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How social desirability impacts life satisfaction among Chinese youth: mediators of mental toughness and emotional intelligence

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Social desirability has been recognized as a predictor of life satisfaction but it has yet to know the mechanism of this effect. This research aimed to explore the relationship between social desirability and life satisfaction, as well as the mediation effects of mental toughness and emotional intelligence. In Sample 1, we asked 1200 youths (12-24 years old) to complete an online questionnaire measuring social desirability, life satisfaction, mental toughness, and emotional intelligence. Results indicated that social desirability had a direct positive effect on youth's life satisfaction. In addition, mental toughness and emotional intelligence mediated the relationship between social desirability and life satisfaction, showing a chain role of mental toughness and emotional intelligence. A second sample (n = 750) was then used to verify the above findings, and similar results were found. These findings are consistent with our hypotheses, revealing the mechanisms of social desirability in relation to life satisfaction and the important role of mental toughness and emotional intelligence.

KEYWORDS

trait social desirability, mental toughness, emotional intelligence, life satisfaction, young adults

Introduction

As a multifaceted concept, "social desirability" varies in terminology and understanding when applied across various disciplines. Social desirability consists of two factors: impression management and self-deception (1, 2), which are often used to screen and identify individuals who may be biased in their self-reports in psychological assessments and surveys.

Traditionally, it has been defined as the tendency of individuals to respond in a manner that is culturally acceptable and favorable. That is, social desirability is used to describe people who tend to portray themselves in a generally favorable manner (3–6). However, more recent perspectives suggest that social desirability could be considered a personality trait (4, 7–9). Uziel proposed "rethinking social desirability" in an influential review (7), suggesting that people with higher social desirability show greater self-control, particularly in social settings. Since then, researchers have proposed that social desirability is an interpersonal-oriented positive trait (4, 10) and that it is related to personal well-being and interpersonal adjustment (7). Some studies have indicated that social desirability is positively associated with forming and maintaining a good reputation (7), marital relationships, and friendships (11, 12), and showing greater perseverance in solving difficult problems (4).

Recently, social desirability has been found to play a significant positive role in a range of positive psychological and behavioral outcomes for individuals (4, 7–9, 13–18). It has been well documented that social desirability is not only positively linked to a variety of positive psychological and behavioral outcomes (7, 11, 12, 15), but that it is also negatively correlated with both criminal and suicidal tendencies (12, 19–22). Researchers have revealed a variety of positive outcomes associated with social desirability, such as increased creativity (10), greater self-control in a public context (16, 17), more honest behaviors (18), better job performance (14), greater perseverance in solving highly difficult problems, and better prediction of future job performance and adaptation to stress during recruitment (4). Studies have also revealed that self-reported mental health is highly related to social desirability (4, 8, 9, 13). Social desirability is a higher-level, complex integration mental function (23) that focuses on improving mental health and job performance. Thus, social desirability has significant effects on healthy defensive behaviors (4). Although it is mentioned that social desirability has a significant impact on mental health and job performance, and may exert its influence through healthy defensive behaviors, the existing literature may not have fully explored whether the relationship between social desirability and life satisfaction is mediated by other factors. Current research may also not have detailed which specific factors might serve as mediators between social desirability and life satisfaction. This indicates the need for further research into potential mediating variables to verify this relationship and its mediating mechanisms. Therefore, in the current research, we focus on whether the relationship between social desirability and life satisfaction is mediated by mental toughness and emotional intelligence among Chinese youth.

In the era of digital connectivity and social media, the construct of social desirability has become increasingly influential, particularly among youths. This study aims to delve deeply into the impact of social desirability on life satisfaction, with a particular focus on the mediating roles of mental toughness and emotional intelligence. The academic significance of this research lies in its contribution to the existing literature by exploring these constructs within the unique cultural context of China, potentially offering new insights that differ from Western perspectives. Furthermore, this study challenges some existing theoretical assumptions about social desirability. Traditional views may regard social desirability as a construct of response bias, while our research reveals that it may actively influence life satisfaction in a more complex manner through the mediating roles of mental toughness and emotional intelligence. Practically, it can inform interventions aimed at enhancing mental health and well-being in educational and community settings, and also impact policy-making, such as the development of programs to cultivate mental toughness and emotional intelligence. In summary, this study provides a new theoretical perspective and empirical data for understanding the roles of social desirability, mental toughness, and emotional intelligence in adolescent life satisfaction by supplementing and extending existing theories. This not only helps to enrich the theoretical framework of the relevant fields but also has significant implications for guiding practice and improving the mental health and quality of life of Chinese youth.

Social desirability and young adults' life satisfaction

Social desirability is a crucial factor in improving young adults' life satisfaction and is often viewed as a tendency to protect self-esteem by avoiding threatening information and minimizing negative effects (24). This psychological defense mechanism has often been associated with better mental health and life satisfaction (25–27). Previous studies have shown a moderate positive correlation between social desirability and life satisfaction (28), and social desirability is considered an important determinant of life satisfaction (29, 30). Recent evidence also revealed that social desirability is correlated with personal well-being (7, 31). For example, Hitchcott et al. (26) found social desirability is significantly related to higher life satisfaction and fewer depressive symptoms in adults aged 20 to 101 years, consistent with previous research (9, 32, 33). Therefore, the positive effect of social desirability might be an advantageous coping style, which could be a crucial factor in enhancing life satisfaction. Given the positive association between social desirability and life satisfaction, we hypothesized that social desirability will have a positive influence on life satisfaction (hypothesis 1).

Mental toughness as a potential mediator

Mental toughness is related to life satisfaction (34–37), and is an important individual difference factor for coping with challenges and demonstrating persistence under pressure conditions (37). However, little research has explored the role of mental toughness in the relationship between social desirability and life satisfaction among young adults.

Mental toughness has been theoretically hypothesized to mediate the relationship between social desirability and life satisfaction. It enables some individuals to better persist in many situations, including sports (35, 38–41), education (36, 42–44), the workplace (45, 46); and the military (45, 47, 48). Recent studies have indicated

that mental toughness reflects personal resources that are broadly associated with various positive psychological traits such as self-efficacy, optimism, and coping strategies (37, 45, 49). In a longitudinal study conducted by Gerber et al. (50), mental toughness was found to be positively related to life satisfaction. These findings were replicated by Jin and Wang (51), who revealed that mental toughness mediated the relationship between attachment and life satisfaction in a sample of 217 international students.

Although no studies have directly explored the relationship between social desirability and mental toughness, the construct of mental toughness, which has components referring to how one regulates emotions and changes cognition to deal with stressful conditions (52), may be positively correlated with social desirability. Individuals with higher social desirability always favorably portray themselves (53), even under time pressure (54). Meggs et al. (55) in a study of 105 athletes with higher mental toughness had more positive self-concepts. Some studies have also suggested that mental toughness is positively linked to optimism and negatively linked to pessimism (56), extraversion, conscientiousness, neuroticism (57), affiliative and self-enhancing humor styles (58), and the Dark Triads traits (59). From a coping model perspective (60), studies have explored the application of mental toughness to mental health and life satisfaction, indicating that a higher level of mental toughness could predict higher life satisfaction and lower psychological distress (50, 51, 91). Therefore, we hypothesize that mental toughness mediates the relationship between social desirability and life satisfaction (hypothesis 2).

Emotional intelligence as a potential mediator

Besides mental toughness, emotional intelligence might mediate the relationship between social desirability and life satisfaction. The positive relationship between mental toughness and emotional intelligence indicates that individuals with higher mental toughness have a higher level of emotional intelligence (61). Therefore, emotional intelligence could be proposed as another mechanism to explain the relationship between social desirability and life satisfaction.

It is generally appreciated that individuals with a higher level of emotional intelligence report higher life satisfaction (62–71). Previous research has indicated that emotional intelligence not only directly affects individuals' life satisfaction, but also plays a mediator role in life satisfaction (70, 72). Several studies have confirmed that emotional intelligence is a significant predictor of life satisfaction (73, 74). One meta-analysis revealed a significant positive correlation (r = 0.32) between emotional intelligence and life satisfaction (34). The essence of emotional intelligence includes perceiving, understanding, harnessing, and managing the complexity and nuances of emotional experiences in the self and others (75). Therefore, we hypothesized that emotional intelligence would play a significant role in the relationship between social desirability and life satisfaction (hypothesis 3).

The chain mediation effect of mental toughness and emotional intelligence

Mental toughness, which is related to perseverance and success in performance domains, could be a stress buffer for people (76). Emotional intelligence, which influences emotion perception and emotion control and management can promote the mental toughness of athletes. Previous studies found that both mental toughness and emotional intelligence worked together to help athletes cope with stress and improve their performance (77). Studies also found that emotional intelligence was a significant predictor of mental toughness (78). Contrarily, some studies found that mental toughness was a predictor of emotional intelligence (Gucciardi et al., 2008; 61). Given the interaction of these two variables, we propose hypothesis 4 based on previous studies (61). Thus, we hypothesize that mental toughness and emotional intelligence will play a chain mediation role in the relationship between trait social desirability and life satisfaction (hypothesis 4).

The current study

To further explore the impact of social desirability on youth's life satisfaction, the current study has three aims. First, we aim to examine the direct effect of social desirability on life satisfaction. Second, we seek to explore the mediating role of mental toughness and emotional intelligence. Third, we intend to explore whether social desirability predicts life satisfaction through the chain-mediating effect of mental toughness and emotional intelligence. Thus, in the present research, we hypothesized (1) social desirability will have a positive influence on life satisfaction, (2) mental toughness mediates the relationship between social desirability and life satisfaction, (3) emotional intelligence mediates the relationship between social desirability and life satisfaction, mental toughness and emotional intelligence play a chain mediation role in the relationship between trait social desirability and life satisfaction (See Figure 1). To examine these objectives, we used two independent samples of Chinese college students. In Sample 1, we conducted a multiple mediation analysis to test the mediation effect of mental toughness and emotional intelligence on the relationship between social desirability and life satisfaction. In Sample 2, we repeated the same procedures on another college student sample.

Materials and methods

Participants and procedures

Sample 1 consisted of 1,200 Chinese adolescent and young adult participants enrolled at one middle school, two high schools, and two universities in Guangdong. Participants were aged from 12 to 24 years (M = 19.36, SD = 2.21), and they received compensation upon completing the survey. Sample 2, the sample consisted of 750

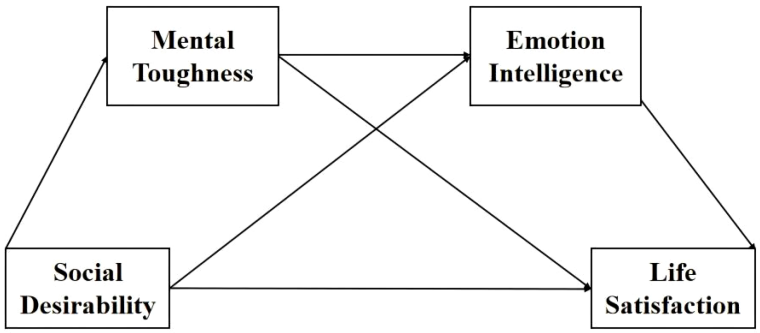

FIGURE 1
The hypothetical structure model.

Chinese adolescent and young adult participants enrolled at one middle school, one high school, and two universities in Guangdong. Participants were aged from 12 to 24 years (M = 19.19, SD = 2.58), and they received compensation upon completing the survey. All data were collected by a web-based survey designed by Wenjuanxing (in Chinese). Informed consent was obtained at the start of the survey. It was made clear to the participants that they could withdraw from the survey at any time by closing their browser without having their responses registered. Questionnaire completion was self-paced. The study was approved by the author's Institutional Review Board. The participants completed all measures anonymously to alleviate their anxiety about disclosing individual information and to ensure the validity of the survey. The survey took about 15 minutes to complete.

Measures

Social desirability

Social desirability was measured with the Social Desirability Scale-17 (SDS-17; 79), which consists of 16 true–false items (e.g., "I will never live off other people"), and is an updated version of the MCSDS (80). It has been validated in the United States and Germany (81). The Cronbach's α in the present sample was 0.68 for the SDS-17 total score. Higher scores indicate a stronger tendency to present oneself in a desirable light.

Life satisfaction

The Satisfaction with Life Scale (SWLS; 82) was used to measure of global life satisfaction. The SWLS consists of five items (e.g., "I am satisfied with my life") which were rated on a seven-point Likert-type scale (1= strongly disagree, 7= strongly disagree). A Chinese translation of the SWLS demonstrated adequate reliability and validity (83). The Cronbach's α of the scale was 0.87 in the present sample.

Mental toughness

We assessed mental toughness using a Chinese version of the 27-item Hardiness Scale (84). The Hardiness Scale was developed according to the theory of hardiness/mental toughness and Chinese social culture. It has adequate reliability and validity and is adapted for testing people's personality traits of mental toughness. Responses are rated on a four-point Likert scale (1= strongly agree, 4= strongly disagree). The Cronbach's α of the scale was 0.94 in the present sample.

Emotional intelligence

Emotional intelligence was measured using the Wong Law Emotional Intelligence Scale (85) which is a 16-item self-report measurement with four sub-dimensions (self-emotion appraisal, appraisal of others' emotions, use of emotion, and regulation of emotion). The items are scored on a seven-point scale (1 = very strongly disagree, 4 = neutral, 7 = very strongly agree). The Chinese version demonstrates adequate reliability and validity. The Cronbach's α for the scale was 0.92.

Control variables

According to previous research, age, and gender may have an effect on life satisfaction (86, 87), so we controlled for age and gender as covariates in the present study.

The same measures related to social desirability, mental toughness, emotional intelligence, and life satisfaction were used in Sample 2. The Cronbach's alphas for measures related to social desirability, mental toughness, emotional intelligence and life satisfaction in this study were 0.66, 0.96, 0.94, and 0.90, respectively.

Analyses

Descriptive analyses, correlations, and mediation analyses were conducted (88). In particular, considering the non-normal distribution of the data, bias-corrected confidence intervals (CI; 95%) based on 5000 bootstrap replications were used to determine the significance of the indirect effect (c' path). CIs that did not contain zero would indicate significant mediation effects (88).

According to the power tables for mediation analysis (89), supposing a medium effect size (0.39) for the mediation effect (αβ), a minimum sample of 71 participants was required to achieve a minimum statistical power of 0.80. Therefore, the sample size in the study was more than adequate and had a

statistical power of over 0.95. Table 1 provides information on the demographic characteristics of the Sample 1. The same analysis method was used for Sample 2.

Results

Common method bias test

We conducted the common method basis test using the Harman single-factor method to include all items in the self-report scales of social desirability, mental toughness, emotional intelligence, and life satisfaction using exploratory factor analysis. Only 29.17% of the variance was explained by the largest factor, which was less than the critical value of 40%. The results indicated that there was no significant common method bias in the current study.

Correlation analysis

The results from the Pearson correlation analysis indicated that social desirability, mental toughness, emotional intelligence, and life satisfaction, all shared a significantly positive correlation. Table 2 provides the results of the correlation analysis.

Our findings suggest that greater levels of social desirability were positively associated with higher levels of life satisfaction ($r = 0.30$, $p < 0.001$), and that both social desirability and life satisfaction were separately positively associated with mental toughness ($r = 0.32$, $p < 0.001$; $r = 0.43$, $p < 0.001$) and emotional intelligence ($r = 0.35$, $p < 0.001$; $r = 0.43$, $p < 0.001$). Mental toughness was significantly correlated with emotional intelligence ($r = 0.64$, $p < 0.001$).

TABLE 1 Demographic characteristics of Sample1.

	N (%)	M (SD)	Range (years)
Age		19.36 (2.21)	12-24
Male	561 (46.75%)	19.43 (2.19)	12-24
Female	639 (53.25%)	19.30 (2.23)	13-24
Total	1200 (100%)	19.36 (2.21)	12-24

N =1200.

Single mediation analysis

A single mediation analysis was first conducted to examine the mediating role of both mental toughness and emotional intelligence in the relationship between social desirability and life satisfaction after controlling for age and gender as covariates. As we hypothesized, mental toughness exerted a significant mediation effect on the relationship (estimate = 0.28, 95% CI = [0.22, 0.35]). Additionally, emotional intelligence also exerted a significantly mediation effect on the relationship (estimate = 0.30, 95% CI = [0.23, 0.37]).

Multiple mediation analysis

As shown in Table 3, we explored the mediation effect of mental toughness and emotional intelligence on the relationship between social desirability and life satisfaction using a chain mediation analysis in PROCESS (88). As predicted, social desirability was significantly associated with life satisfaction, b = 0.30, p < 0.001, 95% CI = [0.54, 0.79] (Model 1). The results showed that social desirability significantly positively predicted mental toughness, b= 0.32, p < 0.001, 95% CI = [1.32, 1.83] (Model 2) (see Figure 2 a1 path). Model 3 showed that social desirability positively and significantly predicted emotional intelligence significantly, b = 0.17, p < 0.001, 95% CI = [0.56, 0.98] (see Figure 1 a2 path), and mental toughness was positively associated with emotional intelligence, b = 0.59, p < 0.001, 95% CI = [0.52, 0.61] (see Figure 2 b21 path). Furthermore, mental toughness (b = 0.26, p < 0.001, 95% CI = [0.09, 0.15] (see Figure 1 b1 path) and emotional intelligence (b = 0.22, p < 0.001, 95% CI = [0.07, 0.13] (see Figure 1 b2 path) positively predicted life satisfaction, Meanwhile the direct effect of social desirability on life satisfaction was significant (Model 4), b= 0.30, p< 0.001, 95% CI = [0.18, 0.42] (see Figure 1 C' path). The results of the mediation analysis confirmed our hypotheses. The results indicated that the overall model explained 66.54% of the variance in life satisfaction, the standardized regression coefficient (β) for each path was significant, ps < 0.001, and the overall explanation rate of social desirability on life satisfaction was 45.54%. With the mediators controlled, the direct link of social desirability with life satisfaction remained significant, β = 0.30, p < 0.001, revealing that mental toughness and emotional intelligence had partial mediation effects on the relationship.

TABLE 2 Descriptive statistics and correlation analysis for all variables.

Variables	M	SD	1	2	3	4	5	6
1 Social desirability	10.38	3.07	_					
2 Mental toughness	70.23	14.90	0.32***	_				
3 Emotional intelligence	81.46	14.34	0.35***	0.64***	_			
4 Life satisfaction	20.70	6.89	0.30***	0.43***	0.43***	_		
5 Age	19.36	2.21	-0.04	-0.05	-0.03	-0.04	_	
6. Gender			0.04	-0.12**	-0.06*	0.07**	-0.03	_

***p <.001, **p <.01, *p <.05.

TABLE 3 Multiple regression of the mediation effect.

	Model1 (LS)		Model 2 (MT)		Model 3 (EI)		Model 4 (LS)	
	β	*t*	*β*	*t*	*β*	*t*	*β*	*t*
Gender	0.05*	1.99	-0.14***	-5.01	0.01	0.24	0.11***	4.22
Age	-0.03	-0.97	-0.04***	-1.43	0.01	0.10	-0.01	- 0.48
SD	0.30***	10.78	0.32***	11.95	0.16 ***	7.16	0.14***	5.00
MT					0.59***	25.32	0.26***	7.97
EI							0.22***	6.45
R	0.31		0.35		0.66		0.50	
R^2	0.09		0.12		0.43		0.25	
F	41.42***		55.41***		229.31***		81.10***	

*p <.05, **p <.01, ***p <.001.

As presented in Table 4, the bootstrap analysis found that the 95% BootCIs of mental toughness (estimate = 0.16, 95% CI = [0.06, 0.11]) and emotional intelligence (estimate = 0.04, 95% CI = [0.02, 0.05]) did not contain zero, thereby indicating that the mediation effects of mental toughness and emotional intelligence in the relationship between social desirability and life satisfaction were significant. In addition, a path from social desirability to life satisfaction through mental toughness and emotional intelligence remained significant (estimate = 0.04, 95% CI = [0.03, 0.06]), revealing that the link between social desirability with life satisfaction could be mediated by the serial path of mental toughness and emotional intelligence (see Figure 2).

The same method of analysis was used on the data obtained from Sample 2. Table 5 presents the descriptive statistics and correlations for all variables. The results indicated that social desirability, mental toughness, emotional intelligence, and life satisfaction had a significant positive correlation with each other (ps <.01). In Sample 2, we conducted a multiple mediation analysis to examine the mediating role of mental toughness and emotional intelligence in the relationship between social desirability and life satisfaction after controlling for age and gender. The results indicated that the mediation effects of mental toughness (estimate = 0.20, 95% CI = [0.12, 0.28]) and emotional intelligence (estimate = 0.06, 95% CI = [0.02, 0.11]) in the relationship between social desirability and life satisfaction were significant. Furthermore, a path from social desirability to life satisfaction through mental toughness and emotional intelligence remained significant (estimate = 0.11, 95% CI = [0.06, 0.16]), revealing that the relationship between social desirability and life satisfaction could be mediated by the chain path of mental toughness and emotional intelligence.

Lastly, we also conducted an exploratory moderation analysis to test whether mental toughness and emotional intelligence may moderate the relationship between social desirability and life satisfaction. The results indicated that mental toughness and emotional intelligence did not moderate this relationship between social desirability and life satisfaction (see Supplementary Materials for Samples 1 and 2).

Discussion

The present study primarily investigated the direct effect of social desirability on life satisfaction and the indirect effects of mental toughness and emotional intelligence. The results indicated

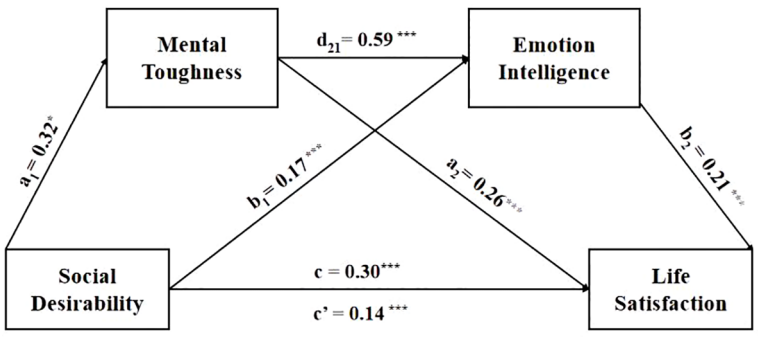

FIGURE 2
Path diagram of mediator model based on Sample 1. *p <.05,***p <.001.

TABLE 4 Standardized indirect effects and confidence estimates for Bootstrap estimates in Sample 1.

Model pathways	Estimates	BootSE	95% BootCI	
			Lower	Upper
Total effect	0.30[a]	0.06	0.54	0.79
Direct effect	0.14[a]	0.06	0.18	0.42
SD→MT→LS	0.09[a]	0.01	0.06	0.11
SD→EI→LS	0.03[a]	0.01	0.02	0.05
SD→MT→EI→LS	0.04[a]	0.01	0.03	0.06

CI, confidence interval; SD, social desirability; MT, mental toughness; EI, emotional intelligence; LS, life satisfaction.
[a]Empirical 95% confidence interval does not overlap with zero.

that social desirability not only directly impacts youth's life satisfaction but also has indirect effects through the mediators of mental toughness and emotional intelligence.

The current research revealed that social desirability had a significant positive effect on life satisfaction. These findings are consistent with previous research on the relationship between social desirability and life satisfaction (7, 26, 31). Previous research indicated that higher social desirability predicts higher life satisfaction (7, 25–31). Even after controlling for age and gender, social desirability was an important personal trait for improving young adults' life satisfaction.

The present research revealed that mental toughness played a mediating role in the relationship between social desirability and life satisfaction, which extends previous findings. Mental toughness is often viewed as a resilience resource or factor because both concepts involve one's capacity to cope with stressful situations and the ability to bounce back from adversity (51). However, there are differences among them: mental toughness focuses on one's ability to deal with stress and hardship (60) while resilience considers one's general attitudes and beliefs regarding stressful situations (51). Therefore, a positive association between social desirability and mental toughness suggests that mentally tough individuals tend to cope with challenges and to persist under hardship (37), while individuals with high social desirability cope with stressful situations more effectively and have more perseverance in solving difficult problems and enduring boredom (4). Another important composite of mental toughness was confidence in ability and interpersonal skills (90). Mentally tough individuals are able to maintain high levels of control and confidence, allowing them to push themselves forward in social settings and leading to better life satisfaction. Therefore, there is a clear relationship between social desirability and mental toughness.

From a theoretical perspective, the current findings provide further evidence to support the notion that social desirability is associated with life satisfaction and that interpersonal adjustment could represent a vital bridging concept between the constructs of social desirability and mental toughness. In addition, the findings support the previously made assumption that individuals with a higher level of mental toughness might have more life satisfaction (35–37). On the practical side, the significant mediation effect provides further support to the findings from several previous studies which tested the effectiveness of mental toughness training for young adults. Such training has been found to lead to decreased depressive symptoms (91, 92), and better life satisfaction and mental health (93, 94). Recent studies on youth mental health have begun to pay more attention to mental toughness (35, 37, 38). Given that the World Health Organization conducted the World Mental Health International College Student project, which focused on correlates of common mental health disorders among first-year college students (95), training in mental toughness might be an effective way of improving young adults' mental health and school performance. Our findings may also support the view that training young adults so that they develop a higher mental toughness may lead to better outcomes.

The current research revealed that emotional intelligence played a mediating role in the relationship between social desirability and life satisfaction. People with high emotional intelligence often have better emotional regulation abilities, allowing them to manage negative emotions such as anxiety and depression more effectively. Previous research confirmed that emotional intelligence is a significant predictor of life satisfaction (73, 74). People with high levels of emotional intelligence contribute to maintaining a high level of life satisfaction (73). Our results are also consistent with previous studies which indicated that emotional intelligence acted as a mediator role in life satisfaction (70–72). One possible reason for this is that emotional intelligence, as a psychological ability, may act as a bridge between social desirability and life satisfaction by influencing an individual's social interactions, emotional experiences, and decision-making processes. However, this mediation effect may vary due to individual differences, cultural backgrounds, and

TABLE 5 Descriptive statistics and correlations for all variables in Sample 2.

Variables	*M*	*SD*	1	2	3	4	5	6
1 Social desirability	11.00	2.97	_					
2 Mental toughness	70.85	15.56	0.33***	_				
3 Emotional intelligence	82.16	15.07	0.32***	0.66***	_			
4 Life satisfaction	21.82	6.87	0.27***	0.43***	0.42***	_		
5 Age	19.19	2.59	-0.03	-0.04	-0.03	0.03	_	
6. Gender			0.06	-0.13**	-0.05	0.02	0.04	_

***p <.001, **p <.01, *P <.05.

specific situations. This can help individuals to gain more social approval because emotionally stable individuals are generally more likable. They are usually more adaptable to different social environments and situations. This adaptability may make them more successful in social interactions, thereby increasing their life satisfaction. In addition, our results extended previous studies by revealing that mental toughness and emotional intelligence may make independent contributions to the association in the general young adult population using the multiple mediation model. It would also help contribute to knowledge in the field of social desirability and life satisfaction.

We found that the serial mediation effect of mental toughness → emotional intelligence played an important role in the relationship between social desirability and life satisfaction. This study was the first to explore the potential mechanism linking social desirability and life satisfaction with mental toughness and emotional intelligence. That is, individuals with higher social desirability are expected to display higher mental toughness, and individuals with greater mental toughness would have higher emotional intelligence, which may lead to higher life satisfaction. Taken together, the present results showed that the serial mediation effect of mental toughness→ emotional intelligence could act as a mechanism in the relationship between social desirability with life satisfaction.

Given the replication crisis declared in the region of psychology (96, 97), we conducted another study using an independent sample to test if our results were repeatable. We found that all the results remained significant in Sample 2. The mediation effect of mental toughness and emotional intelligence on the relationship between social desirability and life satisfaction found in Sample 1 was confirmed. Therefore, our findings were found to be stable and repeatable.

The study also has a few limitations. First, the sample in this study consisted of a limited number of Chinese participants aged 12-24 years old, so it is not appropriate to apply the findings to all other young adults. Second, the data used in this study came from only one cultural context. The generalization of the results is limited and the results should not be directly applied to other countries of different cultures. Comparative studies could reveal cultural nuances in how social desirability impacts life satisfaction and whether the mediating roles of mental toughness and emotional intelligence are consistent across cultures. Third, our results were based on a cross-sectional design, which means that we cannot infer causality or the direction of the relationships observed. More tests are needed to further confirm the findings. Given the cross-sectional nature of this research, future studies could benefit from a longitudinal design to examine the causal relationships over time between social desirability, mental toughness, emotional intelligence, and life satisfaction. This approach would help to determine whether changes in one variable precede and predict changes in another. Additionally, the reliance on self-report measures could introduce biases such as social desirability bias, where participants may provide answers that they believe will be viewed favorably by others. Future research could benefit from incorporating objective measures or utilizing experimental designs to mitigate these potential biases. Lastly, the sample size, while sufficient for this preliminary study, may not be large enough to detect smaller effect sizes or to allow for subgroup analyses. A larger and more diverse sample could enhance the external validity of the study and provide a more comprehensive understanding of the phenomena under investigation. This study identified mental toughness and emotional intelligence as key mediators. Future research could explore other potential mediators or moderators, such as personality traits, social support, or coping strategies, that may influence the relationship between social desirability and life satisfaction. By addressing these areas, future research can build upon the current study's findings, deepen our understanding of the underlying mechanisms, and contribute to the development of effective strategies for promoting life satisfaction among youth.

Conclusions

The current study indicates that social desirability directly or indirectly impacts life satisfaction through the mediating role of mental toughness and emotional intelligence. It provides a new theoretical framework for researchers to explore the mediation effects of mental toughness and emotional intelligence in the relationship between social desirability and life satisfaction. Future studies could explore this area further to validate and extend the study findings. The findings revealed the probable underlying mechanisms of the effect of social desirability on life satisfaction which may provide us with more important information on how to improve young adults' life satisfaction.

Data availability statement

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

Ethics statement

The study was approved by the author's Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

FL: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. ZY: Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Conceptualization. ZL: Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Data curation, Conceptualization. JG: Writing – review & editing. JT: Writing – review & editing. RF: Writing – review & editing, Data curation. BA:

Writing – review & editing. MY: Writing – review & editing. DG: Writing – review & editing, Funding acquisition, Conceptualization.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2024.1467804/full#supplementary-material

References

1. Paulhus DL. Two-component models of socially desirable responding. *J Personal Soci Psychol*. (1984) 46:598–609. doi: 10.1037/0022-3514.46.3.598

2. Paulhus DL. Chapter 2. measurement and control of response bias. In: *Measures of personality & social psychological attitudes* Academic Press, Inc. (1991). p. 17–59.

3. Andrejevic M, Meshi D, van den Bos W, Heekeren HR. Individual differences in social desirability are associated with white-matter microstructure of the external capsule. *Cogn Affect Behav Neurosci*. (2017) 17:1255–64. doi: 10.3758/s13415-017-0548-2

4. Guo S, Liu Y, Wang Y, Li LMW, Gao D-G. Impression management in predicting social stress and adaptive work behaviors. *Inter J Stress Manage*. (2019) 29:319–29. doi: 10.1037/str0000143

5. Holden RR. *Social desirability. 4th edition*. New York: Wiley (2010).

6. Huang CL, Yang YK, Chu CL, Lee IH, Yeh TL, Chen PS, et al. The association between the Lie scale of the Maudsley personality inventory and striatal dopamine D2/D3 receptor availability of healthy Chinese community subjects. *Eur Psychi*. (2006) 21:62–5. doi: 10.1016/j.eurpsy.2005.05.004

7. Uziel L. Rethinking social desirability scales: from impression management to interpersonally oriented self-control. *Perspect Psychol Sci*. (2010) 5:243–62. doi: 10.1177/1745691610369465

8. Fastame MC, Hitchcott PK, Penna MP. Does social desirability influence psychological well-being: perceived physical health and religiosity of Italian elders? A developmental approach. *Aging Ment Heal*. (2017) 21:348–53. doi: 10.1080/13607863.2015.1074162

9. Fastame MC, Penna MP, Hitchcott PK. Psychological markers of longevity in sardinian centenarians: the impact of developmental factors and social desirability. *Aging Clin Exp Rese*. (2019) 32:107–14. doi: 10.1007/s40520-019-01157-y

10. Uziel L. Look at me, I'm happy and creative: The effect of impression management on behavior in social presence. *Pers Soc Psychol Bullet*. (2010) 36:1591–602. doi: 10.1177/0146167210386239

11. Russell RJH, Wells PA. Social desirability and quality of marriage. *Pers Indi Diff*. (1992) 13:787–91. doi: 10.1016/0191-8869(92)90051-P

12. Twenge JM, Im C. Changes in the need for social approval 1958-2001. *J Rese. Personal*. (2007) 41:171–89. doi: 10.1016/j.jrp.2006.03.006

13. Fastame MC, Penna MP. Does social desirability confound the assessment of self-reported measures of well-being and meta-cognitive efficiency in young and older adults? *Clin Gerontol*. (2012) 35:239–56. doi: 10.1080/07317115.2012.749319

14. Ingold PV, Kleinmann M, König CJ, Melchers KG. Shall we continue or stop disapproving of self-presentation? Evidence on impression management and faking in a selection context and their relation to job performance. *Euro J Work Organi Psychol*. (2015) 24:420–32. doi: 10.1080/1359432X.2014.915215

15. Tracey TJ. A note on socially desirable responding. *J Counsel Psychol*. (2016) 63:224 –232. doi: 10.1037/cou0000135

16. Uziel L. Impression management ("lie") scales are associated with interpersonally oriented self-control, not other-deception. *J Personal*. (2014) 82:200–12. doi: 10.1111/jopy.12045

17. Uziel L, Baumeister RF. The effect of public social context on self-control: Depletion for neuroticism and restoration for impression management. *Pers Soc Psychol Bullet*. (2012) 38:384–96. doi: 10.1177/0146167211427310

18. Zettler I, Hilbig BE, Moshagen M, de Vries RE. Dishonest responding or true virtue? A behavioral test of impression management. *Pers Individ Diff*. (2015) 81:107–11. doi: 10.1016/j.paid.2014.10.007

19. Ivanoff A, Jang SJ. The role of hopelessness and social desirability in predicting suicidal behavior: A study of prison inmates. *J Consult Clini Psychol*. (1991) 59:394–9. doi: 10.1037//0022-006x.59.3.394

20. Linehan MM, Nielsen SL. Social desirability: Its relevance to the measurement of hopelessness and suicidal behavior. *J Consul Clini Psychol*. (1983) 51:141–3. doi: 10.1037//0022-006x.51.1.141

21. Miotto P, Preti A. Suicide ideation and social desirability among school-aged young people. *J Adoles*. (2008) 31:519–33. doi: 10.1016/j.adolescence.2007.08.004

22. Tan L, Grace RC. Social desirability and sexual offenders: A review. *Sex Abu J Rese. Treat*. (2008) 20:61–87. doi: 10.1177/1079063208314820

23. Egerton A, Rees E, Bose SK, Lappin JM, Stokes PR, Turkheimer FE, et al. Truth, lies or self-deception? Striatal D (2/3) receptor availability predicts individual differences in social conformity. *Neuroimage*. (2010) 53:777–7781. doi: 10.1016/j.neuroimage.2010.06.031

24. Paulhus DL, John OP. Egoistic and moralistic biases in self-perception: the interplay of self-deceptive styles with basic traits and motives. *J Personal*. (1998) 66:1025–60. doi: 10.1111/1467-6494.00041

25. Erskine J, Kvavilashvili L, Conway MA, Myers L. The effects of age on psychopathology, well-being and repressive coping. *Aging Ment Heal*. (2007) 11:394–404. doi: 10.1080/13607860600963737

26. Hitchcott PK, Penna MP, Fastame MC. Age trends in well-being and depressive symptoms: the role of social desirability. *Psychi Quar*. (2020) 91:463–73. doi: 10.1007/s11126-020-09711-y

27. Linden W, Paulhus DL, Dobson KS. Effects of response styles on the report of psychological and somatic distress. *J Consul Clini Psychol*. (1986) 54:309–13. doi: 10.1037//0022-006x.54.3.309

28. Diener E. Assessing subjective well-being: Progress and opportunities. *Soc Indi Res*. (1994) 31:103–57. doi: 10.1007/BF01207052

29. Gilman R, Barry J. Life satisfaction and social desirability among adolescents in a residential treatment setting: Changes across time. *Resident Treat Chil Youth*. (2003) 21:19–42. doi: 10.1300/J007v21n02_02

30. Huebner ES, Laughlin JE, Ash C, Gilman R. Further validation of the multidimensional students' Life satisfaction scale. *J Psychoedu Assess*. (1998) 16:118–34. doi: 10.1177/073428299801600202

31. Miller BK, Zivnuska S, Kacmar KM. Self-perception and life satisfaction. *Pers Individ Diff*. (2019) 139:321–5. doi: 10.1016/j.paid.2018.12.003

32. Fastame MC, Penna MP, Hitchcott PK. Life satisfaction and social desirability across the late life span: what relationship? *Qual Life Res*. (2015) 24:241–4. doi: 10.1007/s11136-014-0750-4

33. Soubelet A, Salthouse TA. Influence of social desirability on age differences in self-reports of mood and personality. *J Personal*. (2011) 79:741–62. doi: 10.1111/j.1467-6494.2011.00700.x

34. Sánchez-Álvarez N, Extremera N, Fernández-Berrocal P. The relation between emotional intelligence and subjective well-being: A meta-analytic investigation. *J Posi Psychol*. (2016) 11:276–85. doi: 10.1080/17439760.2015.1058968

35. Micoogullari BO, Odek U, Beyaz O. Evaluation of sport mental toughness and psychological well-being in undergraduate student athletes. *Edu Rese. Rev*. (2017) 12:483–7. doi: 10.5897/err2017.3216

36. Stamp E, Crust L, Swann C, Perry J, Clough P, Marchant D. Relationships between mental toughness and psychological wellbeing in undergraduate students. *Pers Individ Diff*. (2015) 75:170–4. doi: 10.1016/j.paid.2014.11.038

37. Lin Y, Mutz J, Clough PJ, Papageorgiou KA. Mental toughness and individual differences in learning, educational and work performance, psychological well-being, and personality: A systematic review. *Front Psychol*. (2017) 8:1345. doi: 10.3389/fpsyg.2017.01345

38. Crust L, Earle K, Perry J, Earle F, Clough A, Clough PJ. Mental toughness in higher education: relationships with achievement and progression in first-year university sports students. *Per Individ Diff*. (2014) 69:87–91. doi: 10.1016/j.paid.2014.05.016

39. Gucciardi D, Gordon S, Dimmock J. Advancing mental toughness research and theory using personal construct psychology. *Int Rev Sport Exe Psychol*. (2009) 2:54–72. doi: 10.1080/17509840802705938

40. Gucciardi D, Gordon S, Dimmock J. Evaluation of a mental toughness training programme for youth-aged Australian footballer: a quantitative analysis. *J Appl Sport Psychol*. (2009) 21:307–23. doi: 10.1080/10413200903026074

41. Nicholls AR, Levy AR, Polman RCJ, Crust L. Mental toughness, coping self-efficacy, and coping effectiveness among athletes. *Int J Sport Psychol*. (2011) 42:513–24. doi: 10.1016/j.paid.2007.11.011

42. Bédard-Thom C, Guay F. Mental toughness among high school students: a test of its multidimensionality and nomological validity with academic achievement and preference for difficult tasks. *Soc Psychol Edu*. (2018) 21:827–48. doi: 10.1007/s11218-018-9437-y

43. St Clair-Thompson H, Bugler M, Robinson J, Clough P, Mcgeown SP, Perry J. Mental toughness in education: Exploring relationships with attainment, attendance, behavior and peer relationships. *Edu Psychol*. (2015) 35:886–907. doi: 10.1080/01443410.2014.895294

44. St Clair-Thompson H, Giles R, McGeown SP, Putwain D, Clough P, Perry J. Mental toughness, and transitions to high school, and to undergraduate study. *Edu Psychol*. (2017) 37:792–809. doi: 10.1080/01443410.2016.1184746

45. Gucciardi DF, Hanton S, Gordon S, Mallett CJ, Temby P. The concept of mental toughness: tests of dimensionality, nomological network, and traitness. *J Pers*. (2015) 83:26–44. doi: 10.1111/jopy.12079

46. Marchant DC, Polman RCJ, Clough P, Jackson JG, Levy AR, Nicholls AR. Mental toughness: managerial and age differences. *J Managerial Psychol*. (2009) 24:428–37. doi: 10.1108/02683940910959753

47. Arthur CA, Fitzwater J, Hardy L, Beattie SJ, Bell J. Development and validation of a military training mental toughness inventory. *Mil Psychol*. (2015) 27:232–41. doi: 10.1037/mil0000074

48. Godlewski R, Kline T. A model of voluntary turnover in male Canadian Forces recruits. *Mil Psychol*. (2012) 24:251–69. doi: 10.1080/08995605.2012.678229

49. Manley H, Jarukasemthawee S, Pisitsungkagarn K. The effect of narcissistic admiration and rivalry on mental toughness. *Pers Individ Diff*. (2019) 148:1–6. doi: 10.1016/j.paid.2019.05.009

50. Gerber M, Brand S, Feldmeth AK, Lang C, Elliot C, Holsboer-Trachsler E, et al. Adolescents with high mental toughness adapt better to perceived stress: a longitudinal study with Swiss vocational students. *Pers Individ Diff*. (2013a) 54:808–14. doi: 10.1016/j.paid.2012.12.003

51. Jin L, Wang CD. International students' attachment and psychological well-being: the mediation role of mental toughness. *Counsel Psychol Quart*. (2018) 22:59–78. doi: 10.1080/09515070.2016.1211510

52. Harmison RJ. A social cognitive framework for understanding and developing mental toughness in sport. In: Gucciardi DF, Gordon S, editors. *Mental toughness in sport: Development in theory and research*. Routledge, New York (2011).

53. Parmač Kovačić M, Galić Z, Jerneić Ž. Social desirability scales as indicators of self-enhancement and impression management. *J Pers Assess*. (2014) 96:532–43. doi: 10.1080/00223891.2014.916714

54. Protzko J, Zedelius CM, Schooler JW. Rushing to appear virtuous: time pressure increases socially desirable responding. *Psychol Sci*. (2019) 30:1584–91. doi: 10.1177/0956797619867939

55. Meggs J, Ditzfeld C, Golby J. Self-concept organisation and mental toughness in sport. *J Sports Sci*. (2014) 32:101–9. doi: 10.1080/02640414.2013.812230

56. Nicholls AR, Polman RCJ, Levy AR, Backhouse SH. Mental toughness, optimism, pessimism, and coping among athletes. *Pers Individ Diff*. (2008) 44:1182–92. doi: 10.1016/j.paid.2007.11.011

57. Veselka L, Schermer JA, Petrides K, Vernon PA. Evidence for a heritable general factor of personality in two studies. *Twin Rese. Hum Genet*. (2009) 12:254–60. doi: 10.1375/twin.12.3.254

58. Veselka L, Schermer JA, Martin RA, Vernon PA. Laughter and resiliency: a behavioral genetic study of humor styles and mental toughness. *Twin Rese. Hum Genet*. (2010) 13:442–9. doi: 10.1375/twin.13.5.442

59. Sabouri S, Gerber M, Bahmani DS, Lemola S, Clough PJ, Kalak N, et al. Examining dark triad traits in relation to mental toughness and physical activity in young adults. *Neuropsychia Dis Treat*. (2016) 12:229–35. doi: 10.2147/NDT.S97267

60. Coulter TJ, Mallett CJ, Gucciardi DF. Understanding mental toughness in Australian soccer: Perceptions of players, parents, and coaches. *J Sports Sci*. (2010) 28:699–716. doi: 10.1080/02640411003734085

61. Nicholls AR, Perry J, Jones L, Sanctuary C, Carson F, Clough P. The mediating role of mental toughness in sport. *J Sports Med Phys Fit*. (2015) 55:824–34.

62. Extremera N, Fernández-Berrocal P. Perceived emotional intelligence and life satisfaction: predictive and incremental validity using the trait meta-mood scale. *Pers Individ Diff*. (2005) 39:937–48. doi: 10.1016/j.paid.2005.03.012

63. Extremera N, Ruiz-Aranda D, Pineda-Galán C, Salguero JM. Emotional intelligence and its relation with hedonic and eudaimonic well-being: a prospective study. *Pers Individ.Diff*. (2011) 51:11–6. doi: 10.1016/j.paid.2011.02.029

64. Kong F, Zhao J, You X. Social support mediates the impact of emotional intelligence on mental distress and life satisfaction in Chinese young adults. *Pers Individ Diff*. (2012) 53:513–7. doi: 10.1016/j.paid.2012.04.021

65. Kong F, Zhao J. Emotional intelligence and life satisfaction in Chinese university students: the mediating role of self-esteem and social support. *Pers Individ Diff*. (2012) 53:1039–43. doi: 10.1016/j.paid.2012.07.032

66. Kong F, Zhao J. Affective mediators of the relationship between trait emotional intelligence and life satisfaction in young adults. *Pers Individ Diff*. (2013) 54:197–201. doi: 10.1016/j.paid.2012.08.028

67. Liu Y, Wang ZH, Lu W. Resilience and affect balance as mediators between trait emotional intelligence and life satisfaction. *Pers Individ Diff*. (2013) 54:850–5. doi: 10.1016/j.paid.2012.12.010

68. Lopez-Zafra E, Ramos-Álvarez MM, El Ghoudani K, Luque-Reca O, Augusto-Landa JM, Zarhbouch B, et al. Social support and emotional intelligence as protective resources for well-being in Moroccan adolescents. *Front Psychol*. (2019) 10:1529. doi: 10.3389/fpsyg.2019.01529

69. Palmer B, Donaldson C, Stough C. Emotional intelligence and life satisfaction. *Pers Individ Diff*. (2002) 33:1091–100. doi: 10.1016/s0191-8869(01)00215-x

70. Schutte NS, Malouff JM. Emotional intelligence mediates the relationship between mindfulness and subjective well-being. *Pers Individ Diff*. (2011) 50:1116–9. doi: 10.1016/j.paid.2011.01.037

71. Szczeniak M, Tuecka M. Family functioning and life satisfaction: The mediator role of emotional intelligence. *Psychol Rese. Behav Manage*. (2020) 13:223–32. doi: 10.2147/prbm.s240898

72. Chen Y, Peng Y, Fang P. Emotional intelligence mediates the relationship between age and subjective well-being. *Int J Aging Hum Dev*. (2016) 83:91–107. doi: 10.1177/0091415016648705

73. Gallagher EN, Vella-Brodrick DA. Social support and emotional intelligence as predictors of subjective well-being. *Pers Individ Diff*. (2008) 44:1551–61. doi: 10.1016/j.paid.2008.01.011

74. Koydemir S, Schütz A. Emotional intelligence predicts components of subjective well-being beyond personality: A two-country study using self- and informant reports. *J.Positive Psychol*. (2012) 7:1–12. doi: 10.1080/17439760.2011.647050

75. Brackett MA, Salovey P. Measuring emotional intelligence with the Sayer-Salovery-Caruso emotional intelligence test (MSCEIT). *Psicothema*. (2006) 18:34–41.

76. Powell AJ, Myers TD. Developing mental toughness: lessons from paralympians. *Front Psychol*. (2017) 8:1270. doi: 10.3389/fpsyg.2017.01270

77. Crombie D, Lombard C, Noakes T. Emotional intelligence scores predict team sports performance in a national cricket competition. *Int J Sports Sci Coach*. (2009) 4:209–24. doi: 10.1260/174795409788549544

78. Cowden RG. Mental toughness, emotional intelligence, and coping effectiveness: An analysis of construct interrelatedness among high-performing adolescent male athletes. *Percept Motor Ski*. (2016) 123:737–53. doi: 10.1177/0031512516666027

79. Stöber J. The Social Desirability Scale-17(SDS-17): Convergent validity, discriminant validity, and relationship with age. *Eur J Psychol Assess*. (2001) 17:222–32. doi: 10.1027//1015-5759.17.3.222

80. Crowne DP, Marlowe D. A new scale of social desirability independent of psychopathology. *J Consul Psychol*. (1960) 24:349–54. doi: 10.1037/h0047358

81. Blake BF, Valdiserri J, Neuendorf KA, Nemeth J. Validity of the SDS-17 measure of social desirability in the American context. *Pers Individ Diff*. (2006) 40:1625–36. doi: 10.1016/j.paid.2005.12.007

82. Diener E, Emmons RA, Larsen RJ, Griffin S. The satisfaction with life scale. *J Pers Assess*. (1985) 49:71–5. doi: 10.1207/s15327752jpa4901_13

83. Bai X, Wu C, Zheng R, Ren X. The psychometric evaluation of the satisfaction with life scale using a nationally representative sample of China. *J Happiness Stud*. (2011) 12:183–97. doi: 10.1007/s10902-010-9186-x

84. Lu G, Liang B. Development of hardiness scale. *Stud Psychol Behav*. (2008) 2:103–6.

85. Wong C, Law K, Wong P. Development and validation of a forced choice emotional intelligence measure for Chinese respondents in Hong Kong. *Asia Pacific J Manage*. (2004) 21:535–59. doi: 10.1023/B:APJM.0000048717.31261.d0

86. Froh JJ, Yurkewicz C, Kashdan TB. Gratitude and subjective well-being in early adolescence: Examining gender differences. *J Adoles*. (2009) 32:633–50. doi: 10.1016/j.adolescence.2008.06.006

87. Fugl-Meyer AR, Melin R, Fugl-Meyergher KS. Life satisfaction in 18-to 64-year-old Swedes: In relation to gender, age, partner and immigrant status. *J Rehabili Medi*. (2002) 34:239–46. doi: 10.1080/165019702760279242

88. Hayes AF. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press (2013).

89. Fritz MS, Cox MG, Mackinnon DP. Increasing statistical power in mediation models without increasing sample size. *Evaluat Heal Profess*. (2015) 38:343–66. doi: 10.1177/0163278713514250

90. Clough P, Earle K, Sewell D. Mental toughness: the concept and its measurement. In: Cockerill I, editor. *Solutions in sport psychology*. Thomson, London (2002). p. 32–43.

91. Gerber M, Kalak N, Lemola S, Clough PJ, Perry JL, Pühse U, et al. Are adolescents with high mental toughness levels more resilient against stress? *Stre Heal*. (2013b) 29:164–71. doi: 10.1002/smi.2447

92. Mutz J, Clough P, Papageorgiou KA. Do individual differences in emotion regulation mediate the relationship between mental toughness and symptoms of depression? *J.Individ Diff*. (2017) 38:71–82. doi: 10.1027/1614-0001/a000224

93. Clough P, Strycharczyk D. *Developing mental toughness: improving performance, wellbeing and positive behaviour in others*. London: Kogan Page (2012).

94. Posner Z, Janssen J, Roddam H, Charnock D. Mental health staff views on improving burnout and mental toughness. *J Ment Heal Train Edu Pract*. (2017) 12:1–16. doi: 10.1108/JMHTEP-03-2017-0021

95. Auerbach RP, Mortier P, Bruffaerts R, Alonso J, Collaborators WI. Who world mental health surveys international college student project: prevalence and distribution of mental disorders. *J Abnorm Psychol*. (2018) 127:623–38. doi: 10.1037/abn0000362

96. Patil P, Peng RD, Leek JT. What should researchers expect when they replicate studies? A statistical view of replicability in psychological science. *Perspect Psychol.l Sci*. (2016) 11:539–44. doi: 10.1177/1745691616646366

97. Stanley TD, Carter EC, Doucouliagos H. What meta-analyses reveal about the replicability of psychological research. *Psychol Bull*. (2018) 144:1325–46. doi: 10.1037/bul0000169