 (1.09)	4.88 (0.96)
Boys ($n = 367$)	4.85 (0.95)	4.74 (1.01)	4.10 (1.07)	4.84 (0.99)
Girls ($n = 375$)	4.61 (1.03)	4.83 (1.00)*	4.07 (1.12)	4.92 (0.92)

* $p < 0.05$; missing data ranged from 4.82% ($n = 36$) to 5.62% ($n = 42$) across all variables.

TABLE 3 | Means (SD) of psychological well-being by romantic relationship status.

	Self-acceptance	Positive interpersonal relationships	Autonomy	Life development
Current romantic relationship	4.79 (0.89)	4.70 (0.96)	3.92 (1.12)	4.90 (1.09)
Past romantic relationship	4.72 (0.94)	4.77 (0.94)	3.96 (1.14)	4.93 (0.85)
Never romantic relationship	4.82 (0.67)	4.60 (0.98)	4.16 (0.94)	4.83 (0.83)

Missing data = 38 (5.1%).

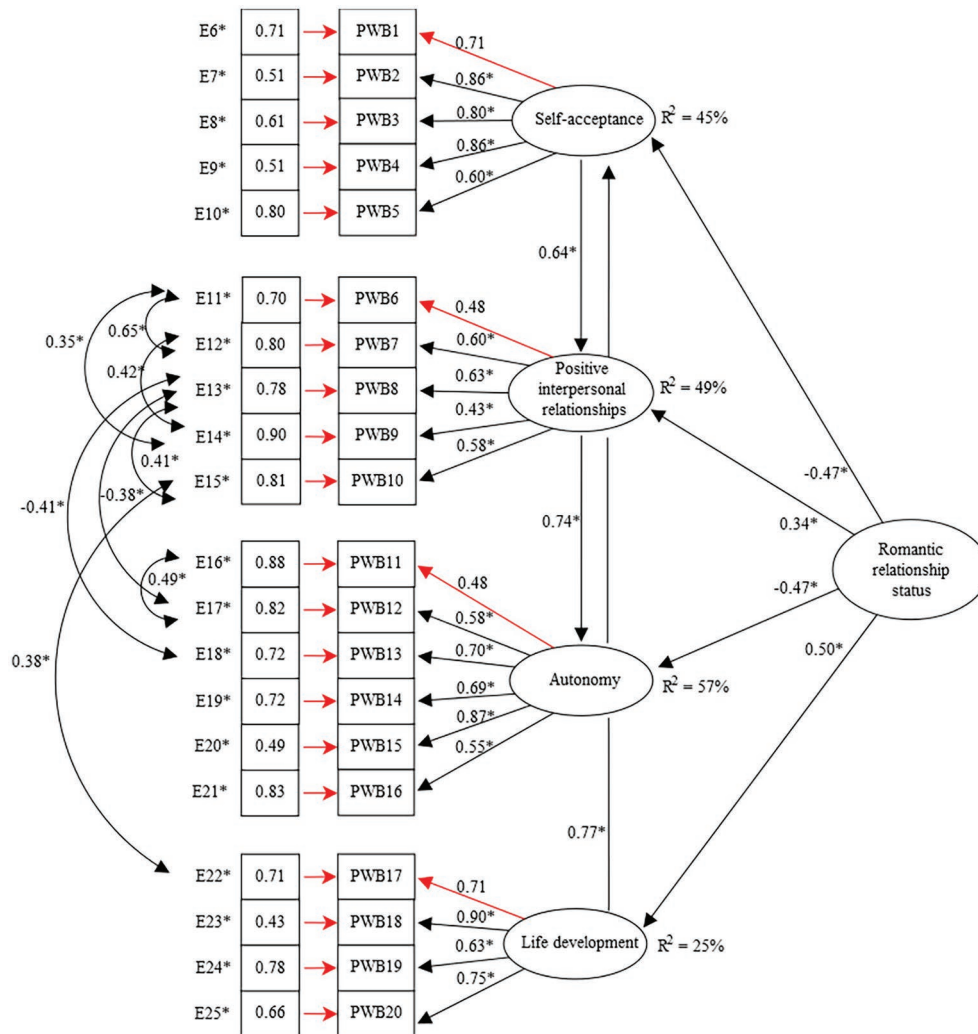


FIGURE 1 | Romantic relationships and psychological well-being during adolescence Structural Equation Model (SEM) * $p < 0.05$.

between the variables, the explained variance (R^2) for each of these relationships was from 25 to 57% (Figure 1).

DISCUSSION

Despite the evidence that the majority of adolescents overcome the challenges of this vital period without experiencing major social, emotional or behavioral difficulties (Steinberg and Morris, 2001), there are significantly fewer studies on adolescent well-being than those performed in the adult population (Huebner et al., 2009). Likewise, longitudinal studies regarding adolescent well-being adopt mainly a hedonic perspective, analyzing subjective well-being mostly in terms of satisfaction with life or affect balance (e.g., Inchley et al., 2016; Meade and Dowswell, 2016; Lerkkanen et al., 2018; Patalay and Fitzsimons, 2018), while only a few cross-sectional studies have been found adopting a eudaimonic approach (e.g., Loera-Malvaez et al.,

2008; Ruini et al., 2009; Fernandes et al., 2010, 2011; Vescovelli et al., 2014; Oprea et al., 2018). For these reasons, the first objective of this work was to analyze the level of psychological well-being during adolescence and its stability over time.

Psychological Well-Being During Adolescence and Its Stability Over Time

The results obtained showed medium-high general levels in the four categories measured: *self-acceptance*, *positive interpersonal relationships*, *autonomy*, and *life development* (Viejo et al., 2018). These values remained stable, with the exception of positive interpersonal relationships, whose scores increased in wave 2. The adolescents who took part in the study maintained a positive perception of themselves over time, considered themselves capable of regulating their own behavior and felt that they were developing their potential. As time progressed, they considered themselves more capable of establishing close, trusting and meaningful relationships with other people,

characterized by the expression of empathy, affection, and intimacy. The stability we found in psychological well-being did not allow us to support Hypothesis 1, according to which participants' scores of well-being would decrease in time 2. These results may be related to studies claiming that eudaimonic activities produce longer-lasting effects on well-being, and that eudaimonic well-being is more stable and durable than hedonic well-being (Steger et al., 2008; Huta and Ryan, 2010). Nonetheless, this should be interpreted with caution, as no comparisons have been made in this study between the two types of well-being. On the other hand, results obtained go against the results of previous research in the adult population, which indicates that the levels of personal growth (termed *life development* in this study) decrease during this stage (Clarke et al., 2000; Springer et al., 2011). This is surprising, because although no significant differences were found between the two waves, the highest levels of psychological well-being found in this study corresponded to this dimension (life development) – with the exception of the boys in wave 1, who scored more high in self-acceptance, in both wave 1 and 2. Longitudinal studies with adolescent samples also provide contradictory results to those found in this research. The HBSC study (Inchley et al., 2016) and Patalay and Fitzsimons (2018) reported poor stability for well-being, which tended to decrease over time, while other authors found improvements or stable scores for well-being as time progressed (Meade and Dowswell, 2016; Lerkkanen et al., 2018). These results, however, must be taken with caution, since they focus mainly on hedonic variables (e.g., satisfaction with life). Despite the fact that we have not found longitudinal research which measures eudaimonic well-being in the same way, some cross-sectional studies have used Ryff's psychological well-being scales (2014). Again, the results obtained are inconsistent compared to previous findings. Portuguese adolescents, for instance, showed both lower (Fernandes et al., 2010, study 1) and similar (Fernandes et al., 2010, study 2; Fernandes et al., 2011) levels of psychological well-being, while Dutch adolescents (Opree et al., 2018) and Italians (Ruini et al., 2009; Vescovelli et al., 2014) produced lower scores. This could be related to the data obtained by Ottová-Jordan et al. (2015), who found differences between the different countries analyzed.

As regards the participants' gender, both boys and girls showed medium-high levels of well-being in all the categories evaluated; however, the boys felt more self-satisfaction than the girls, while the latter showed a greater feeling of improvement and development of their self-potential, in indicators which remained stable. As time progressed, the girls reported higher levels of positive interpersonal relationships. This result partially supports Hypothesis 1 formulations that stated the absence of gender differences at time 1 but not in the follow-up. Previous cross-sectional studies using similar measurements did not find any significant differences according to the participants' gender (Vescovelli et al., 2014), while longitudinal studies which analyzed well-being in terms of satisfaction with different areas of life (e.g., friends, family, appearance, school, school work, and life as a whole) found contradictory results, indicating that girls showed a greater tendency to lose well-being compared to

boys (Inchley et al., 2016; Meade and Dowswell, 2016; Booker et al., 2018; Patalay and Fitzsimons, 2018). Research in adult samples showed similar results to those found in this work, with women scoring higher than men in positive relationships with others and in life development (originally termed "personal growth" by Ryff) (Keyes et al., 2002; Lindfors et al., 2006; Ryff and Singer, 2008).

All together, these results suggest, in line with other studies, that well-being during adolescence has its own idiosyncrasy (Casas, 2010), which should be studied from approaches focused on its evolution and specific characteristics. In this regard, it is necessary to highlight as a key aspect the type of measurement used to evaluate it. The contradictory results produced by research could point to the need to develop a theoretical framework in which the empirical data would enable us to understand adolescent well-being as a whole. In addition, the differences shown in the studies in different countries may indicate the need to take cultural factors into consideration.

Psychological Well-Being and Romantic Relationships During Adolescence

According to the specialized literature, well-being during adolescence is strongly influenced by the contexts in which adolescents develop (Geldhof et al., 2013; Inchley et al., 2016), and there is currently a sufficient body of scientific evidence on the impact of peers, parents, the neighborhood or the school on positive development (Benson and Faas, 2014). However, romantic relationships, despite being a particularly relevant context for adolescent well-being (Collins and Van Dulmen, 2006), have received little empirical attention (Steinberg and Morris, 2001; Collins, 2003). The secondary aim of this work therefore focused on analyzing the impact of these relationships on adolescent psychological well-being.

The results obtained show that romantic relationship status is a strong predictor of the four dimensions of psychological well-being measured. Participants with current or past romantic relationships showed better levels of positive interpersonal relationships and life development, while those who had never had a romantic relationship had higher levels of self-acceptance and autonomy. These results partially support Hypothesis 2, according to which romantic relationships will significantly predict adolescent psychological well-being, showing a positive association with self-acceptance, positive interpersonal relationships and life development dimensions, and negative with autonomy. The challenging nature of romantic relationships could account for the negative association found between romantic relationships and self-acceptance and autonomy dimensions. Following the postulates of the *stress and coping model* (Larson et al., 1999), adolescents may not have sufficient resources or coping strategies to deal with the demands of these new contexts, and since they do not feel capable of responding effectively, this could increase the risk of negative consequences (Davila, 2008), such as a more negative image of themselves and their own abilities. Some authors have suggested that novice learners can learn to develop awareness of their own metacognitive deficit (Miller and Geraci, 2011), in which the effect of the

learning curve is especially important (i.e., the improvement in task response effectiveness as it is repeated). It is obvious that a novice clearly takes time to adjust to a new task and requires a settling-in time until the adjusted response is obtained (Mayer, 2011). As adolescents become involved in these new social exchanges and become aware of the skills, abilities, and competencies required, they may feel insecure and underestimate their ability to cope with them, which may lead to an *achievement plateau* which sows an element of doubt in their minds about their own competence. It is reasonable, therefore, to deduce that romantic relationships have differential effects on the psychological well-being of adolescents, since the learning involved is usually self-taught and the immediate context is rarely involved. This could be linked to the results of previous research, which has found associations between romantic relationships and physical and mental problems (Davila et al., 2016). Other studies have associated romantic relationships to another type of negative consequences, such as violence within the couple, substance use, poor school performance or internalizing and externalizing behaviors (e.g., Zimmer-Gembeck et al., 2001; Ackard and Neumark-Sztainer, 2002; Callahan et al., 2003; Cui et al., 2012; Viejo et al., 2015). However, in the specific field of well-being, it is important to emphasize that no studies have been found analyzing the influence of romantic relationships in adolescent well-being following a eudaimonic approach. Studies focused on psychological well-being frequently understand it as the absence of depression and anxiety symptoms (e.g., Callahan et al., 2003; Bauermeister et al., 2010; Baams et al., 2014; Miller, 2014) and associate adolescent romantic relationships mainly with high levels of them (Callahan et al., 2003; Miller, 2014). These results are contradictory to the findings of this work, probably due to the measures used and the different approaches to the study of well-being. The large disparity between the conceptualization of psychological well-being as a multidimensional construct focused on what means to be healthy, well and fully functioning (Ryff and Singer, 2008), and the opposite one, which understand it mostly in terms of absence of illness or mental disorders, makes the task of drawing conclusions particularly difficult.

Besides this, the data obtained could point to a double reading of the impact of romantic relationships on adolescent well-being. Thus, the higher rates of life development and positive interpersonal relationships in the participants with romantic relationships could lead us to the idea that their challenging nature can equally lead to positive outcomes. As well as to being a developmental challenge, they can also act as a stimulating context in which to acquire skills for coping and managing interpersonal relationships. Therefore, as adolescents become involved in these types of relationships, they may eventually feel that they are improving and developing their potential and increasing their capacity to maintain close, trusting relationships based on empathy. These findings are consistent with those from other research, which has shown that romantic relationships provide a context of great intimacy, support, and importance for their protagonists (Demir, 2010; Shulman et al., 2011) and are a source of emotional connection

and social integration (Meirer and Allen, 2008). It is also important to stress the links found between autonomy, romantic relationships, and positive interpersonal relationships. While romantic relationships were negatively related to autonomy, positive interpersonal relationships had a positive link; in other words, maintaining satisfactory relationships with peers had positive effects on the adolescents' ability to feel independent and follow their own convictions, while romantic relationships had the opposite effect. These results could point to the distinctive nature of romantic relationships in comparison to other types of relationships, such as friendship (Collins, 2003; Collins et al., 2009). They seem to have a specific influence on adolescent well-being, fact that suggests the need to understand them as specific phenomena with their own characteristics.

Altogether, this calls for a need to take actions to promote healthy relationships; in other words, a need for training young people to manage and acquire the skills they need to maintain satisfactory relationships (Davila et al., 2017). Maintaining romantic relationships requires specific abilities which differ from those learned and used in other types of interpersonal relationships (Shulman et al., 2011). From this point of view adolescence, a stage in which erotic-sentimental interest begins and the first romantic relationships take place can be seen as the best period to start taking this kind of steps (Shulman et al., 2011).

Limitations and Future Directions

One limitation of this work is that, despite of being a longitudinal study, the follow-up period was relatively brief. On the other hand, the consideration of participants' romantic status through a cross-sectional design, calls for further longitudinal studies taking into account the impact of specific characteristics of romantic experience on adolescent well-being, such as the duration of the relationships, the content of the interactions or the romantic status changes. Therefore, cross-lagged path analyses would be very useful to compare the prospective relationships between romantic relationships and well-being. Concerning the possible gender and age moderation in the association between romantic relationships and adolescent well-being, in future studies, it would be appropriate to carry out multigroup analyses that help to clarify this issue. In addition, it is also suitable to control other variables, such as relationships with parents and peers. Besides that, the use of self-reports on aspects related to well-being could be affected by a *positivist bias*, that is, the tendency to overestimate the real values of well-being (Cummins, 1998). Future studies in populations outside Spain could also further our understanding of adolescent well-being and help us to draw more general conclusions about how it works and about its characteristics. Finally, without denying the significance of studying the implications of romantic relationships for adolescents' mental illness, the confusing scenario found with respect to psychological well-being conceptualization suggests the need to continue making empirical efforts to consolidate a shared language in well-being arena, as well as to strengthen the notion that mental health is not the mere absence of mental illness (Seligman, 2008).

CONCLUSIONS

The reduced amount of studies in comparison with adulthood, in both romantic relationships and eudaimonic well-being, suggests that further research is required to help shed light on the functioning, characteristics, and associations of these two phenomena during adolescence. This study provides empirical support for the view of adolescence as a period with good levels of well-being, as well as providing evidence of its stability. Furthermore, it reinforces the consideration of romantic relationships as essential contexts for adolescent well-being (Collins and Van Dulmen, 2006; Connolly and McIsaac, 2009). In this sense, it is important to emphasize that the practical implications of research on romantic relationships in adolescence and well-being must take into account the fundamental importance of the contexts in which adolescents develop. A greater involvement of parents, teachers, clinician, and adults in general would be essential to achieve optimal results. Romantic relationships have an effect on the well-being of adolescents, and the issue of how we, as members of the adult world, can help ensure that this effect is positive should not be avoided (Collins, 2003). Most parents, teachers, and clinicians will probably have to deal on a daily basis with issues related to romantic relationships of their children, students or patients and may feel overwhelmed or constrained in their capacity to provide guidance (Florsheim, 2003). In this regard, it is crucial that adults acquire knowledge about how to help adolescents to maintain healthy romantic relationships (Florsheim, 2003), given their significant influence on adolescent well-being.

Particularly in relation to well-being, a change of mindset about adolescence is also considered necessary. It is essential that the potentialities of adolescents, their positive qualities, their capacity to achieve a successful adjustment, and feel high levels of well-being be taken into account in the different areas with the potential to promote a positive development during these years: family, school, community, clinical practice, and scientific research. Only under this positive vision of adolescence, it will be possible to design and develop research and intervention programs encouraging knowledge and involvement of adults in adolescent romantic context, promoting

well-being of boys and girls and teaching them about how to successfully manage their relationships, thus creating social and empirical means to promote a positive adjustment in these years leading to adulthood.

DATA AVAILABILITY

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

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Declaration of Helsinki and the Spanish Society of Psychology. The protocol was approved by the Comité de Bioética y Bioseguridad de la Universidad de Córdoba (Bioethics and Biosafety Committee of the University of Cordoba). The study was approved by the school boards, and the consent obtained from the parents of the participants was both written and informed.

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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Sexting Among Adolescents: The Emotional Impact and Influence of the Need for Popularity

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Sexting refers to the exchange of sexual content material via technological devices. The definitions of this phenomenon vary greatly, mainly, depending on the types of sexting: primary and secondary. Besides the above, there is no common perspective on whether sexting is a risk behavior that entails some type of impact by itself or not and, in such a case, whether this impact varies according to gender. In addition, the need to be popular has shown to be a factor that could increase the probability of being involved in sexting. The present study analyzes the potential emotional impact of sexting as well as the effect of the need for popularity on this phenomenon and if it varies according to gender. The sample comprised 2,356 high school students (46.8% female, 53.2% male; age range 11–18 years old, $M = 13.72$; $SD = 1.31$) belonging to 12 compulsory secondary education (ESO) schools from the south of Spain. To assess sexting implication, four questions were presented to participants (sending, receiving, forwarding, and receiving sexts via intermediary). Scales, self-report, about emotional impact (depressed, annoyed, and active) and need for popularity were also applied. The results obtained show that, although sexting has a clear emotional impact on adolescents, it does not appear to generate a negative impact among those involved, at least in the short term. Concretely, this phenomenon seems to trigger emotions related to activation in boys and girls (I feel lively, energetic, satisfied, ready, determined, active). Additionally, with respect to the need for popularity, its relevance, specially, in relation to active emotional impact has been confirmed by the analyses. Statistical models found for boys and girls were similar. In addition, some differences in emotional impact by gender were found, girls feeling more depressed and annoyed in secondary sexting, and boys more active regarding both types of sexting.

Keywords: sexting, emotional impact, popularity, adolescents, risk factors

INTRODUCTION

The digital world has opened up a host of opportunities in adolescent social life. The use of electronic media for sharing and exchanging content of a sexual nature has become another form of intimate sexual communication attuned to today's technology-driven society (Döring, 2014). In general terms, sexting refers to the exchange of sexual material via a technological device

(Van Ouytsel et al., 2015). However, sexting definitions vary much depending on the behavior in question, the type of material, and whether sexting is restricted to sexual content or also encompasses erotic content (Barrense-Dias et al., 2017). The conceptual delimitations range from more restrictive ones which exclusively identify sexting as sending one's own sexually explicit images (Wolak et al., 2012; Ybarra and Mitchell, 2014; Choi et al., 2016; Marume et al., 2018) to more comprehensive ones which include other behaviors that cover the dissemination of sexual content to third parties, such as sending, receiving, and forwarding sexually suggestive and explicit photos, videos, and text messages (Mitchell et al., 2012; Villacampa, 2017). The difference between these two kind of conceptual delimitations support the categorization of primary and secondary sexting (Calvert, 2009; Schmitz and Siry, 2011). In the first case, minors send sexts between two people and do not share any further. In secondary sexting, someone shares sexts and they are forwarded beyond the intended recipient. It is relevant to mention that primary sexting tends to be consensual (with some exceptions like sextortion), but secondary sexting is likely to be non-consensual having a greater impact (Lievens, 2014), when freedom of choice is sometimes not an option (Walker and Sleath, 2017).

Involvement rates are highly varied, largely because of the wide range of attributable meanings (Barrense-Dias et al., 2017). When sexting is defined as the sending of sexual content, prevalence ranges from 4.6 (Rice et al., 2012) to 31% (Woodward et al., 2017). Receiving rates go anywhere from 7.1 (Mitchell et al., 2012) to 49% (Lippman and Campbell, 2014; Woodward et al., 2017), whereas prevalence rates for forwarding sexual content range from 2.3 (Lippman and Campbell, 2014) to 25% (Strassberg et al., 2017). These variations are partly linked to the increasing frequency of sexting in recent years (Clancy et al., 2019). Research has also pointed out how sexting is increasing with age (Madigan et al., 2018), especially among adolescents (Klettke et al., 2014). However, the onset of sexting could be starting earlier as age of access to smartphones is decreasing (Influence Central, 2016). This circumstance makes it necessary to develop more studies to analyze sexting behaviors in young adolescents.

To date, studies have failed to show a clear pattern of results concerning possible gender differences in relation to sexting prevalence. Some studies report that girls are more likely to share sexual images than boys (Reyns et al., 2013; Ybarra and Mitchell, 2014); other studies find boys participating more in this activity (West et al., 2014; Gámez-Guadix et al., 2017); and some studies observe no gender differences in sending and receiving sexual photos and messages (Lenhart, 2009; Rice et al., 2012; Campbell and Park, 2014; Vanden Abeele et al., 2014). These differences, in one direction or another, could be due to the type of sexting behavior being analyzed. As such, researchers have found that boys forward and request sexual photos and messages to a greater degree than girls, and that girls acknowledge that content of this type is more frequently asked of them (Norman, 2017; Symons et al., 2018). Ringrose et al. (2013) have pointed out that

gender differences in sexting behavior can also be linked to differences in motivations for sexting. Thus, whereas sexting seems to increase status in boys, girls' participation in sexting causes feeling of shame about themselves and their sexual reputation establishing what has been identified as a sexual double standard (Ringrose et al., 2013).

Apart from the sexting involvement rates, this phenomenon has attracted increased public and scientific attention in recent years because of its potential consequences (Gewirtz-Meydan et al., 2018). However, not everyone in the scientific community considers sexting a risk behavior (de Souza and Alves Banaco, 2018). Some authors defend adolescents' freedom of sexual expression *via* the Internet, arguing that the risks associated with this behavior do not lie in the transfer of files itself, but with the potentiality of its quick and widespread dissemination, thus widening the target audience (Livingstone and Görzig, 2014). However, other studies have found that sexting can affect the physical and psychological health of those involved as well as trigger symptoms of depression and even suicidal ideation (Strasburger et al., 2012; Jasso Medrano et al., 2018). Besides, sexting has also demonstrated to be associated to other risk behaviors (e.g., cyberpornography; Morelli et al., 2017). Therefore, we agree with those authors who consider it is necessary to act upon any potentially risky online behaviors, and, in this case, the very behavior of sexting can have an impact in itself (Van Ouytsel et al., 2014a). Therefore, sexting may bring an emotional impact and negative consequences for those involved (Klettke et al., 2014; Van Ouytsel et al., 2015; Choi et al., 2016). The reasons given for this phenomenon's potential impact include the transgression of sexual boundaries and the non-consensual distribution of sexual content to third parties (Dekker and Thula, 2017). Impact is also linked to different motivations (sexual, instrumental, and body image reinforcement) of sexting behavior, being instrumental reasons which cause higher negative impact (Bianchi et al., 2018). In addition, previous studies have shown how online victimization is associated to negative emotional impact (Ortega et al., 2012; Slonje et al., 2017). It would be necessary to confirm if the emotional impact of sexting is following the same negative pattern as other forms of online aggression/victimization (Giménez Gualdo et al., 2015). Concerning gender, there are also some studies stating a differential emotional impact depending on victims' gender, usually pointing out the higher negative impact in girls (Bastomski and Smith, 2017; Betts et al., 2019).

Although most studies analyze sending and/or receiving, primary sexting, it seems that the action most likely to pose greater harm and, therefore, play a more important role in understanding the consequences behind this phenomenon is the action of forwarding (Livingstone and Görzig, 2014; Dekker and Thula, 2017; Strassberg et al., 2017). The forwarding of sexual content refers to sending someone else's material to another person (Strassberg et al., 2017), secondary sexting, usually done without consent, which increases the risks of damaging the reputation of the victim (Van Ouytsel et al.,

2014b), and increases the risk of being involved in dating violence episodes (Morelli et al., 2016).

The consequences of sexting seem to affect boys and girls differently. It is usually more harmful for girls, as they tend to be at the receiving end of more insults and humiliation, thus damaging their reputation (Wood et al., 2015). In turn, boys can experience positive consequences; for example, increased acceptance inside peer group (Speno, 2016; Burén and Lunde, 2018). This reality exposes the sexual double standard governing sexting, as it is girls who are more likely to have their reputation tarnished and who mostly face the consequences of this phenomenon as well as a greater negative impact (Wood et al., 2015). Thus, there seem to be different patterns to explain the roles that boys and girls take on in the negotiation process and the consequences by gender (Wood et al., 2015; Symons et al., 2018). Furthermore, this might be linked to the type of sexting behavior being analyzed.

Gaining popularity and peer acceptance is one of the main aims of adolescents in their social life (Santor et al., 2000), in face-to-face and online contexts. In fact, research has shown there are no differences between both contexts according to adolescents' need for popularity (Wright, 2018). It has also been mentioned that there are no gender differences concerning need for popularity (Dijkstra et al., 2010), even when boys and girls could use different strategies to find that popularity: boys increasing the number of sexual partners (Prinstein et al., 2011) and girls taking care of their sexual reputation among peers (Salter, 2016). Need for popularity correlates with sexting participation (Gewirtz-Meydan et al., 2018). Adolescents who feel a stronger need to be popular are more likely to post photos of themselves (Vanden Abeele et al., 2014), thinking that posting their own sexual photos represents a strategic means for them to gain in acceptance among their peers (Baumgartner et al., 2015). From this perspective, the results obtained by Vanden Abeele et al. (2014) indicate that the need for popularity predicts sexting involvement in both, boys and girls.

Need for popularity could also be linked to impact of sexting, as suggested by Alonso and Romero (2019), although maybe not in the same way for boys and girls. Thus, girls, when participating in sexting, receive insults and rejection, experiencing negative feelings post-sexting, negative impact which is not usual in boys (Temple and Choi, 2014; Burén and Lunde, 2018). Need for popularity and gender were also identified as moderators of depressive symptoms (Nesi and Prinstein, 2015), pointing out the potential role of these variables over emotional impact of participants. This suggests that although the need for popularity affects boys and girls, different theoretical models could be required to explain these behaviors (Vanden Abeele et al., 2014).

Taking into account the reviewed literature, our main objective was to analyze the potential emotional impact of sexting as well as the importance of the need for popularity in this phenomenon. Specifically, we sought to examine (1) whether the different types of sexting (primary and secondary) affect those involved in it emotionally; (2) whether the need for

popularity is related to both types of sexting and its emotional impact; and (3) whether the aforementioned relationships vary by gender.

In view of the reviewed empirical evidence, our working hypotheses were as follows:

H1: Sexting would have an emotional impact on those involved, but this impact would vary according to the type of sexting and gender.

H2: The need for popularity would affect sexting and its emotional impact but this relationship would vary by gender.

MATERIALS AND METHODS

Participants

The sample comprised 2,356 high school students (46.8% girls, 53.2% boys) from 11 to 18 years of age ($M = 13.72$, $SD = 1.31$). The participants belonged to 12 compulsory secondary education (ESO) schools, three of which were publicly funded private institutions (*concertados*) from the south of Spain. Specifically, 34.5% were first-year students; 28.7% were second-year students; 21.5% were third-year students; and 14.9% were fourth-year students. However, in order to develop the study of primary and secondary sexting, we used two subsamples. Concretely, the sample for primary sexting was composed by those students who had, or having had, a dating partner in the last 3 months and had sent and/or received sexts at least once. So, this sample was composed of 263 participants (44.5% girls, 55.5% boys; $M = 14.34$, $SD = 1.24$ years old). The criterion to be part of the subsample of secondary sexting was having forwarded and/or to have been forwarded sexts at least once. Thus, this sample was formed by 621 participants (41% girls, 59% boys; $M = 14.16$, $SD = 1.26$ years old).

Measures

Some socio-demographical questions, gender and age, were required. In addition, a direct question about partner was also asked: "Do you have or have you had a partner in the last three months?" with dichotomized answer, (Yes or No).

To assess sexting, we used four direct questions relating to both primary and secondary sexting involvement, following the guidelines set out in numerous research studies in which direct questions were used to measure involvement (Temple and Choi, 2014; Choi et al., 2016; Gewirtz-Meydan et al., 2018). These behaviors with regard to primary sexting were: *I've sent videos, photos or messages of an erotic-sexual nature to my boyfriend/girlfriend* and *I've received videos, photos or messages of an erotic-sexual nature from my boyfriend/girlfriend*. With regard to secondary sexting, they were: *I've forwarded or shared videos, photos or messages of an erotic/sexual nature of other boys/girls* and *I've been forwarded videos, photos or messages of an erotic-sexual nature of other boys/girls*. The responses were formulated using a 5-point Likert scale response format:

0 = Never; 1 = Hardly ever; 2 = Sometimes; 3 = Often; and 4 = Always.

To examine the emotional impact of sexting, an adaptation of the Cybervictimization Emotional Impact Scale, namely the CVEIS (Elipe et al., 2017) was used. Just following the four sexting items, a filter question was asked, and those who said to have sent, received, or forwarded videos, photos, or messages of an erotic-sexual nature were required to fill in the current questionnaire. This questionnaire comprises 18 items that evaluate three types of emotional impact: (1) Active, which includes animated; energetic, lively; satisfied, proud; ready, clear-headed; determined, daring; active, alert; (2) Depressed, which is made up of tense, nervous; guilty; scared, afraid; lonely; ashamed; defenseless, helpless; depressed, sad; fed up; jittery, worried; and (3) Annoyed, which covers angry, annoyed; irritable, in a bad mood; choleric, enraged. If the respondent has engaged in the referred-to phenomenon, he/she should respond by indicating to what extent he/she had experienced each emotion on a Likert scale ranging from 0 = Not at all, to 4 = A lot. Reliability (Rho coefficient) in the present sample was optimal, 0.97 for primary sexting and 0.97 for secondary one, and the results of confirmatory factor analyses (CFA) were adequate: $\chi^2_{S-B} = 203.21$, $p = 0.00$; CFI = 0.991; NNFI = 0.992; RMSEA = 0.048; SRMR = 0.077 for primary sexting; $\chi^2_{S-B} = 334.15$; $p = 0.00$, CFI = 0.988; NNFI = 0.986; RMSEA = 0.052, SRMR = 0.090 for secondary sexting.

To assess the need for popularity, we used the *Need for Popularity Scale* (Santor et al., 2000; Utz et al., 2012). This instrument comprises 12 items on a 5-point Likert-type scale (0 = Completely disagree to 4 = Completely agree). Its aim is to evaluate whether behaviors perceived as popular among peers are performed. To this end, items such as *On occasions, I've changed the way I dress in order to be more popular* were included. Reliability (Rho coefficient) in the present sample was 0.93, and the confirmatory factor analysis was adequate: $\chi^2_{S-B} = 250.33$, $p = 0.00$, CFI = 0.991, NNFI = 0.989, RMSEA = 0.043, SRMR = 0.044.

Procedure

First, we obtained permission from the Andalusia Biomedical Research Ethics Coordinating Committee (0568-N-14), which follows the guidelines set by the International Conference on Harmonization (ICH) Good Clinical Practice (GCP). We then contacted the schools to explain the research to them and request their collaboration. The parental written informed consent has been obtained through the acceptance of participation in the Project that is given by the School Board of each school. In the case of administration of anonymous self-reports related to relevant matters to education, each family, when applying to the schools, delegates, unless expressed otherwise in written, the acceptance of participation to the School Board. This School Board is composed by teachers, students, and representatives of families who behave on behalf of school families. Once the School Board approval had been received, we proceeded to collect data. The questionnaires were administered by specially trained researchers during class

time, once teachers had given their prior consent. Completion of the questionnaires took approximately 40 min. Before starting, everyone was informed about the voluntary nature of study participation, response anonymity, and data confidentiality. We stressed the importance of answering truthfully to the students.

Data Analysis

We ran the analyses for each type of sexting, primary and secondary, with those participants who said to have been involved, at least, hardly ever in these behaviors (sending and/or receiving in primary sexting and forwarding and/or to have been forwarded in secondary one). In addition, primary sexting was assessed just in those who said to have or have had a partner in the last 3 months given that the items in this case were referred to their boyfriend or girlfriend.

First, we performed descriptive analyses (M , SD , skewness and kurtosis) of the study variables to explore their distribution as well as to identify potential irregularities, extreme cases, etc., that may skew the results. This was followed by Student's t -tests to analyze possible study variables' differences between boys and girls. We then tested two structural equation models, one for each type of sexting, and the emotional impact dimensions. After that, we tested the gender invariance of these models. Afterward, we tested two equation models, again one for each sexting type, between need for popularity (NfP from now) and sexting. Once again, gender invariance testing was repeated on these models. Eventually, two more complex models, including NfP, sexting (primary or secondary), and emotional impact were run and, one more time, gender invariance was tested.

The models were estimated via the Robust Maximum Likelihood Method, adjusted to the ordinal nature of the study variables (Flora and Curran, 2004). The fit of the models was tested using the following indexes: the Satorra-Bentler scaled chi-square (χ^2_{S-B}) (Satorra and Bentler, 2001); the robust comparative fit index (RCFI) and the non-normality fit index (NNFI) (≥ 0.90 is adequate; ≥ 0.95 is optimal); the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) (≤ 0.08 is adequate; ≤ 0.05 is optimal) (Hu and Bentler, 1999). To test the invariance of the models, between-gender multi-group analyses were run. We used a hierarchical strategy. First, we tested a model with no constraints (configural model); second, we tested a model in which equal factor loadings from items to factors were imposed (measurement model); and third, we tested a model in which, besides equal factor loadings, factor variances and covariances were imposed. In order to assess non-invariance, we used the scaled difference chi-square test by Satorra and Bentler (2001). When non-invariance was detected, the Robust Lagrange Multiplier Test (RLMT) was used to analyze which constraints needed to be released in order to achieve invariance. After that, these constraints were released and the new models were run and compared.

The statistical analyses were performed with EQS 6.2. (Bentler, 2006).

TABLE 1 | Descriptive statistics.

	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Gender	<i>M (SD)</i>	<i>T</i>	<i>p</i>
Primary sexting (N = 263; 44.5% girls, 55.5% boys)								
Active impact	0.83	1.07	1.17	0.30	Girls	0.52 (0.77)	−4.45	0.00*
					Boys	1.09 (1.21)		
Annoyed impact	0.44	0.75	2.38	6.01	Girls	0.46 (0.79)	0.53	0.59
					Boys	0.41 (0.72)		
Depressed impact	0.33	0.78	2.84	8.12	Girls	0.30 (0.74)	0.53	0.59
					Boys	0.36 (0.80)		
Need for popularity	0.75	0.65	1.40	2.24	Girls	0.70 (0.73)	−0.92	0.35
					Boys	0.79 (0.73)		
Secondary sexting (N = 621; 41% girls, 59% boys)								
Active impact	0.54	0.89	1.82	2.54	Girls	0.25 (0.55)	−7.54	0.00*
					Boys	0.74 (1.01)		
Annoyed impact	0.33	0.58	2.66	8.88	Girls	0.39 (0.63)	2.19	0.02*
					Boys	0.28 (0.53)		
Depressed impact	0.34	0.76	2.66	7.03	Girls	0.48 (0.91)	3.31	0.00*
					Boys	0.25 (0.62)		
Need for popularity	0.70	0.69	1.36	1.97	Girls	0.67 (0.67)	−1.10	0.27
					Boys	0.70 (0.70)		

p* < 0.05.TABLE 2 |** Fit indexes of the models to emotional impact including the three impact factors: Active, Depressed, and Annoyed.

	$\chi^2 - B$	<i>p</i>	NNFI	CFI	RMSEA	SRMR
Primary sexting	324.48	0.00	0.85	0.87	0.06	0.09
Secondary sexting	452.25	0.00	0.82	0.84	0.05	0.09

TABLE 3 | Fit indexes of the models to the active impact.

	$\chi^2 - B$	<i>p</i>	NNFI	CFI	RMSEA	SRMR	<i>R</i> ²
Primary sexting	26.75	0.11	0.98	0.98	0.04	0.02	0.27
Secondary sexting	40.87	0.02	0.96	0.97	0.04	0.03	0.28

RESULTS

First, we calculated the descriptive statistics of the different study variables and we calculated the Student's *t*-tests to determine the potential differences between boys and girls (see **Table 1**). In primary sexting, significant differences were found in active impact, yielding a higher average in boys. In secondary sexting, significant differences in all types of impact were found. Specifically, whereas boys showed a higher average in active impact, the contrary was true for girls in annoyed and depressed impact. No differences were found in NfP in primary and neither secondary sexting according gender (see **Table 1**).

Next, we analyzed two structural equation models with emotional impact. Neither of the models showed adequate statistical adjustment (see **Table 2**).

We analyzed then the statistical indexes finding that the contribution of Depressed and Annoyed emotional impact to the models was minimum. In the case of the Annoyed impact, the *R*² was 0.005 for primary sexting and 0.009 for

secondary sexting. In the case of the Depressed impact, the *R*² was 0.013 for primary and 0.003 for secondary sexting. Therefore, we decided to test the models again, linking each type of sexting exclusively to the Active impact factor, which has demonstrated a clear relationship to both types of sexting.

As can be seen in **Table 3** and **Figure 1**, in this case, all models achieved an optimal fit.

Next, we performed an invariance analysis to verify to what extent each of these two models was valid for boys and girls.

Both models showed, in general, gender invariance with the only exception of the most restrictive model, the structural model, in secondary sexting (see **Table 4**). The RLMT identified equality in sexting as the to-be-released constraint. Once this constraint was released, model showed to be invariant (see **Table 4**).

Two models from NfP to involvement in sexting were then run (See **Figure 2**). Both showed an optimal adjustment although *R*² was pretty low (see **Table 5**).

The between-gender multi-group analyses showed that these models were totally invariant for girls and boys (see **Table 6**).

Lastly, the models were run by incorporating NfP as a predictor variable of involvement in the different types of sexting (see **Table 7** and **Figure 3**).

Then, as in the previous cases, next invariance analyses by gender were run revealing, one more time, a total invariance between girls and boys (see **Table 8**).

DISCUSSION

The overall aim of our study was to advance knowledge of the emotional impact behind sexting, shedding light not only



FIGURE 1 | Graphic solution of the sexting models to active impact.

TABLE 4 | Fit statistics for models of active impact to test gender invariance.

	χ^2 ($\Delta\chi^2$)	df (Δ df)	p	NNFI	RCFI	RMSEA
Model primary sexting						
Model 1	102.712	38		0.961	0.973	0.057
Model 2	115.55 (12.84)	44(6)	0.57	0.971	0.978	0.048
Model 3	122.88 (20.16)	46 (8)	0.38	0.967	0.973	0.052
Model secondary sexting						
Model 1	185.32	38		0.920	0.946	0.056
Model 2	226.55 (41.24)	44(6)	0.16	0.928	0.943	0.053
Model 3	256.08 (70.77)	46 (8)	0.02	0.912	0.928	0.059
Model 3b	228.57 (43.26)	45 (7)	0.20	0.931	0.945	0.052

Model 1: Configural invariance. Model 2: Measurement invariance (equal factor loadings). Model 3: Structural model invariance (equal factor loadings, factor variances, and covariances). χ^2 , Chi square statistic; df, degrees of freedom; NNFI, non-normed fit index; RCFI, robust comparative fit index; RMSEA, root mean-square error approximation.

on the emotional impact of this phenomenon among young involved individuals, but also on the influence that the need for popularity has on sexting involvement.

Regarding the first hypothesis, sexting involvement certainly has an emotional impact on those involved. However, this impact does not differ by type of sexting or gender. Irrespective of primary or secondary sexting, it has been determined that this phenomenon does not generate an obvious negative emotional impact at the moment in which the adolescents engage in sexting practices. Although the phenomenon has a clear emotional impact on adolescents, at least in the short term during involvement, this impact is linked to the active emotions (I feel lively, energetic, satisfied, ready, determined, active).

Thus, contrary to studies that observed a correlation between sexting and negative aspects including anxiety and depression (Strasburger et al., 2012; Jasso Medrano et al., 2018), in our study the emotions generally considered “negative,” that is, those related to sadness and depression, and those related to anger or annoyance, were not associated with sexting involvement. These results seem to support the line of argument held by some authors that sexting itself is

not the cause of negative emotional impact; rather, it could be further episodes, such as the non-consensual dissemination of images to third parties, a rapidly increasing target audience, and social judgments upon the victim’s reputation, that would likely cause this damage (Livingstone and Görzig, 2014; Van Ouytsel et al., 2014b). It is important to bear in mind that we have assessed the impact of sexting involvement in first person (I’ve sent, I’ve received, I’ve forwarded, I’ve been forwarded), and we have not elicited any information by way of question about whether the personal content sent has been distributed to third parties. It is highly likely that the negative consequences referred to in previous studies are a result of this situation (Livingstone and Görzig, 2014).

From this perspective, the fact that sexting generates an active emotional impact, as opposed to depressive or anger-based responses linked to poor psychosocial adjustment, could be something positive. However, this very aspect may also represent a risk to adolescents (Crockett et al., 2006). The active emotional response may act as a stimulus that invites adolescents to not anticipate and assess – or either manages to minimize – the possible effects of primary and secondary sexting and the associated risks. Therefore, experiencing a positive emotional impact when engaging in sexting can indicate a lack of awareness of the potential consequences of this practice. This highlights the need to explore this issue further by focusing on those actions whose aim is to prevent and address sexting.

In terms of gender differences, the results obtained suggest that the emotional impact behind both types of sexting is similar in boys and girls. On the basis of the findings of this study, it is possible to speculate that while girls could experience higher social pressure to engage in sexting, as reported in some studies (Wood et al., 2015), this pressure, be it perceived that way or not, does not translate into anger, as one might expect, but into activation. From this perspective, it would be interesting to qualitatively analyze what interpretation is made of the cited pressure. It might also indicate that those involved in these behaviors do not perceive

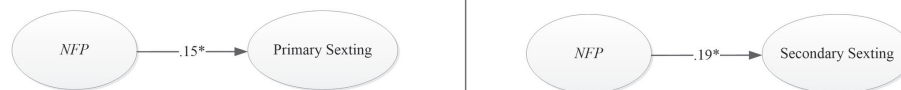


FIGURE 2 | Graphic solution of the models of Need for Popularity (NfP) to sexting.

TABLE 5 | Fit indexes of the models Need for Popularity to sexting.

	χ^2_{df-B}	p	NNFI	CFI	RMSEA	SRMR	R^2
Primary sexting	107.81	0.00	0.92	0.93	0.04	0.05	0.02
Secondary sexting	151.35	0.00	0.92	0.93	0.04	0.04	0.04

TABLE 6 | Fit statistics for the models NfP to sexting to test gender invariance.

	$\chi^2 (\Delta\chi^2)$	df (Δdf)	p	NNFI	RCFI	RMSEA
Model primary sexting						
Model 1	295.03	152		0.904	0.920	0.046
Model 2	313.61 (18.58)	164 (12)	0.45	0.912	0.920	0.044
Model 3	318.00 (22.97)	166 (14)	0.47	0.914	0.921	0.044
Model secondary sexting						
Model 1	396.823	152		0.912	0.926	0.042
Model 2	413.16 (16.33)	164 (12)	0.60	0.920	0.927	0.040
Model 3	414.38 (17.55)	166 (14)	0.72	0.922	0.929	0.040

Model 1: Configural invariance. Model 2: Measurement invariance (equal factor loadings). Model 3: Structural model invariance (equal factor loadings, factor variances, and covariances). χ^2 , Chi square statistic; df, degrees of freedom; NNFI, non-normed fit index; RCFI, robust comparative fit index; RMSEA, root mean-square error approximation.

TABLE 7 | Fit indexes of the models' active impact and sexting, incorporating the Need for Popularity.

	χ^2_{df-B}	p	NNFI	CFI	RMSEA	SRMR	R^2
Primary sexting	235.44	0.00	0.94	0.95	0.04	0.06	0.32
Secondary sexting	272.90	0.00	0.95	0.95	0.03	0.04	0.37

a risk of potential forwarding thereafter, and as suggested by Ybarra and Mitchell (2014), they conceive sexting as a romantic and enriching part of the relationship, although it carries an element of danger.

Although depressed and anger dimensions of emotional impact were not relevant in models, and these models showed

invariance between genders, we should not forget girls presented significantly higher scores in depressed and anger dimensions of emotional impact when we analyzed secondary sexting, and boys have a significantly higher active emotional impact in both types of sexting. In line with Ringrose et al. (2013), these results point to a different meaning behind sexting involvement by gender, reinforcing the idea of a double sexual standard to explain different consequences for boys and girls (Symons et al., 2018). This different impact can also be linked to other variables like motivations of sexting (Bianchi et al., 2018), non-consensual participation in sexting (Dekker and Thula, 2017), or some other factors associated to sexting experience like social pressure or threat (Lee and Crofts, 2015).

Regarding the second hypothesis, the need for popularity has contributed to understand the implication in sexting, but even more to explain the emotional impact of both types of sexting, slightly more in the case of the secondary one. As we used a scale to assess need for popularity in offline context, this reinforces the continuity between face-to-face and online worlds, as Wright (2018) suggested. When need for popularity is included in structural models of emotional impact of sexting, it increases their goodness fit. This coincides with previous studies which indicate that sexting participation could be linked to the need for popularity (Gewirtz-Meydan et al., 2018). Adolescents who feel a greater need for popularity are far more likely to post photos of themselves (Vanden Abeele et al., 2014), taking the view that posting their own sexual photos is a strategic way of gaining popularity among peers (Baumgartner et al., 2015).

As for gender differences, the explanatory power of the need for popularity in the emotional impact generated by primary and secondary sexting is similar in boys and girls. These results demonstrate that seeking peer acceptance through popularity is an important motivation for boys and girls when it comes to participating in these practices. From this perspective, the results obtained by Vanden Abeele et al. (2014) indicate that the need for popularity predicts, in a similar way, sexting involvement by boys and girls. Both sexes would seek acceptance

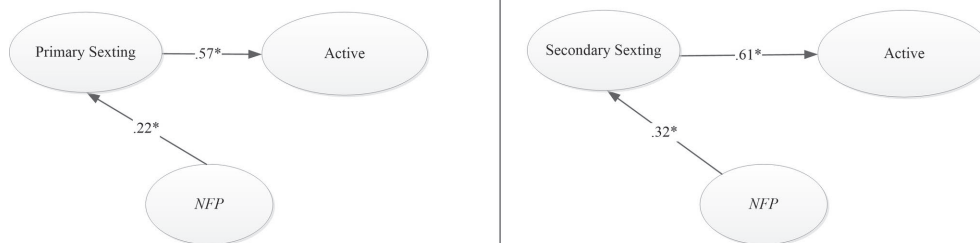


FIGURE 3 | Graphic solution of the models of sexting to active impact including NfP.

TABLE 8 | Fit statistics for the models sexting to active impact with NfP to test gender invariance.

	$\chi^2 (\Delta\chi^2)$	df (Δdf)	p	NNFI	RCFI	RMSEA
Model primary sexting						
Model 1	618,481	336		0.897	0.909	0.053
Model 2	647.48 (28.10)	353 (17)	0.55	0.905	0.912	0.051
Model 3	655.65 (37,17)	356 (20)	0.49	0.906	0.911	0.051
Model secondary sexting						
Model 1	768.34	336		0.922	0.931	0.039
Model 2	805.59 (37.25)	353 (17)	0.66	0.930	0.935	0.037
Model 3	810,91 (42,575)	356 (20)	0.70	0.932	0.936	0.037

Model 1: Configural invariance. Model 2: Measurement invariance (equal factor loadings). Model 3: Structural model invariance (equal factor loadings, factor variances, and covariances). χ^2 , Chi square statistic; df, degrees of freedom; NNFI, non-normed fit index; RCFI, robust comparative fit index; RMSEA, root mean-square error approximation.

and popularity by engaging in sexually permissive behaviors. However, the consequences of these practices would vary among them. These practices would help boys enhance their social capital and be more accepted within their peer group. In contrast, girls would, for the most part, not only gain in popularity but also be at the receiving end of insults and rejection, having their reputation damaged and experiencing negative feelings (Ringrose et al., 2013; Temple and Choi, 2014; Wood et al., 2015; Burén and Lunde, 2018). This reality echoes the sexual double standard that seems to govern this phenomenon (Wood et al., 2015; Symons et al., 2018).

CONCLUSIONS

Our study presents novel findings on the emotional impact of sexting and the influence of the need for popularity on adolescents. Taken together, the results reveal sexting to be a phenomenon that, in itself, does not appear to generate a negative impact among those involved, in a short term. Its impact, which is essentially “active,” seems to more strongly correlate with typical behaviors of desire and curiosity about

new experiences, much like the sexual experiences that play out during this developmental stage. The importance attached to the need for popularity when studying sexting behavior involvement has also been confirmed, given that adolescents who feel the need to be popular may see the exchange and distribution of sexual content as a strategy for gaining in acceptance into the peer group.

No significant gender differences were observed for either the emotional impact of sexting or the explanatory power of the need for popularity in the impact of primary and secondary sexting. However, girls presented significant higher scores when we analyzed depressed and anger dimensions in the case of secondary sexting. This finding invites us to continue exploring the role of sexting not only in terms of interaction with potential dating partners, but also in terms of female and male group status. This knowledge is essential as it enables us to identify key areas for designing prevention and intervention proposals that address sexting.

Our study does, however, pose some limitations that warrant mention. Measures applied in this study have shown some restrictions linked to a developing topic. In this sense, to our knowledge, no previous instruments have been applied to assess emotional impact in sexting episodes, and need for popularity has been usually assessed asking only for offline context. Additionally, we did not assess whether the content sent had been distributed to third parties without the sender's prior consent, or about the different motivations which could be behind sexting. Including these variables could be an important aspect for exploring the consequences of sexting further. That said, this is the first study to analyze the emotional impact of sexting, and we need to continue along these lines of inquiry.

As a future line of research, it would be useful to conduct qualitative studies that allow us to capture and analyze gender differences in greater depth. It is possible that some of the differences to emerge from the medium- and long-term consequences among boys and girls have more to do with the socially attributed meaning given by the protagonist of the sexual material, be it male or female, than with the impact brought about by the undertaking of sexting behavior itself.

DATA AVAILABILITY

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

ETHICS STATEMENT

The study was approved by the Comité Coordinador de Ética de la Investigación Biomédica de Andalucía (Coordinating Ethics Committee of Biomedical Research of Andalusia) and was in accordance with all regulations concerning professional ethics as stated in the International Conference on Harmonization Good Clinical Practice Guideline. The study was approved by the school boards and the students were visited and the anonymous, confidential, and voluntary nature and the objective of the study were explained before the survey was taken.

AUTHOR CONTRIBUTIONS

RR and JM-M designed the study. RR, JC, and MO collected the data. JC and PE designed and conducted the statistical

analyses in close consultation with RR, MO, and JM-M. MO and RR wrote the first draft of the introduction, PE and JC wrote the first draft of the method and results, and JM-M wrote the first draft of the discussion, in close consultation of all the authors. All authors contributed to and have approved the final manuscript.

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Character Strengths Lead to Satisfactory Educational Outcomes Through Strength Use: A Longitudinal Analysis

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Despite the flourishing of positive education, understanding of whether different character strengths have different predictive effects on academic achievement/well-being and the mechanisms of actions between character strengths are limited. Specifically, this study adopted strength use as a mediator to understand how character strength (assessed by caring, inquisitiveness, and self-control) is associated with students' end-of-year academic achievements and eudaimonic well-being. Survey data from 349 adolescents from three different schools showed that three factors of character strengths have positive correlations with academic achievements and eudaimonic well-being. Regression models indicated that inquisitiveness and self-control predicted academic achievements, while caring, inquisitiveness, and self-control predicted eudaimonic well-being, with the foremost as the strongest predictor. Mediation analyses indicated that (1) strengths use fully mediated the relationship between inquisitiveness, self-control, and academic achievements/eudaimonic well-being, while (2) caring had a direct effect on eudaimonic well-being. These findings provided possible explanations on how character strengths could affect students' academic achievements or eudaimonic well-being and theoretical and empirical evidence for practices that aim to enhance students' academic achievements and positive developments via interventions based on character strengths.

Keywords: character strengths, strengths use, academic achievement, eudaimonic well-being, positive education, positive development, adolescents, longitudinal analysis

INTRODUCTION

In recent years, the flourishing of positive psychology has corrected the imbalances in traditional psychological research and practices. Positive psychology deals with the positive aspects of human functioning (e.g., courage, perseverance, forgiveness, and originality), valued experience (e.g., well-being, contentment, satisfaction, and hope), civic virtues, and the institutions that move individuals toward good citizenship (e.g., responsibility, altruism, civility, and work ethic) (Seligman and Csikszentmihalyi, 2000). The core theme of positive psychology is "character

strengths” (Peterson and Seligman, 2004), which can be conceptualized as the positive qualities or dispositions of interests, talents, values, emotions, and thoughts manifested by individuals (Park and Peterson, 2009).

An increasing number of psychologists and educators suggest the application of positive psychology elements in this field to eliminate the negative tendency in traditional education, enhance the balance in education, and deepen its essence (Seligman et al., 2009; Shoshani and Steinmetz, 2014; Shoshani and Slone, 2017). Unlike traditional education that focuses on accomplishments, positive education proposes that accomplishments (e.g., academic achievements) and well-being are equally important components in the development of students’ life outcomes (International Positive Education Network, 2019). Well-being emphasizes individuals’ positive functioning, including competence, engagement, meaning and purpose, optimism, self-acceptance, supportive relationships, well-being of others, and being respected (Ryff and Keyes, 1995; Diener et al., 2010; Duan and Xie, 2019). Positive education advocates that character strengths is a potential pathway to facilitate students’ academic achievements and well-being in the educational context (Seligman et al., 2009; International Positive Education Network, 2019).

Peterson and Seligman (2004) developed the Values in Action (VIA) classification as a systematic framework to study character strengths. However, their two-tier structure of six virtues and 24 character strengths was unsupported by most empirical studies (e.g., Macdonald et al., 2008; Duan et al., 2012; Azañedo et al., 2014) with one exception (Ruch and Proyer, 2015). These results suggest that an alternative factor structure of character strengths can be developed. After the careful controlling of cultural influence, a few scholars have independently found the effectiveness of 24 character strengths grouped into a three-factor structure using various samples and instruments (e.g., Duan et al., 2012; McGrath, 2015; Duan and Bu, 2017; Duan and Ho, 2017; Park et al., 2017), namely, caring, inquisitiveness, and self-control. Caring indicates the strengths (e.g., kindness, authenticity, and fairness) involved in maintaining agreeable relations toward others, inquisitiveness indicates the strengths (e.g., curiosity, creativity, and zest) that describe the curiosity and creativity to associate oneself with all life in the world, and self-control indicates the strengths (e.g., self-regulation, judgment, and love of learning) reflecting the regulation and adaptation ability in achieving values and goals (Duan and Bu, 2017). McGrath (2019) implied that the three-factor model is a reliable latent structure of the VIA classification form from cultural and psychological perspectives.

Extant studies have demonstrated that character strengths were positively related to the cognitive and emotional types of educational outcomes, including academic achievements (Lounsbury et al., 2009; Kern and Bowling, 2015) and well-being (Tang et al., 2016; Hausler et al., 2017). However, three dimensions of character strengths were found to have a different focus on academic achievements or well-being. For instance, although a study found that the intrapersonal, intellectual, and interpersonal strengths are positively correlated with grade point average above demographic covariates, only the intrapersonal

strength was significant when predicting the growth of grade point average (Park et al., 2017). A longitudinal study that followed 417 students and 13 teachers from four public middle schools found that temperance and intellectual strength, rather than interpersonal strength, were central in the prediction of students’ academic performances and achievements (Shoshani and Slone, 2013). Notwithstanding, in a two-year study of high school students, only other-directed strengths (similar to caring strengths) were strong predictors of well-being when controlling the influence of the temperance and intellectual strengths (Gillham et al., 2011). In the framework of positive education, academic achievements, and well-being must be developed simultaneously, however, the abovementioned studies only separately discussed the relationship between character strengths and academic achievements or well-being. Identifying the profiles of strengths that are strongly linked to academic achievements and well-being is crucial.

More importantly, in line with Linley et al. (2006), exploring the processes and mechanisms that lead to valued educational outcomes should be one of the key issues of positive education. Peterson and Seligman (2004) emphasized that individuals with specific character strengths act in accordance with such strengths and be intrinsically motivated to use them. When people use their character strengths, they follow their own will and natural capacities to fulfill their potential and achieve their goals, which would lead to valued outcomes such as achievements and well-being (Linley and Harrington, 2006). Consequently, the Aware-Explore-Apply (A-E-A) model was proposed to describe how strength-based approaches lead to valued outcomes (Niemi, 2013). The awareness phase aims to help individuals build the knowledge of their strengths, the exploring phase allows participants to understand how character strengths relate to valued outcomes through past and current experiences, and finally, the applying phase focuses on using character strengths in daily settings.

According to the A-E-A model, strength knowledge and strength use were two successive phases, with the former as the “launching point” (Shankland and Rosset, 2017). However, Zhang and Chen (2018) argued that if a person knows his character strengths well but never uses them, then he is unlikely to gain many benefits from these strengths. Therefore, strengths use is the direct route although strength knowledge is a prerequisite for obtaining valuable outcomes. Consistent with this, Quinlan et al. (2015) attempted a six-session intervention with 9- to 12-year-old students and found that rather than strength knowledge, strength use was associated with well-being changes and achievements. Thereafter, in a 1-year randomized controlled intervention Duan et al. (2018a) found that changes in strength use were significantly correlated with well-being, whereas changes in the awareness and recognition of character strengths did not significantly predict well-being. Thus, believing that strength use rather than strength knowledge was the working component is reasonable.

In sum, the above literature reviews imply the following. (a) Although general positive associations between character strengths and academic achievements/well-being are confirmed, character strengths may have different focuses when predicting educational outcomes. (b) Apart from exploring the direct

relationship between variables, clarifying the processes, and mechanisms that lead to valued educational outcomes should be more important in positive education. From the perspective of developmental psychology, the cognitive style and behavioral habits formed in adolescence play a decisive role in future life developments because people experience more rapid growth changes during this period than in any other life phases, except infancy (Carnegie Council on Adolescent Development, 1989). Under educational psychology, education received in schools is effective in shaping adolescents' cognitive styles and behavioral habits because they spend considerable time in these institutions (McLaughlin and Clarke, 2010). Therefore, the present study aims to address the abovementioned gaps by using longitudinal data from adolescents. Specifically, the following hypotheses are examined: (a) self-control and inquisitiveness strengths are stronger than caring when predicting academic achievements; (b) caring strengths are stronger than self-control and inquisitiveness when predicting well-being; and (c) strength use plays a mediating role between character strengths and valued educational outcomes, including academic achievements, and well-being.

To the best of our knowledge, this is the first study to examine the mediation role of strength use between the three-dimensional model of character strengths and educational outcomes among adolescents. The longitudinal design is used with the perspective of positive education. The results further clarify the key factors at work in the A-E-A model and then provide guidance for future effective strength interventions based on such model. Moreover, the findings can help educators develop effective strength-based positive education programs to improve students' academic achievements and eudaimonic well-being, as well as provide enlightenment significance to conduct positive education projects for teachers and practitioners in the future.

MATERIALS AND METHODS

Participants and Procedures

Participants included seventh to ninth grade students from three urban middle schools in Guangxi, Jiangsu, and Chongqing, China. All students in the said grade levels were welcome to participate in the present study. The three participating schools are all ordinary middle schools and were selected according to convenience. In each school, recruitment announcements were posted on the notice board 3 days before data collection. Data were collected through a paper-and-pencil method by trained master students majoring in social work. Parents and students signed consent forms before the latter completed the surveys.

The questionnaires were completed during the academic year. Different measures were used at each time point to test the predictive ability of character strengths. Character strengths and strength use were assessed at the beginning of the spring semester (February 2016) for the academic year 2015–2016 (Time 1). The order of scales was randomized to reduce any systematic order effect. Eudaimonic well-being was measured at the end of the same semester (July 2016), and the final exam grades were collected from the official school records (Time 2). In this survey,

359 students participated at Time 1, and 356 students participated at Time 2. Three students did not complete Time 2 because they transferred to another school. Seven students who forgot or missed to fill out all the items were removed. Finally, a total of 349 responses (193 females and 156 males, mean age = 13.64, $SD = 0.94$, age range = 12–17) were considered valid.

Instruments

Three-Dimensional Inventory of Character Strengths (TICS)

Character strengths were measured using the self-reported 15-item TICS (Duan and Bu, 2017) on a five-point Likert scale (1 = “very much unlike me” to 5 = “very much like me”). Caring (e.g., “I enjoy being kind to others”), inquisitiveness (e.g., “I am always coming up with new ways to do things”), and self-control (e.g., “I am a highly disciplined person”) were identified in previous empirical studies (Duan et al., 2012; Duan and Ho, 2017). High mean scores indicate considerable character strengths. Prior research has showed an acceptable goodness-of-fit of TICS (factor loadings = 0.492–0.814), as well as good internal consistency and invariant structures between Western and Eastern societies, medical and community populations, and across gender and age groups (Duan and Bu, 2017). In the present study, the reliabilities of caring ($\alpha = 0.85$), inquisitiveness ($\alpha = 0.82$), and self-control ($\alpha = 0.78$) were excellent.

Strength Use Scale (SUS)

Strength use was assessed by the 14-item SUS (Govindji and Linley, 2007). The scale was preceded by the following prompt: “The following questions ask you about your strengths, that is, the things that you are able to do well or do best.” Responses from the SUS (e.g., “I am able to use my strengths in lots of different situations”) were all made on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree). High mean scores in each scale indicate high levels of strength use. The goodness-of-fit indices of the revised Chinese version were satisfied among adolescents (Duan et al., 2018b), with the standardized factor loadings ranging from 0.52 to 0.91. In the present study, the SUS Cronbach alpha was 0.96.

Educational Outcomes

Academic achievement was assessed through the final exam grades. The official school records provided final exam grades for eight major academic courses, including Chinese, Mathematics, English, History, Geography, Biology, Physics, and Chemistry. The middle schools follow the normal grading systems in China. All students are required to attend the formal final exams. A student who is absent from the exam could make up the test in a later period. We averaged the final exam grades of the participants in the said courses to reflect academic achievements. The level of eudaimonic well-being was assessed by an eight-item flourishing scale (FS), which describes human functioning from a broad perspective (i.e., competence, engagement, meaning and purpose, optimism, self-acceptance, supportive relationships, well-being of others, and being respected) (Diener et al., 2010; Duan and Xie, 2019). A seven-point Likert scale (1 = “strongly disagree”; 7 = “strongly agree”) was adopted to rate items such

as “I am engaged and interested in my daily activities.” The mean score of the entire scale indicates the overall eudaimonic well-being. The goodness-of-fit indexes indicated that the single-factor model of the FS adequately fits the total, male, and female samples among adolescents, and the standardized factor loadings are higher than 0.56 (Duan and Xie, 2019). The solid single-factor structure, convergent, and discriminant validity of the FS likewise proved solid among the Chinese community (Tang et al., 2016). In the present study, Cronbach's alpha was 0.93.

Analytic Strategy

The means, standard deviation (SD), McDonald's omega (ω), and Peterson's coefficient inter-correlations were calculated for all variables using JASP 0.8.1.2. The three character strengths and strength use were positively related to students' academic achievements and eudaimonic well-being. Subsequently, two regression analyses were performed to examine the relative contributions of the character strengths (caring, inquisitiveness, and self-control) and strength use to educational outcomes (i.e., academic achievement and eudaimonic well-being). In the first regression with academic achievement as the dependent variable, gender and age were set as the control variables in Step 1, followed by the three strengths in Step 2 and strength use in Step 3. Similarly, the second regression replicated the steps, but with the dependent variable as eudaimonic well-being. Finally, on the basis of the regression results, two mediation models were constructed using Mplus 7.0 to examine the direct and indirect effects of strength use between the abovementioned three character strengths and academic achievements/eudaimonic well-being. Maximum likelihood (ML) estimation was adopted. To evaluate the model fit, we used the comparative fit index (CFI > 0.90), Tucker–Lewis index (TLI > 0.90), standardized root mean squared residual (SRMR < 0.80), and root mean square error of approximation (RMSEA < 0.08) to indicate close and reasonable fit (Hu and Bentler, 1999).

RESULTS

Descriptive Statistics and Correlations

Table 1 reports the descriptive and correlation statistics. As expected, character strengths and strength use were positively related to students' academic achievements and eudaimonic well-being ($r = 0.17$ – 0.79 , $p < 0.001$). Moreover, character strengths were positively related to strength use ($r = 0.32$ – 0.55 , $p < 0.001$).

Regressions

Table 2 summarizes the regression results. Gender and age could not significantly explain the variance with academic achievements or eudaimonic well-being. Specifically, when predicting academic achievements, only inquisitiveness and self-control were positive predictors, which explained 9.20% of variances. Strength use became the only significant predictor after entering Step 3, which additionally contributed 2.30% variances to academic achievements. When predicting eudaimonic well-being, all three character strengths significantly explained 38.90% of variances beyond demographic variables. After entering

strength use in Step 3, caring strength remained a significant predictor of eudaimonic well-being, whereas inquisitiveness and self-control were not. In general, strength use contributed additional explanations to academic achievements ($\Delta R^2 = 0.023$, $p < 0.001$) and eudaimonic well-being ($\Delta R^2 = 0.133$, $p < 0.001$) beyond character strengths.

Structural Equation Models to Test Mediation Effects

The abovementioned results showed that the specific dimensions of character strengths have different effects on specific outcome variables. Hence, two initial structural equation models (SEM) were constructed accordingly. In Model 1, inquisitiveness and self-control were used as correlated predictors, strength use was used as a mediator, and academic achievement was used as an outcome. In Model 2, the three character strengths were used as correlated predictors, strength use was used as a mediator, and eudaimonic well-being was used as an outcome. The fit indices of the initial Model 1 ($\chi^2 = 842.026$, $df = 269$, SRMR = 0.042, RMSEA = 0.078, CFI = 0.904, TLI = 0.893) and Model 2 ($\chi^2 = 1883.559$, $df = 619$, SRMR = 0.058, RMSEA = 0.077, CFI = 0.868, TLI = 0.858) were acceptable. When the direct paths from dependent variables to academic achievements/eudaimonic well-being were non-significant, such paths were removed from the model, and the parsimonious version was re-run to include only significant paths. The final Model 1 ($\chi^2 = 849.433$, $df = 271$, SRMR = 0.044, RMSEA = 0.078, CFI = 0.903, TLI = 0.893) and Model 2 ($\chi^2 = 1891.069$, $df = 622$, SRMR = 0.058, RMSEA = 0.076, CFI = 0.868, TLI = 0.858) were constructed with an unchanged goodness-of-fit.

Figure 1 shows the parameter estimates of Model 1. The direct effects of character strengths on academic achievements were non-significant ($p > 0.05$), whereas the indirect effects of inquisitiveness ($\beta = 0.125$, $SE = 0.039$, $p < 0.001$) and self-control ($\beta = 0.085$, $SE = 0.036$, $p < 0.05$) via strength use on academic achievements were significant.

Figure 2 exhibits the parameter estimates of Model 2. The direct effect of caring on eudaimonic well-being was significant ($\beta = 0.433$, $SE = 0.040$, $p < 0.001$). The indirect effects of

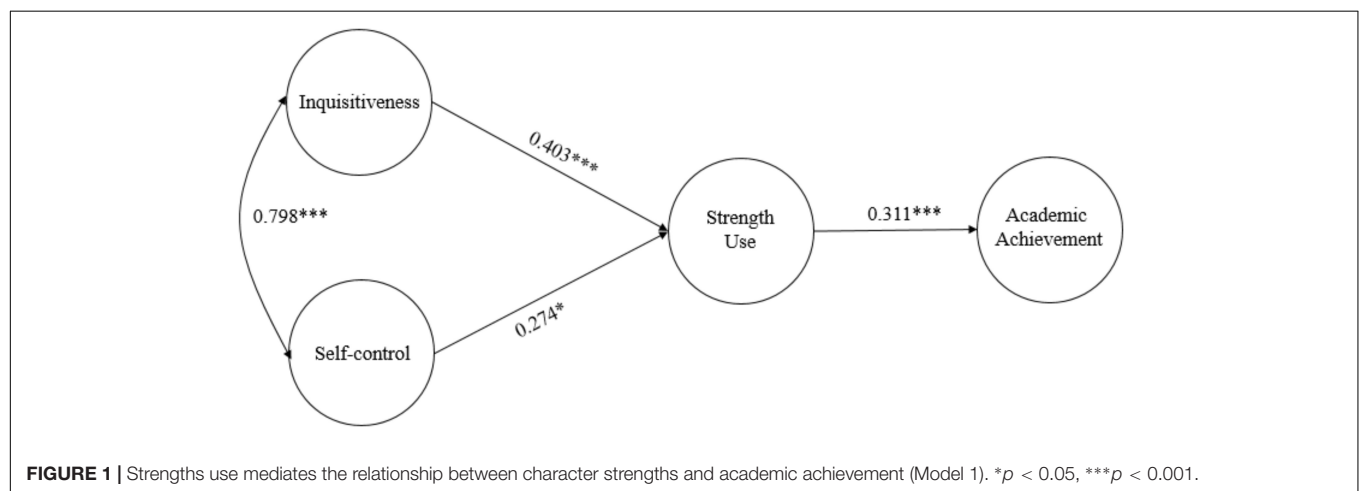
TABLE 1 | Descriptive and correlations statistics ($n = 349$).

	1	2	3	4	5	6
1 Strengths use	—	0.51***	0.32***	0.55***	0.60***	0.30***
2 Self-control		—	0.53***	0.63***	0.51***	0.27***
3 Caring			—	0.51***	0.56***	0.17***
4 Inquisitiveness				—	0.48***	0.27***
5 Well-being					—	0.29***
6 Academic achievement						—
Mean	4.73	3.42	4.02	3.49	5.30	78.21
SD	1.01	0.64	0.64	0.66	1.06	8.82
Cronbach's alpha	0.96	0.78	0.85	0.82	0.93	—

*** $p < 0.001$.

TABLE 2 | Regression results on academic achievement and flourishing ($n = 349$).

Independent variables	Dependent variables: academic achievement		
	Beta (t)		
	Step 1	Step 2	Step 3
Gender	−0.053 (−0.964)	−0.064 (0.232)	−0.050 (−0.937)
Age	−0.049 (−0.878)	−0.047 (0.372)	−0.045 (−0.862)
Caring		0.004 (0.950)	0.010 (0.165)
Inquisitiveness		0.170* (0.014)	0.094 (1.294)
Self-control		0.156* (0.026)	0.105 (1.478)
Strengths use			0.188** (2.963)
R^2 (F)	0.004 (0.683)	0.092 (6.922***)	0.114 (7.362***)
ΔR^2 (ΔF)		0.088 (11.041***)	0.023 (8.778**)
Independent variables	Dependent variables: wellbeing		
Gender	−0.002 (−0.029)	−0.011 (−0.252)	0.023 (0.605)
Age	0.003 (0.045)	0.001 (0.020)	0.006 (0.160)
Caring		0.372*** (7.193)	0.387*** (8.454)
Inquisitiveness		0.154** (2.730)	−0.030 (−0.553)
Self-control		0.212*** (3.705)	0.088 (1.695)
Strengths use			0.455*** (9.782)
R^2 (F)	<0.001 (0.002)	0.389 (43.754***)	0.523 (62.476***)
ΔR^2 (ΔF)		0.389 (72.921***)	0.133 (95.692***)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

inquisitiveness ($\beta = 0.202$, $SE = 0.056$, $p < 0.001$) and self-control ($\beta = 0.132$, $SE = 0.055$, $p < 0.05$) via strength use on eudaimonic well-being were significant.

DISCUSSION

The present study mainly aimed to systematically explore the profiles of strengths that highly relate to academic achievements and eudaimonic well-being and then test the mediation effect of strength use. As expected, the three character strengths (i.e., caring, self-control, and inquisitiveness) showed significant positive correlations with academic achievements and eudaimonic well-being. Regressions indicated

that inquisitiveness and self-control significantly predicted academic achievements and eudaimonic well-being, but caring significantly predicted eudaimonic well-being rather than academic achievements. The SEM results further indicated that strength use mediated the predictive effects of inquisitiveness and self-control on academic achievements/eudaimonic well-being, whereas caring showed a direct effect on eudaimonic well-being. Overall, these results supported our hypotheses and suggested that strength use could be an internal mechanism between the relationship of character strengths and educational outcomes.

The hierarchical regression models revealed interesting findings. Inquisitiveness and self-control predicted academic achievements and eudaimonic well-being, whereas caring was a stronger predictor of eudaimonic well-being than inquisitiveness

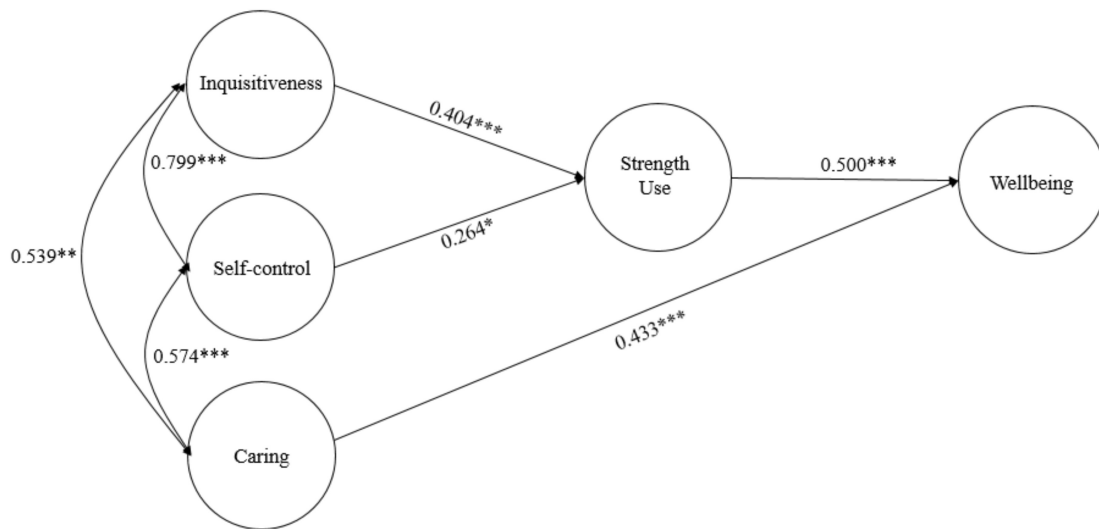


FIGURE 2 | Strengths use mediates the relationship between character strengths and well-being (Model 2). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

and self-control. These findings highlight the different functions of character strengths for educational outcomes. According to the strength model of self-control, students with high self-control love learning and are good at effectively managing study time and directing their efforts toward one area, which promote their academic achievements (Tangney et al., 2004; Duckworth and Seligman, 2006). Inquisitiveness, as a form of intrinsic motivation, was associated with curiosity, bravery, zest, and reflected intellectual endeavors (McGrath, 2015; Oudeyer et al., 2016). This trait is regarded as the important pillar of academic achievements (von Stumm et al., 2011). Caring strengths are those that maintain good relations toward others, and studies have shown that these strengths are more strongly connected to eudaimonic well-being than intellectual strengths (similar to inquisitiveness strengths) and strengths of restraints (similar to self-control strengths) (Martinez-Marti and Ruch, 2017).

The SEM results revealed that strength use mediated the relationships between inquisitiveness/self-control and academic achievements/eudaimonic well-being. The self-concordant model (Sheldon and Elliot, 1999) suggested that attaining goals that are self-concordant would obtain more beneficial outcomes (e.g., achievement and eudaimonic well-being) than those that are not. People who use their character strengths would stay true to their interests and values, which would help set self-concordant goals. For example, in a study of university students, using signature strengths offered a reliable pathway of setting and attaining self-concordant goals, which in turn promoted positive affect and eudaimonic well-being (Linley et al., 2010). A new study used the within-person approach by recording fluctuations in the strength use of 87 Norwegian naval cadets over the course of 30 working days. Individuals were found to experience a peak in positive affect and work engagement on days when they used their core strengths (Bakker et al., 2019).

Unexpectedly, in the present study, strength use did not play a role in the relationship between caring and eudaimonic

well-being. The conceptual overlaps between strengths and values could provide a tentative explanation. This overlap can lead people to the overestimation of the similarity of others' actions and thoughts to their own, and the underestimation of their own prowess may lead to blindness regarding their own strengths, such as kindness, curiosity, and bravery, especially for people whose values have evolved (Biswas-Diener et al., 2011). Caring is deeply embedded in Chinese culture. Chinese people could obtain a high level of well-being by adapting to social and ethical norms (Suh et al., 1998), such as making their significant others (e.g., family member) feel happy (i.e., caring) (Ho, 2010). For certain Chinese, caring is viewed as the "right thing" rather than an "extraordinary thing." As such, they do not realize that caring is a character strength and therefore do not consider actions of caring as strength use. Similarly, considering the role and function of strength knowledge is valuable. What needs acknowledgment is that the overcoming of strength blindness could be beneficial in improving individuals' self-efficacy and self-confidence, which in turn could affect individual well-being (Waters, 2015). Self-determination theory likewise indicates that the fulfillment of psychological needs for competence enhances personal developments and well-being (Ryan and Deci, 2000, 2001). Strength use could be practiced and developed over time and then deliver sustainable benefits, but strength knowledge could move from "no" (strengths knowledge = 0) to "have" (strengths knowledge = 1) and then deliver an initial benefit (Duan et al., 2018a). Thus, as suggested by Duan et al. (2018a), strength knowledge can be set as a binary variable to investigate its role between character strengths and outcomes in future studies.

This study has several theoretical and practical implications. On the one hand, the study provides evidence on the causal relationship between the three character strengths and academic achievements and eudaimonic well-being, as well as an underlying mechanism of how character strengths

contribute to educational outcomes by considering strength use. These results extend the A-E-A model and previous research on the association between character strengths and educational outcomes. Most importantly, this study points out that strength use plays a key role in the A-E-A model, which proves the effectiveness of strength use in strength-based interventions. On the other hand, the findings demonstrated the sights of character strengths and positive education for current and future educational programs and provided practical implications for teachers and practitioners who wish to enhance students' academic achievements and eudaimonic well-being. Encouraging students to use their strengths is an effective guiding strategy for educators, teachers, and school coaches, and strategies for different goals must be targeted. For instance, if the intervention aims to promote students' academic achievements, cultivating their use of inquisitiveness and self-control could be a better choice than cultivating their use of caring. Moreover, teachers and practitioners could likewise benefit from a positive education program. Hence, the results of this study likewise provide enlightenment for strength-based interventions conducted for teachers and practitioners.

Limitations and Future Directions

Despite these interesting and meaningful implications, several limitations of the present study must be highlighted. First, although character strengths are important factors in the positive educational context, their importance must not be over-expanded. Spengler et al. (2016) found that the characteristics, intelligence quotient, and perception of the academic ability of students likewise predicted the stable part of their grades. Second, the present study does not address the mechanisms of how strength use affects educational outcomes and the other potential mechanisms between character strengths and educational outcomes. For instance, Allan and Duffy (2014) found that the presence of calling moderates the relationship between strength use and satisfaction in the life and academic domains. Gillham et al. (2011) argued that other-directed (similar to caring) strengths could predict high well-being via the mediation effect of social support. Hence, more elements could be incorporated into the study of the educational context to reveal other influencing factors in favor of valued educational outcomes in the future. Third, the samples were collected in selected institutions, the inherent nature of which may influence the results. For instance, certain schools would substantially focus on academic achievements, whereas others may remarkably focus on the development of learned quality. In the future, a great diversity of samples and different school levels are necessary to ensure generalizable findings. Fourth, although the present study has a smaller sample size than the ideal, which is a size-to-parameter ratio of 20:1 (Kline, 2010), it met the less ideal criterion (i.e.,

size-to-parameter ratio between 10:1 and 15:1) recommended by Thompson (2000). Previous studies, such as those conducted by Lowe (2018) and Feldt et al. (2015), have adopted such a sample size for model fitting. Therefore, our current sample size can be justified. However, increasing the sample size in the future is worth taking to facilitate results in further research.

CONCLUSION

The character strengths of inquisitiveness and self-control predicted academic achievements and eudaimonic well-being, whereas the strength of caring only predicted eudaimonic well-being. Strengths use played a bridge between inquisitiveness/self-control and academic achievements and eudaimonic well-being, whereas caring had a direct effect on eudaimonic well-being. Positive education programs in campuses could be developed through strength-based approaches with the focus on strength use.

DATA AVAILABILITY

The raw data supporting the conclusions of this manuscript 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 Human Subjects Ethics Sub-Committee of the Department of Sociology, Wuhan University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

XT designed the study, analyzed the data, wrote the manuscript, and prepared the submission materials. WD and XC collected the data and comment on the original version. YL and WM helped to revise the manuscript and conducted the additional analyses.

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The Relationship Between Sensation Seeking and Tobacco and Alcohol Use Among Junior High School Students: The Regulatory Effect of Parental Psychological Control

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The present study primarily aims to examine differences in the use of tobacco and alcohol by junior high school students under different parental control levels (including parental psychological control and parental behavioral control). It thus explores the regulatory effect of parental control on the relationship between adolescent sensation seeking and tobacco and alcohol use. A total of 1,050 junior high school students in Shandong province were surveyed using sensation-seeking scale, parental control scale, and adolescent health-related risk behavior questionnaire. As the results showed, (1) sensation seeking and gender had effects on the use of tobacco and alcohol among junior high school students; (2) parental psychological control can enhance and moderate the relationship between sensation seeking and the use of tobacco and alcohol; (3) parental behavioral control cannot regulate the relationship between sensation seeking and the use of tobacco and alcohol among junior high school students; and (4) no significant urban-rural differences were found regarding the regulatory effects of parental psychological control on sensation seeking and alcohol and tobacco use in junior high school students.

Keywords: sensation seeking, parental control, tobacco and alcohol use, junior high school students, moderating effect

INTRODUCTION

In recent years, smoking and drinking among junior high school students (mostly aged 12–15) have become a public health issue attracting great concern. According to the China Youth Tobacco Survey Report, the smoking rate of junior high school students aged 13–15 was 6.4%:10.6% for boys and 1.8% for girls, respectively (China Centre for Disease Control, 2014). According to the 2018 Alcohol and Health Status Report published by the World Health Organization, more than a quarter (26.5%) of adolescents aged 15–19 are current drinkers (World Health Organization, 2018). This rebellious phenomenon is prominent due to the imbalance between the physiological maturity and psychological maturity of junior high school students (Han et al., 2016), which is likely to cause adolescents to violate their parents' wishes and to engage in negative behaviors, such as smoking and drinking. Tobacco and alcohol use is very harmful for junior high school students, as it not only will damage their physical

health by affecting the central nervous system (Benowitz et al., 2016), but also could trigger some behavioral and social problems such as interest addiction, depression, anxiety, and other adverse consequences (Visser et al., 2012; Huang et al., 2014). To prevent and control the tobacco and alcohol use in junior high school students, it is necessary to explore its influencing factors and its mechanism of action.

Previous studies have studied the effects of demographic variables such as grade, gender, and urban-rural residence on the externalized behavior of tobacco and alcohol use. First, previous studies have shown that there are significant gender differences in the use of tobacco and alcohol, and boys engage in more smoking and drinking behavior than girls (Xia et al., 2012; Yuan et al., 2016). Only a few studies have found that there are no significant gender differences in adolescent externalizing behavior (Wang et al., 2013). Therefore, we propose research Hypothesis 1a: there is a significant gender difference in the use of tobacco and alcohol in junior high school students, boys engage in more smoking and drinking behavior than girls. Second, studies have shown that there are urban-rural differences in the use of tobacco and alcohol and that the proportion of smoking and drinking behavior among rural middle school students is significantly higher than that among urban middle school students (Atav and Spencer, 2002; Zhi and Chen, 2008). Therefore, we propose Hypothesis 1b: there are significant urban-rural differences in the use of tobacco and alcohol in junior high school students, the smoking and drinking behaviors of rural middle school students were significantly higher than those of urban middle school students. Third, some studies have found that the differences in drinking behavior among young people between different grades are not significant (Lin et al., 2010). However, there are also studies that recruit students in the first, second, and third grades of junior high school as subjects that find significant grade differences in adolescents' externalized problem behaviors. Specifically, it has been found that there are significantly more problems with externalized behavior in junior three than in junior one or junior two but that there is no significant difference in problems with externalized behavior between the first and second grades (Wang et al., 2013). This difference may be because junior high school students are facing more pressure from the senior high school entrance examination, which leads them to engage in more tobacco and alcohol use behavior to relieve stress. This study focuses on the influence of parental control on the use of tobacco and alcohol in junior high school students, and the pressure of the senior high school entrance examination is a variable that needs to be controlled. Therefore, third grade junior high school students are excluded, and Hypothesis 1c is proposed: there is no significant grade difference in the use of tobacco and alcohol by junior high school students. Finally, to lay the foundation for a comprehensive analysis and understand the influencing factors of tobacco and alcohol use, this study will first explore the relationship between demographic variables and tobacco and alcohol use and then further explore any contradictions brought to light.

Previous research has found that sensation seeking increased the risk of initiating substance use (Jensen et al., 2017). Many

studies have shown that sensation seeking is a risk factor for adolescent tobacco and alcohol use (Wang et al., 2012b; Meil et al., 2016; Yuan et al., 2016). Sensation seeking refers to individuals engaging in social, physiological, economic, or legal risk-taking behaviors because they seek novel, intense, complex, and varied emotional experiences (Chen et al., 2006; Zuckerman, 2008). Nicotine in tobacco could stimulate the central nervous system (Benowitz et al., 2016), increases the amount of dopamine in the brain (Shiffman and Kirchner, 2009). Alcohol poisoning can cause irritability, hallucinations, and other adverse symptoms. Overall speaking, tobacco and alcohol use together can make individuals happier, thus promoting more smoking and drinking behaviors in individuals with high sensation seeking (Piasecki et al., 2011; Yuan et al., 2016). In addition, junior high school students have lower risk assessment ability, and thus it is easier for junior high school students who have higher sensation-seeking levels to underestimate the risk of tobacco and alcohol use, resulting in more tobacco and alcohol use behaviors (Hoyle et al., 2002; Romer and Hennessy, 2007). Therefore, sensation seeking is a risk factor for the use of tobacco and alcohol in junior high school students. We propose Hypothesis 2: sensation seeking significantly positively predicted the use of tobacco and alcohol by junior high school students.

Although studies have investigated the impact of sensation seeking on problem behaviors such as tobacco and alcohol use by junior high school students, there has been less discussion about the mechanism of action between them. Social cognition theory emphasizes how individual cognition, behavior, and environmental factors and their interactions influence individual behavior (Bandura, 1997). Even individuals with the same perceptions who are living in different environments may exhibit different problems. In the family environment, parental control has an important influence on the use of tobacco and alcohol in junior high school students. Parental control refers to a relatively stable behavior used by parents to manage and control their children. Barber et al. (1994) first proposed the division of parental control into psychological control and behavioral control based on the parent's control point source; that is, the classification criteria are based on the parent's control over the child's psychological or external behavior. Psychological control refers to parents trying to control their child's behavior by controlling their emotions, thoughts, and parent-child relationship and disrupting their children's autonomy (Wang et al., 2007; Arim and Shapka, 2008). Behavioral control refers to parents controlling the external behavior of adolescents by supervising, restricting, and establishing rules. The parent effect model argues that specific parenting behaviors, such as psychological control, can significantly influence the development of problem behavior among adolescents (Branje et al., 2008). Empirical studies have shown that there is a significant correlation between parental control and adolescent tobacco and alcohol use behavior (Ye et al., 2012; Lai et al., 2014a). However, the results of previous research on the effects of parental control of behaviors such as the use of tobacco and alcohol among adolescents are not consistent. Studies have found that psychological control has a negative impact on individual development and that parents' psychological control can significantly predict the

child's externalization behavior (Arim and Shapka, 2008; Lansford et al., 2014; Xing et al., 2017; Chen et al., 2018). Wang et al. (2007) noted that parental behavioral control can promote appropriate development outcomes (such as reduced disciplinary behavior) among adolescents. Social connection theory can explain this conclusion, which holds that the parental supervision of adolescents is an important component of social connections. When adolescents are supervised by parents, the opportunities for them to be exposed to crimes or problematic behaviors will be reduced, which can also reduce the likelihood of these problem behaviors (Hirschi, 1969). In summary, parents' behavioral control and psychological control have different effects on the behavior of junior high school students. Parental behavioral control can reduce the use of tobacco and alcohol among junior high school students, while parental psychological control can increase the use of tobacco and alcohol for junior high school students.

Studies have shown that parental regulation plays a moderating role in the relationship between socializing with problematic companions and adolescents' own problem behaviors (Wang et al., 2014). Adolescent parental monitoring also plays a moderating role in the relationship between Internet addiction and social adaptation (Wang et al., 2011); thus, it can be seen that parental supervision and control may play a moderating role in many variables involved in adolescents' adaptive behavior, but no research has examined the specific mechanism of parental control in the relationship between adolescents' sensation seeking and the use of tobacco and alcohol. Junior high school students are experiencing puberty and in a semi-mature but also semi-naïve mental state. The higher the level of parental psychological control is, the more easily it may provoke their rebellious psychology. These students may be more likely to violate their parents' wishes and engage in smoking and drinking behaviors. Many studies have shown that parental psychological control can positively predict behavior such as the internalization of problems such as depression in adolescents (Lai et al., 2014b; Peng et al., 2016). Junior high school students with psychological depression are more likely to engage in smoking and drinking to relieve their inner grief (Xu and Huang, 2013). High levels of parental behavioral control may reduce the chances that junior high school students are exposed to tobacco and alcohol, thereby reducing their use of these substances. Therefore, we propose Hypothesis 3: parental control can moderate the relationship between sensation seeking and the use of tobacco and alcohol in junior high school students; Hypothesis 3a: parental psychological control can enhance the relationship between sensation seeking and tobacco and alcohol use in junior high school students; and Hypothesis 3b: parental behavioral control can weaken the relationship between sensation seeking and the use of tobacco and alcohol in junior high school students.

Most previous studies have directly explored the relationship between sensation seeking and internalizing problems (e.g., depression and anxiety) or externalizing problems (e.g., alcohol and tobacco use) (Hittner and Swickert, 2006; Ko et al., 2007; Gu et al., 2012). Some studies also used family, school, and other environmental variables as exterior factors when conducting

research (Stephenson and Helme, 2006; Ye et al., 2011; Yuan et al., 2016; Zhao et al., 2017). Due to the immature psychological development of junior high school students, the phenomenon of rebellion is particularly prominent. It is particularly important to explore the role of parental control between sensation seeking and the tobacco and alcohol use, which has not been explored. Moreover, the differences between urban and rural areas in this model have not been explored. Before China began constructing the new countryside, its urban and rural areas were quite different. However, with the introduction of socialist modernization and the development of urban and rural integration, China's rural areas have entered a period of transition. The spiritual, cultural, and cognitive levels of rural residents have developed significantly, and rural education levels have made great progress. To test the moderating effect of parental control, the path model map is suitable for different regions, that is, it can be used to test consistency in the effects of demographic variables on junior high school students. By examining the consistency of rural and urban issues in family education and junior high school students' behavior in recent years and exploring the cultural and educational development gap between rural and urban areas, we further compare the moderation models. Sensation seeking is associated with novel and risky behaviors. Urban students have more adverse behaviors such as drug use than rural students, and teenagers living in urban environments have significantly higher levels of excitement seeking than those living in rural areas (Gordon and Caltabiano, 1996; Scherer et al., 2000). Therefore, to verify the existence of significant urban-rural differences in junior high school students' use of tobacco and alcohol and to establish a moderating effect model of parental control on junior high school students' sensation seeking and use of tobacco and alcohol, we will further propose Hypothesis 4: in the entire moderating model, there are significant differences between urban and rural areas, this moderating model maybe more applicable in cities than in rural areas.

In summary, we propose a moderation model based on the parental effect model and social connection theory. The following content reflects the main discussion: (1) investigate the relationship between sensation seeking and the use of tobacco and alcohol in junior high school students; (2) explore the moderating effect of parental control on sensation seeking and junior high school students' use of tobacco and alcohol; (3) identify whether there are significant differences between urban and rural areas in the regulation model.

MATERIALS AND METHODS

Participants

A total of 1,050 questionnaires were distributed in two ordinary junior high schools in Shandong province by cluster sampling. A total of 1,009 valid questionnaires were collected, for an effective recovery rate of 96.10%. The age range of the subjects was from 11 to 16 years, $M = 13.34$ years, $SD = 0.71$. There were 536 male students, accounting for 53.12% of the total, and 473 female students, accounting for 46.88% of the total number.

The subjects covered the seventh and eighth grades of junior high school. There were 588 students in the seventh grade, accounting for 58.28% of the total, and 421 students in eighth grade, accounting for 41.72% of the total number. Examining family residence, 321 students lived in an urban area, accounting for 31.81% of the total, and 688 lived students in a rural area, accounting for 68.19% of the total.

Measures

Sensation Seeking

Sensation seeking was measured using the Primary and Secondary Sensation-Seeking Scale (Chen et al., 2006), which includes the Disinhibition (Dis) subscale and the Excitement and Adventure Seeking (TAS) subscale. There are 15 items in each subscale, and the questionnaire uses a 3-point scale (1 = “do not want to do”; 2 = “want to do, but will not necessarily do”; 3 = “want to do if there is a chance to do it”). The scores of all items are added to obtain the original total score, and a higher total score for the subjects indicates a higher level of perceived sensation seeking. In this study, the Cronbach’s alpha coefficient was 0.898. The CFA test found that structural validity was good, $\chi^2/df = 3.27$, CFI = 0.91, TLI = 0.90, RMSEA = 0.05.

Parental Control

The Parental Control Scale (Wang et al., 2007) was used to measure the level of parental control. The scale consists of two subscales: the psychological control subscale and the behavioral control subscale. The psychological control subscale contains 18 items, such as “My parents say that if I truly care about them, I will not do things that make them worry.” The behavioral control subscale contains 16 items, such as “My parents took the initiative to talk to me about what I did with my friends.” The questionnaire uses five points to score, ranging from 1 = “very disagreeable” to 5 = “very consistent,” respectively. The higher the level of behavioral control is, the higher the score. In this study, the Cronbach’s alpha coefficients of the Parental Psychological Control and Behavior Control subscales were 0.96 and 0.92, respectively. The CFA test found that the structural validity was good, $\chi^2/df = 3.41$, CFI = 0.92, TLI = 0.90, RMSEA = 0.05.

Tobacco and Alcohol Use

The subscale for smoking and drinking behavior in the Adolescent Health Related Risk Behavior Questionnaire (Wang et al., 2012a) was used. The questionnaire consisted of six items that examined smoking and drinking behavior among adolescents. Each behavior consists of three items, such as “Do you smoke?” and “Have you ever had a drink or been drunk?”. The questionnaire is scored from 1 to 5 points ranging from “never” to “always.” The scores of smoking and drinking behaviors were added together to form the total scores of tobacco and alcohol use questionnaire. To reduce false answers from participants motivated by a desire for social approval, the formal test was conducted using a double anonymous approach (anonymity of the participants, anonymous questionnaire), and six unrelated

items were added, such as “Do you have breakfast?” which were not counted in the final score. In the present study, the Cronbach’s alpha coefficient of the questionnaire was 0.890. The CFA test found that the structural validity was good, $\chi^2/df = 2.75$, CFI = 0.99, TLI = 0.97, RMSEA = 0.04.

Procedure

The survey was conducted during September 2018. The data were collected on the class as a unit, in junior high schools from Shandong province of China, by graduate students majoring in psychology who had received professional and systematic training. The process is about 40 min long, in a self-study class. In the process, we emphasized that survey data were kept confidential and were used for academic purposes only. The questionnaires completed by respondents were collected uniformly. This study has obtained the written informed consent of the students’ parents, as well as with the approval of the Institutional Review Board of Shandong Normal University and the target junior high schools.

Data Analysis

The completed questionnaires were numbered and analyzed using SPSS Statistics 16.0 and AMOS 17.0 software. Pearson product-moment correlation analysis among three variables: sensation seeking, tobacco and alcohol use, and parental control was conducted by using SPSS16.0. Hierarchical regression analysis was used to examine the moderating effect of parental control in three steps: gender was included in the first step; sensation seeking and parental control were included in the second step; and binary interaction terms of sensation seeking and parental control were included in the third step. Then simple slope analysis was used to examine the direction of the moderating role of parental control. We use independent sample *t* test to examine the differences of the three main variables. Specifically, gender, urban and rural area, and grade variables were put into grouping variables respectively; sensation seeking, psychological control, behavior control, and tobacco and alcohol use were put into test variables respectively; and then the differences of the three variables in demographic variables were tested. In order to explore the applicability of the model in urban and rural areas, this study used AMOS 17.0 to conduct multiple comparisons. In the model comparison, we use the unconstrained model M1 and the constrained model M2. The unconstrained model is freely estimated for all parameters, and the constrained model is equalized by all regression coefficients.

RESULTS

Common Method Deviation

Because all the variables in this study are from the self-reports of adolescents, there may be a common method deviation problem (Zhou and Long, 2004). Therefore, common method deviation was statistically confirmed by the Harman single factor test method. The results show that the first principal

factor explained a variation of 13.298%, so the threat of common method deviation in this study is low, and the data can be analyzed in the next step.

Descriptive Statistics

Taking the average score of the questionnaire items as an indicator, the average, standard deviation and correlation coefficient of each variable were obtained (see **Tables 1, 2**). The *t* test was used to investigate the gender differences for each variable. It was found that the psychological control of junior high school students and the use of tobacco and alcohol had significant gender differences ($t = 2.355, p < 0.05$; $t = 3.416, p < 0.001$), boys engage in more smoking and drinking behavior than girls, which supported Hypothesis 1a. There is no gender difference in sensation seeking and behavioral control among junior high school students. The *t* test was used to investigate urban-rural differences in the variables. There was a significant urban-rural difference between sensation seeking and tobacco and alcohol use ($t = 5.529, p < 0.001$; $t = 3.299, p < 0.001$), the smoking and drinking behaviors of urban middle school students were significantly higher than those of rural middle school students; this is not consistent with Hypothesis 1b, but there was no urban-rural difference between psychological control and behavioral control. The *t* test was used to investigate the grade differences for each variable. There were significant grade differences in sensation seeking, psychological control, and behavioral control ($t = -3.277, p < 0.001$; $t = 3.046, p < 0.01$; $t = 2.505, p < 0.05$). There was no grade difference in the use of tobacco and alcohol among junior high school students, which supported Hypothesis 1c.

Pearson correlation analysis of each study variable showed that sensation seeking was significantly positively correlated with psychological control, behavioral control, and the use of tobacco and alcohol. Psychological control as a form of parental

control was significantly positively correlated with behavioral control, tobacco and alcohol use. Behavioral control was not significantly related to the use of tobacco and alcohol.

The Predictive Effect of Sensation Seeking on Alcohol and Tobacco Use

This study provided statistical control of sensation seeking by incorporating the antecedent variable “sensation seeking” into the regression equation to obtain the predictive effect of sensation seeking on alcohol and tobacco use. The results showed that sensation seeking had a significant positive predictive effect on alcohol and tobacco use in junior high school students ($\beta = 0.307, t = 10.232, p < 0.001$) and could account for 9.4% of the variation. Therefore, Hypothesis 2 was supported: sensation seeking could positively predict the use of alcohol and tobacco in junior high school students.

Analysis of the Moderation Role of Parental Control

Taking the use of tobacco and alcohol as the dependent variable, multiple regression analysis was used to investigate the relationship between sensation seeking and tobacco and alcohol use and the moderating effect of parental control. Because the two dimensions of parental control (psychological control and behavioral control) are reversed in the hypothesis, the multiple regression analyses are performed separately.

First, we explored the role of psychological control regulation. Each variable enters the regression model in three steps: the first step is to input gender as a control variable in the regression equation; the second step is to input sensation seeking and psychological control; and the third step is to input the binary interaction term (sensation seeking \times psychological control). The results (see **Table 3**) showed that after controlling for the effect of gender, the interaction term of sensation seeking and psychological control could significantly predict tobacco and alcohol use ($\beta = 0.464, t = 2.712, p < 0.01$). Therefore, Hypothesis 3a was supported: psychological control can play a moderating role in the relationship between sensation seeking and the use of tobacco and alcohol.

Second, we explored the role of behavioral control regulation. Again, each variable enters the regression model in three steps: first, gender is entered into the model, followed by sensation seeking, and then, third, their binary interaction (sensation seeking \times behavioral control). The results (see **Table 4**) showed that after controlling for gender, the interaction between sensation seeking and behavioral control did not predict tobacco and alcohol use ($\beta = -0.037, t = -0.184, p > 0.05$). Therefore, parental behavior control did not play a moderating role in the influence of sensation seeking on alcohol and tobacco use.

The regression results showed that the interaction between sensation seeking and psychological control was significant, that is, the moderating effect of psychological control was significant. Finally, to further reveal the direction of the moderating effect of psychological control on the relationship between sensation seeking and tobacco and alcohol use, a simple slope test (Toothaker, 1994) was used, and an interaction

TABLE 1 | Means and standard deviations for the variables ($N = 1,009$).

Variables	Mean (SD)	1	2	3	4
Gender	Male	1.61 (0.34)	2.62 (0.72)	3.27 (0.77)	1.25 (0.45)
	Female	1.64 (0.34)	2.50 (0.77)	3.23 (0.79)	1.17 (0.33)
Grade	Seven	1.60 (0.35)	2.62 (0.72)	3.30 (0.78)	1.21 (0.39)
	Eight	1.67 (0.34)	2.48 (0.78)	3.18 (0.77)	1.22 (0.42)
Urban/rural	Urban	1.71 (0.35)	2.54 (0.79)	3.26 (0.84)	1.27 (0.45)
	Rural	1.59 (0.33)	2.57 (0.73)	3.24 (0.75)	1.19 (0.38)

TABLE 2 | Correlations for the variables.

	1	2	3	4
1. Sensation seeking	1			
2. Psychological control	0.12**	1		
3. Behavior control	0.11**	0.30**	1	
4. Tobacco and alcohol use	0.30**	0.18**	0.00	1

** $p < 0.01$.

TABLE 3 | The relationship between sensation seeking and the use of tobacco and alcohol: the regulation of psychological control.

	<i>b</i>	SE	β	<i>t</i>	ΔR^2
First step					0.011
Gender	-0.085	0.025	-0.105	-3.354***	
Second step					0.127
Gender	-0.084	0.024	-0.104	-3.543***	
Sensation seeking	0.339	0.035	0.288	9.735***	
Psychological control	0.094	0.016	0.174	5.882***	
Third step					0.006
Gender	-0.084	0.024	-0.103	-3.527***	
Sensation seeking	0.041	0.115	0.035	0.357	
Psychological control	-0.094	0.071	-0.174	-1.319	
Sensation seeking \times psychological control	0.114	0.042	0.464	2.712**	

** $p < 0.01$.*** $p < 0.001$.**TABLE 4 |** The relationship between sensation seeking and the use of tobacco and alcohol: the regulation of behavioral control.

	<i>b</i>	SE	β	<i>t</i>	ΔR^2
First step					0.011
Gender	-0.085	0.025	-0.105	-3.354***	
Second step					0.098
Gender	-0.096	0.024	-0.119	-3.989***	
Sensation seeking	0.370	0.035	0.314	10.505***	
Behavioral control	-0.015	0.015	-0.028	-0.945	
Third step					0.000
Gender	-0.097	0.024	-0.119	-3.988***	
Sensation seeking	0.396	0.148	0.337	2.671**	
Behavioral control	-0.001	0.076	-0.002	-0.013	
Sensation seeking \times behavioral control	-0.008	0.045	-0.037	-0.184	

** $p < 0.01$.*** $p < 0.001$.

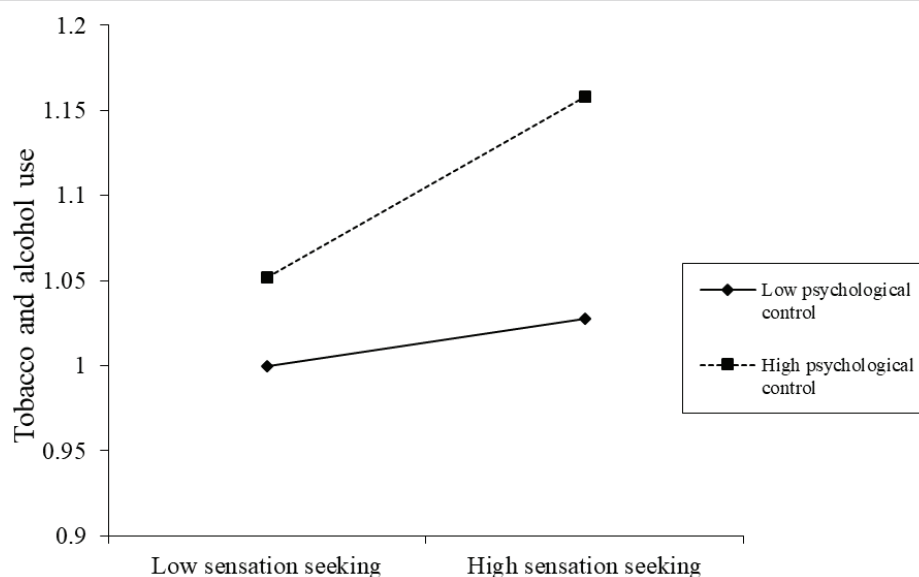
map of sensation seeking and psychological control was obtained (see **Figure 1**).

The results of the simple slope test showed that under a low psychological control level, the predictive effect of sensation seeking on tobacco and alcohol use in junior high school students was not significant ($\beta = 0.041$, $t = 0.356$, $p > 0.05$). Further, the analysis of the predictive effect under a high psychological control level found that the positive predictive effect of sensation seeking on tobacco and alcohol use among junior high school students was significant ($\beta = 0.155$, $t = 2.038$, $p < 0.05$). This indicates that the high level of parental psychological control plays a moderating role in the relationship between junior high school students' sensation seeking and their tobacco and alcohol use. Reducing parents' psychological control can reduce the negative effects of sensation seeking on alcohol and tobacco use among junior high school students.

Multiple Comparisons

The results of this study found that there is a significant urban-rural difference in sensation seeking and the use of tobacco and alcohol. To test the suitability of this path model graph for different regions, that is, to test its consistency for junior high school students given the demographic variables, multiple comparisons were conducted to the moderating model. The unconstrained model of urban and rural areas is shown in **Figures 2, 3**.

The fit index of the multiple comparison models is shown in **Table 5**. The results showed that RMSEA < 0.1 and that CFI, GFI, and other fit indices are close to 1, indicating that the model has a good fit, $p < 0.001$ but $\Delta CFI < 0.01$, it can be seen that the difference between the model M2 after limiting the regression coefficient and the model M1 without defining the difference is not significant, indicating that the urban-rural moderating effect is not significant; this is not consistent with Hypothesis 4.

**FIGURE 1 |** The moderating effect of psychological control on the relationship between sensation seeking and the tobacco and alcohol use.

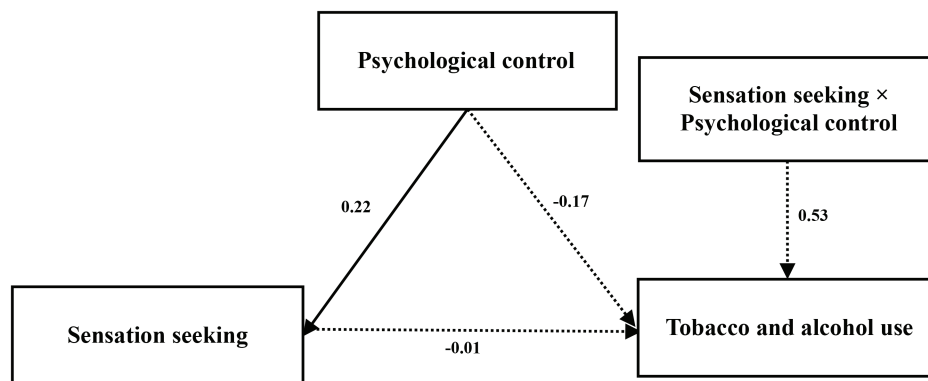


FIGURE 2 | Unconstrained model of urban area.

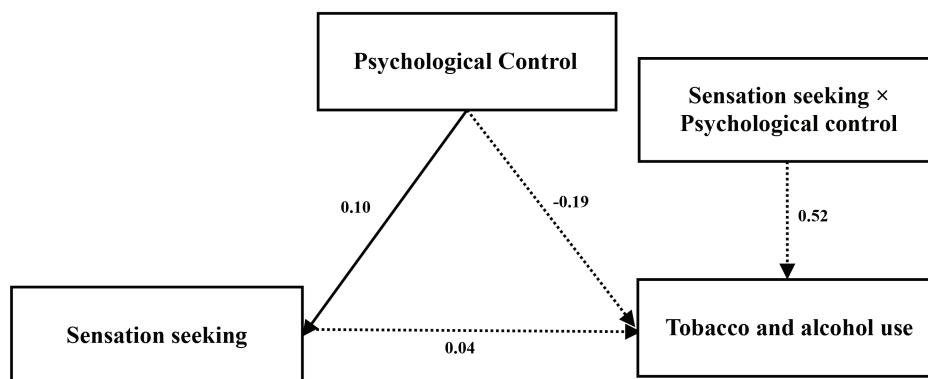


FIGURE 3 | Unconstrained model of rural area.

TABLE 5 | Multiple comparison model fitting index.

Model	χ^2	df	χ^2/df	GFI	AGFI	RMSEA	CFI	ΔCFI	p
Unconstrained	121.931	46	2.651	0.974	0.949	0.040	0.984	0.009	0.000
Structural weights	175.369	55	3.189	0.963	0.940	0.047	0.975		0.000

DISCUSSION

The present study primarily aimed to examine differences in the use of tobacco and alcohol by junior high school students under different parental control levels (including parental psychological control and parental behavioral control) and further explore the relationship between sensation seeking and alcohol and tobacco use at high and low levels of parental control. This study constructed a moderation model based on the parental effect model, social connection theory, and previous research. It is clear that sensation seeking in which conditions (regulatory role of parental control) had a predictive effect on adolescents' tobacco and alcohol use. In addition, this study also verified the urban-rural differences in the regulation model. This study has certain theoretical and practical significance in guiding parents to adopt appropriate control methods, as well as in helping adolescents with different levels of sensation seeking to prevent and reduce tobacco and alcohol use.

Gender, Grade, and Urban-Rural Differences in the Use of Tobacco and Alcohol in Junior High School Students

In this study, the gender difference test of junior high school students using tobacco and alcohol found that boys engage in more smoking and drinking behavior than girls, which is consistent with previous research results (Wan et al., 2009; Chen et al., 2012; Xia et al., 2012). On the one hand, because male adolescents are driven by imitative psychology, they will imitate the smoking and drinking behavior of their surrounding companions or adults. On the other hand, the ability of male adolescents to identify right and wrong is relatively low, so they cannot correctly appreciate the harmful nature of smoking and drinking. They consider these behaviors to be a symbol of maturity (Yuan et al., 2016), and some even believe that smoking and drinking are attractive to the opposite sex. The study also found that the tobacco and alcohol use in junior high school students has significant urban-rural differences,

with more tobacco and alcohol use behaviors in cities than in rural areas; this is not consistent with Hypothesis 1b of the study. On the one hand, it may be because of the great difference between urban and rural parents' education methods for teenagers. Urban teenagers' parents often refuse and deny their children, punish them severely, and intervene excessively more than rural parents (Zhang, 1997; Li and Wang, 2015), making teenagers use alcohol and tobacco to vent their inner dissatisfaction. On the other hand, urban junior high school students have more contact with new stimuli and temptations and may have more opportunities to obtain tobacco and alcohol. Therefore, urban students show more tobacco and alcohol use behaviors. There is no significant grade difference in the use of tobacco and alcohol in junior high school students, which is consistent with the research results of Wang et al. (2013) and the research hypothesis of this study, that is, the difference in the use of tobacco and alcohol among junior high school students in the first and second grades is not significant. One possible explanation is that grade 7 and grade 8 students are of similar age, have a similar level of psychological development, and a similar ability to distinguish right from wrong. Meanwhile, they also have roughly a similar level of understanding about the harm caused by tobacco and alcohol use. Therefore, there is no significant grade difference in the use of tobacco and alcohol.

The Predictive Effect of Sensation Seeking on Alcohol and Tobacco Use

The results of this study indicated that there is a significant positive correlation between sensation seeking and the use of tobacco and alcohol among junior high school students. Sensation seeking can predict the use of tobacco and alcohol in junior high school students, which is consistent with previous research results (Ye et al., 2011; Yuan et al., 2016). Impulsivity is a risk factor for tobacco and alcohol use, and as one of the impulsivity personality traits, sensation seeking has a significant positive correlation with tobacco and alcohol use (Gonzalez et al., 2011). As previously mentioned, tobacco and alcohol use together can make individuals happier, thus teenagers with a high level of sensation seeking will take the initiative to smoke and drink to meet their need for stimulation. The results of this study suggest that adolescents with high sensation-seeking levels may be more likely to use alcohol and tobacco for stimulus-seeking or rule-breaking reasons than adolescents with low sensation-seeking levels. This study proved that sensation seeking was a risk factor for junior high school students' tobacco and alcohol use and verified the important influence of sensation seeking on their substance use. Parents and schools should pay more attention to the behavior of junior high school students with high sensation-seeking levels, guide them to choose appropriate activities to meet their need for thrill-seeking, and help them to avoid or reduce externalized behaviors such as smoking and drinking.

The Moderating Role of Parental Psychological Control

In this study, parental control was investigated as a moderating variable between sensation seeking and the use of tobacco and alcohol. The results showed that parental psychological control

plays a moderating role in and can enhance the relationship between junior high school students' sensation seeking and their use of tobacco and alcohol, which verifies the hypothesis of this study and conforms to the parental effect model. This research result is similar to relevant research conclusions within China and worldwide; namely, a high level of psychological control is related to externalized problem behaviors among children and adolescents (Arim and Shapka, 2008; Gao et al., 2016; Yu, 2016; Xing et al., 2017), which may lead them to engage in smoking, drinking, drug use, Internet addiction, aggressive behaviors, and other problems (Ye et al., 2012; Cui et al., 2014; Lai et al., 2014a). This result is not difficult to understand. Parental psychological control destroys children's psychological autonomy by stimulating guilt and withdrawing care (Barber, 1996), which is a negative control method. Eventually, teenagers' basic psychological needs (such as autonomy needs and relationship needs) cannot be satisfied. Previous studies have shown that teenagers meet their basic psychological needs through alcohol and tobacco use (Niemi et al., 2009; Gillison et al., 2011; Xia and Ye, 2014). Therefore, high levels of parental psychological control can enhance the relationship between sensation seeking and the alcohol and tobacco use.

Previous studies have found that low levels of parental behavioral control can significantly predict a higher level of externalization behaviors among adolescents, such as antisocial behavior, drug abuse, and disciplinary behavior (Li et al., 2003; Pettit et al., 2010; Xiao, 2016). However, in this study, it was found that parental behavioral control was not significantly related to tobacco and alcohol use, which is similar to the results of previous studies; that is, the correlation between behavioral control and junior high school students' externalization is not significant (Wang et al., 2013). First, this may be caused by the different views of teenagers on parental behavior control between Chinese and western cultural backgrounds. In the context of Chinese collectivistic culture, children tend to regard their parents' harsh discipline as an expression of caring and loving (Wang and Liu, 2018). Parental behavioral control, such as corporal punishment, may be commonly accepted by children (Wang and Liu, 2014); regardless of the degree of parental control, we think that parental behavioral control may have less effect on children's externalizing behavior and have no significant differences in China. Second, the reason for this lack of correlation may be that teenagers from different educational backgrounds have different views on parental behavioral control. Parental rearing patterns have a wide-ranging impact on the psychological development and psychological barriers of children and adolescents (Hiramura et al., 2010), affecting the personality of children and adolescents (Jiang et al., 2013). Adolescents who live under an authoritative and strict family atmosphere are more likely to have problems with conduct, hostile psychological barriers, and negative and hostile attitudes toward parental behavioral control. Therefore, the higher the level of parental behavioral control is, the stronger the child's anger and resistance, and the likelier that they will engage in problem behaviors such as alcohol and tobacco use that are not accepted by parents. Teenagers who live in a democratic and harmonious family atmosphere are more likely

to regard parental behavioral control as a manifestation of their parents' care and to feel gratitude for their parents' efforts, thus generating more adaptive behaviors (Zou et al., 2010).

Multiple Comparisons

To investigate the moderating effect of urban-rural demographic variables on this model of parental psychological control, this study conducted a multi-group comparative analysis. The results showed that the moderating effect of urban and rural areas was not significant; that is, for adolescents residing in both urban and rural areas, the moderating effect of parental psychological control on the influence of sensation seeking over the use of tobacco and alcohol in junior high school students was basically stable. The reasons are as follows. First, urban and rural parents have roughly the same psychological control over junior middle school students, for example, engaging in guilt or love cancellation (Barber, 1996). This result suggests that neither urban nor rural parents should engage in higher levels of psychological control of junior high school students, such as not giving them space for independent thinking or for determining the correct choices, or apply methods to psychologically control their children. Instead of helping their children's growth, ultimately, it will only backfire and lead to more problem behaviors such as alcohol and tobacco use (Chen et al., 2018). Second, with the popularization and development of the Internet, rural and urban children are exposed to roughly the same information, and thus they form similar outlooks on life and values. Third, the withdrawal of rural schools and the process of urban-rural integration have narrowed the gap between rural and urban areas. Children born in rural areas have the opportunity to study in urban or urban-rural areas. Finally, the state is paying increasing attention to education, and thus it provides excellent teachers for rural schools, encourages urban teachers to go to the countryside, and promotes the development of rural cultural education.

CONTRIBUTIONS AND LIMITATIONS

There are some shortcomings in the current study. First, the cross-sectional design used in this study may have a generation effect, which to some extent weakens the credibility of the causal relationship between the inferred variables. Second, this study adopts the "self-report method" with teenagers and a questionnaire for measurement. This research method is relatively simple. In the future, this research can be further verified by combining an experimental task with the questionnaire. In addition, the students' emphasis on parental communication and understanding deviation may affect the direction and effect of parental control, are also worth considering factors in the use of tobacco and alcohol. Teenagers with high sensitivity will pay more attention to their parents' words, may be more likely to report more internalizing and externalizing problems if they perceived parental control as a signal that they are being rejected by their parents. So in the future research, we should focus on more additional mediating and moderating factors between sensory seeking and the use of tobacco and alcohol. Finally, this study focuses on

the use of tobacco and alcohol among junior high school students in grades 7 and 8. For high school students and college students, this study did not examine or verify either the role of psychological control or the regulatory role of behavioral control in the influence of sensation seeking on the use of tobacco and alcohol among other groups. To further enrich research on the use of tobacco and alcohol and create a healthy and harmonious living environment for students, future research should explore these problems.

Despite these limitations, the present study provides some valuable information to the related literature and has important practical implications. Based on the ecological systems theory, this study introduced the family variable of parental control (including parental psychological control and parental behavioral control), discussed the moderating effect on sensory seeking and the use of alcohol in junior middle school students. The results show that parental psychological control plays a moderating role in the relationship between sensory seeking and the use of tobacco and alcohol, providing ideas for avoiding and reducing the use of tobacco and alcohol in junior high school students. First, attention should be paid to the influence of sensation seeking on alcohol and tobacco use among adolescents. On the one hand, in adolescence, individuals' sensation-seeking level increases rapidly with age (Steinberg et al., 2008). Therefore, it is necessary to understand teenagers' sensation-seeking level over time, guide them to meet their needs for stimulating experiences through appropriate activities and channels, and enable them to find release and satisfaction through reasonable and appropriate channels. On the other hand, attention should be paid to intervention around sensation seeking. Sensation seeking is relatively plastic (Bardo et al., 1996), and intervention in adolescents' sensation seeking can help reduce problems such as alcohol use. Second, this study found that parental psychological control will enhance the influence of sensation seeking on tobacco and alcohol use, so we should also aim at improving communication between teenagers and their parents to prevent or reduce excessive psychological control and improve the psychological quality of their environmental response. Psychological quality helps teenagers to live actively. Third, this model is applicable to both urban and rural areas in China, which enlighten us not to overstate the differences between urban and rural areas in view of some problems. Whether in urban or rural areas, reducing parental psychological control is an effective way to reduce the use of tobacco and alcohol in adolescents.

DATA AVAILABILITY

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

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Institutional Review Board of Shandong Normal

University with written informed consent from all subjects in accordance with the Declaration of Helsinki. The protocol was approved by the Institutional Review Board of Shandong Normal University.

AUTHOR CONTRIBUTIONS

FX and WD collected and analyzed the data under the supervision of WZ. WZ designed the study and contributed to materials

and analysis tools. WZ, FX, WD, YS, and QZ contributed to the writing of the manuscript. FX, WD, YS, and QZ contributed to the revision. YS, FX, and WD revised the manuscript and replied to comments.

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Satisfaction of Basic Psychological Needs Leads to Better Academic Performance via Increased Psychological Capital: A Three-Wave Longitudinal Study Among High School Students

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This brief report proposes a model in which academic psychological capital (PsyCap) mediates between the satisfaction of student's basic psychological needs and their academic performance, as assessed by students' GPA. Participants were 407 adolescents, aged 12–18, recruited from three Chilean schools. Through structural equation modeling, direct and indirect effects were calculated. Results show that academic PsyCap (assessed at time 2) fully mediates the relationship between the satisfaction of basic psychological needs (assessed at time 1) and academic performance (assessed at time 3). This means that students whose basic psychological needs are satisfied at school experience more hope, efficacy, resilience, and optimism (PsyCap), which, in turn, leads to better academic performance. Both theoretical and practical implications of the results are addressed, as well as strengths and weaknesses and directions for future research.

Keywords: basic psychological needs, academic PsyCap, academic performance, GPA, high school students

INTRODUCTION

The emergence of positive education—focused on both traditional skills and happiness (Seligman et al., 2009)—has made it possible to incorporate some recent constructs embraced in positive psychology into the educational research agenda. One of them is academic PsyCap: a psychological state of development characterized by hope, efficacy, resilience, and optimism (Luthans et al., 2012). However, given the relative novelty of the PsyCap construct, little is known about how students' perceptions of their school environment may predict its subsequent appearance (Carmona-Halty et al., 2018). The current study addresses this issue by proposing that the satisfaction of students' basic psychological needs (BPN) –grounded in Self-Determination Theory (SDT; Ryan and Deci, 2000)– could be a relevant antecedent of academic PsyCap, which, in turn, –according

to Conservation of Resources (COR) theory (Hobfoll, 1989)—would predict their academic performance (AP), assessed through their grade point average (GPA). In other words, academic PsyCap is expected to mediate between the satisfaction of BPN at school and AP. Providing empirical evidence about the predictive role of the school environment context for supporting BPN (Ryan and Deci, 2017b)—in academic PsyCap can help to expand our knowledge about possible ways to improve academic PsyCap through evidence-based interventions in the school community.

SDT states that there are specifiable psychological and social nutrients (the so-called BPN), which, when satisfied within the interpersonal and cultural contexts of an individual's development, facilitate growth, integrity, and well-being (Ryan and Deci, 2017a). In other words, satisfying people's BPN—for autonomy, competence, and relatedness—enhances their development, either in general or in specific domains, such as education (Ryan and Deci, 2000). In brief, autonomy refers to feeling willingness and volition with regard to one's behaviors; competence refers to feeling effective in one's interactions with the social environment; and relatedness refers to experiencing that others are responsive and sensitive as well as being able to be responsive and sensitive to others. In a school context, SDT suggests—as confirmed by previous research—that when the conditions of nurturance for holistic development are optimized (i.e., providing autonomy, competence, and relatedness), learning and educational outcomes are also optimized (Ryan and Deci, 2017b). More specifically, the satisfaction of BPN at school is associated with students' prosocial behavior (Tian et al., 2018), gratitude (Tian et al., 2016), self-control skills (Orkibi and Ronen, 2017), academic engagement (Jang et al., 2016), and well-being (Tian et al., 2014), among others (Ratelle and Duchesne, 2014; Yu et al., 2016; Wehmeyer and Shogren, 2017).

COR theory states that individuals strive to obtain, retain, and protect their material, social, and personal resources (Hobfoll, 1989, 2002). This means that people try to accumulate resources in order to preserve and foment their health and well-being (Hobfoll, 2011). COR theory also explains—through the *caravan* notion—that resources do not occur individually, but rather they appear as co-travelers, in contrast to the general tendency in the research to focus on one resource at a time (Hobfoll et al., 2018). In this regard, the PsyCap construct is an example of a resource caravan because when the four resources it includes (i.e., hope, efficacy, resilience, and optimism) are combined into one core construct—based on their commonalities and their unique contributions—, they have a joint impact on people's attitudes, behaviors, well-being, and performance (Luthans and Youssef-Morgan, 2017). Although initial research on PsyCap was conducted in samples of workers, more recently, the notion of academic PsyCap has received attention in both university and high school students. In these samples, direct associations are demonstrated with coping and satisfaction (Ortega-Maldonado and Salanova, 2017), academic adjustment (Liran and Miller, 2017), motivation (Siu et al., 2014), academic engagement (Carmona-Halty et al., 2019a), subjective well-being (Datu et al., 2016), and AP (Carmona-Halty et al., 2019b), among others (Vanno et al., 2014; You, 2016; Datu and Valdez, 2019).

By integrating SDT and COR theory, the present study proposes a longitudinal model that hypothesizes that academic PsyCap mediates between the satisfaction of BPN at school and AP. More specifically, we assume that when students perceive that their school environment supports their BPN during daily school life—according to SDT—, they will be more likely to have the tools they need to accumulate personal resources (in the form of academic PsyCap). In turn, these increased personal resources—according to COR theory—will lead to achieving better AP. In other words, if students' needs for autonomy, relatedness, and competence are met at school, their hope, efficacy, resilience, and optimism about learning activities will increase, and, consequently, they will perform better. This assumption is supported, on the one hand, by research indicating that students tend to show desirable academic outcomes in situations where the social context is more supportive of their autonomy, competence, and relatedness needs (Jang et al., 2016; Orkibi and Ronen, 2017; Wehmeyer and Shogren, 2017) and, on the other hand, by research that identifies academic PsyCap as a predictor of AP (Datu et al., 2016; Ortega-Maldonado and Salanova, 2017; Carmona-Halty et al., 2018).

MATERIALS AND METHODS

Participants

The sample was composed of 407 high school students from three Chilean educational institutions. Participants were from 12 to 18 years old ($M = 14.55$, $SD = 1.77$) and 51.4% were female. Of the 407 students, 17.2% were 12, 15.5% were 13, 17.9% were 14, 13.3% were 15, 18.7% were 16, 15.2% were 17, and 2.2% were 18 years old when the data were collected.

Instruments

All the instruments were administered using a Spanish adaptation carried out following the guidelines of the International Test Commission for adapting tests across cultures (Muñiz et al., 2013). At time 1, the *satisfaction of BPN at school* was measured using a self-constructed scale based on the Work-related Basic Needs Satisfaction Scale (Van den Broeck et al., 2010), adapted for use in educational settings. Our scale has 12 items (e.g., “*I have the feeling that I can even accomplish the most difficult tasks at school*”) grouped into three subscales (i.e., competence, relatedness, and autonomy). All items are scored on a 7-point rating scale from 1 (*strongly disagree*) to 7 (*strongly agree*). At time 2, after 9 weeks, academic PsyCap was measured using the Academic Psychological Capital Questionnaire (Martínez et al., 2019). This questionnaire has 12 items that measure the four PsyCap components (e.g., “*I usually take stressful things in stride with regard to my studies*”) on a 6-point rating scale from 1 (*strongly disagree*) to 6 (*strongly agree*). At time 3, after another 9 weeks, AP was assessed using the grade point average (GPA) provided by the educational institutions, using four mandatory subjects in the Chilean education curriculum: mathematics, language, history, and science. According to the local grading system, GPAs ranged from 1 (*poor*) to 7 (*excellent*).

Procedure

The recommendations of the Comité Ético-Científico (CEC-UTA) of the Chilean university host were followed in carrying out this study, and written informed consent was obtained from all subjects (i.e., the school principals, students, and students' parents) in accordance with the Declaration of Helsinki. Participants voluntarily filled out a questionnaire on two occasions: once when the regular academic semester ended (Time 1 for the satisfaction of BPN at school) and once after a period of 9 weeks (Time 2 for academic PsyCap). In addition, AP was extracted from the teachers' class records at the end of the next academic semester, 9 weeks later (Time 3). The same verbal and written instructions for completing the measures were provided. Participants were told to respond as truthfully as possible and assured that their responses would be anonymous. The questionnaire took about 20 min to complete using an electronic procedure.

Data Analysis

All data were analyzed using JASP 0.9.01 and SPSS AMOS 23. For reliability analysis, Cronbach's alpha and McDonald's omega indexes were calculated. For structural equation modeling, we used maximum likelihood (ML) estimation methods, and goodness-of-fit was evaluated using absolute and relative indexes: Chi-square (χ^2) and normed Chi-square (χ^2/df); Incremental Fit Index (IFI); Tucker Lewis Index (TLI); Comparative Fit Index (CFI); Root Mean Square Error of approximation (RMSEA) with a 90% Confidence Interval (CI); and Standardized Root Mean Square Residual (SRMR). To determine the fit of the model, we followed the recommendations of the European Journal of Psychological Assessment (Schweizer, 2010). Finally, we implemented the bootstrapping procedure – with 5000 new samples taken from our sample (Hayes, 2009) in order to: (1) correct for any biasing impact that multivariate non-normality may have had on the computed chi-square value as a function of using ML estimation (Byrne, 2010; Kline, 2011) and (2) examine direct and indirect effects that were considered statistically significant if the 95% confidence interval estimates did not contain the value of zero.

RESULTS

Table 1 displays descriptive and reliability information about the study variables. It shows that internal consistencies for the scales were good and that the correlations showed significant direct relationships for all the measures used.

The proposed model contained seven latent factors and 19 indicators (see **Figure 1**). In other words, one factor that reflects satisfaction of BPN at school using three indicators; one higher-order factor with four lower-order factors, which, in turn, are composed of 12 indicators that make up the academic PsyCap factor; and four indicators that make up the AP factor. Results showed that this model exceeded the recommended standards and was a good representation of the data, explaining 52.0% of the academic PsyCap variance and 14.3% of the AP variance: $\chi^2 = 381.965$; $df = 145$; $\chi^2/df = 2.634$; IFI = 0.954;

TLI = 0.946; CFI = 0.954; RMSEA = 0.063, 90% CI (0.056, 0.071); SRMR = 0.047.

Considering the good fit of the hypothesized model, direct and indirect effects were calculated and are described below. First, the satisfaction of BPN at school is significantly related to academic PsyCap [$a = 0.721$, $SE = 0.042$, BCa 95% CI (0.629, 0.797), $p = 0.001$]. Second, academic PsyCap is significantly related to AP, after controlling for the satisfaction of BPN at school [$b = 0.241$, $SE = 0.087$, BCa 95% CI (0.071, 0.405), $p = 0.010$]. Third, the satisfaction of BPN at school is significantly and indirectly associated with AP through academic PsyCap [$ab = 0.174$, $SE = 0.063$, BCa 95% CI (0.056, 0.300), $p = 0.008$]. In addition, because the satisfaction of BPN at school is not significantly related to AP [$c = 0.165$, $SE = 0.098$, BCa 95% CI (−0.028, 0.356), $p = 0.088$], we can conclude that academic PsyCap fully mediates the relationship between the satisfaction of BPN at school and AP.

DISCUSSION

The current paper makes several theoretical contributions. First, we found that the satisfaction of students' BPN is directly related to their academic PsyCap. Second, we found that the accumulation of personal resources in the form of academic PsyCap is directly related to students' AP. Third, we found that students whose BPN is satisfied at school (i.e., competence, relatedness, and autonomy) are more likely to achieve better academic results (i.e., GPA score) through academic PsyCap (i.e., a resource caravan formed by hope, efficacy, resilience, and optimism). Taken together, these results are in line with previous research on SDT and COR theory and they make an innovative contribution to the scarce empirical research on school environment variables as antecedents of academic PsyCap (e.g., Orkibi and Ronen, 2017; Wehmeyer and Shogren, 2017; Carmona-Halty et al., 2019b; Datu and Valdez, 2019).

As a main practical implication, we want to emphasize the key role that educational institutions (can) play in increasing students' academic PsyCap. That is, instead of focusing on a curriculum based on control and achievement –which thwarts students' BPN fulfillment– the school community should concentrate on creating an environment that sets clear rules and gives students positive feedback (i.e., supporting the need for competence), expresses interest and care for them (i.e., supporting the need for relatedness), and provides them with the freedom to make their own choices (i.e., supporting the need for autonomy). This proposal is coherent with the *resource caravan passageways* notion, which points out that people's resources exist in an environment that either fosters/nurtures or limits/blocks resource creation or nourishment (see Hobfoll, 2011; Hobfoll et al., 2018). Therefore, the PsyCap components should be enhanced not only through individual-level interventions—using the Psychological Capital Intervention method (Luthans et al., 2008, 2010)—, but also through school-level promotion, including a supportive educational curriculum as a strategy to obtain –based on our results– better academic performance.

TABLE 1 | Means (M), Standard Deviation (SD), Skewness (S), Kurtosis (K), Alpha (α) and Omega (ω). Reliability Indexes, and Correlations for the study variables.

	M	SD	S	K	α	ω	1	2	3
(1) Basic psychological needs at school	5.710	1.018	−1.068	1.360	0.790	0.798	–		
(2) Academic psychological capital	4.417	1.029	−0.595	0.187	0.910	0.912	0.612**	–	
(3) Academic performance	5.213	0.808	−0.143	−0.668	0.886	0.888	0.295**	0.342**	–

** $p < 0.001$.

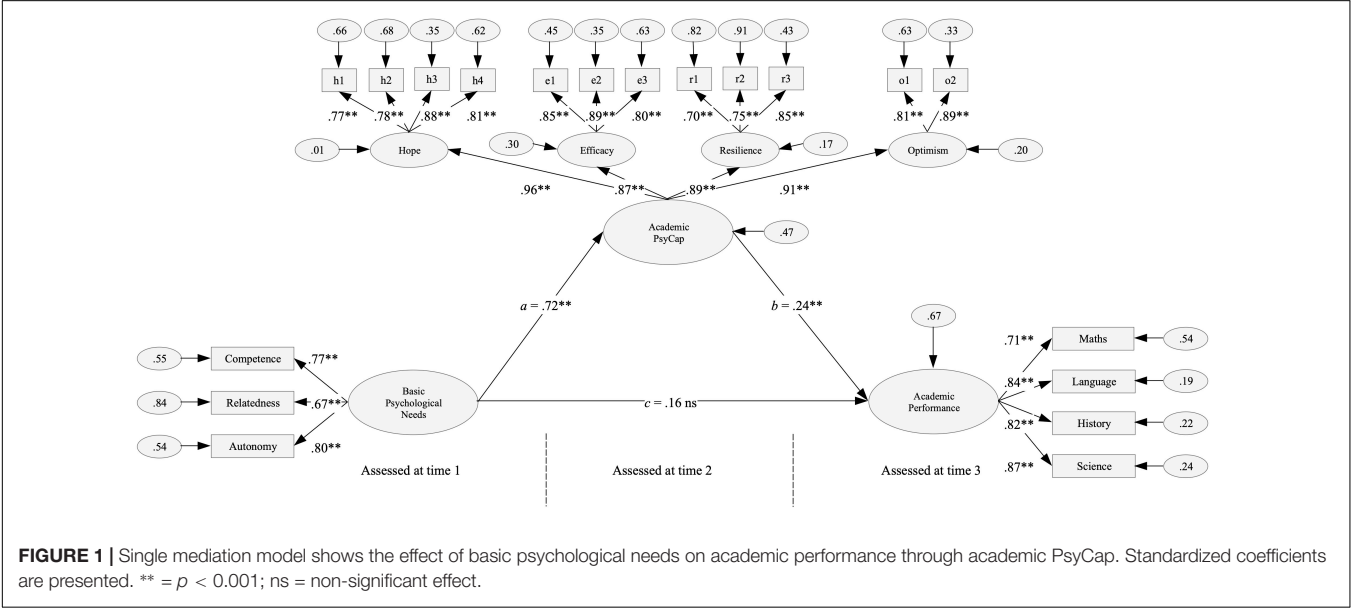


FIGURE 1 | Single mediation model shows the effect of basic psychological needs on academic performance through academic PsyCap. Standardized coefficients are presented. ** = $p < 0.001$; ns = non-significant effect.

This study has several strengths. First, we used a longitudinal three-wave design, which agrees with the temporal sequence that we assumed in the proposed mediational model. Second, we included the GPA as an objective academic performance indicator. Third, we empirically demonstrated the integration of both SDT and COR theory in an academic setting. However, this study has also some weaknesses. First, we used a convenience sample instead of a representative Chilean student sample. Second, we used self-reports for both psychological measures instead of using, for instance, peer or teacher ratings. Third, we focused on unidirectional effects instead of examining bi-directional effects. Fourth, our three assessment points (i.e., BPN, PsyCap, and AP) only cover short-term effects (approximately 5 months) instead of capturing long-term effects (e.g., using a 2 year longitudinal design). Finally, for future research, we would suggest the following. First, it would be interesting to examine an alternative model proposing that students with high satisfaction of BPN and high PsyCap would have higher AP, whereas students with low satisfaction of needs and low PsyCap would have lower AP. Second, based on the recent team-level PsyCap approach, the applicability of class-level PsyCap should be explored in order to examine its role in students' individual and/or class-level outcomes such as academic engagement, academic burnout, and AP. Third, the inclusion of other school environment variables – such as a sense of community– in a more comprehensive model would be a fruitful future research agenda to expand our knowledge about academic PsyCap antecedents.

DATA AVAILABILITY

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 Comité Ético-Científico (CEC-UTA). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

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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Conflict of Interest Statement: 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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