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Exploring the Relationship between Mindfulness and Life Satisfaction in Adolescents: The Role of Social Competence and Self-Esteem

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Abstract

Although previous research demonstrated that greater mindfulness may contribute to life satisfaction, less is unclosed about such an association and the mechanisms potentially explaining it during adolescence. The present study aimed to explore the role of self-esteem and social competence in the mindfulness-life satisfaction relationship in a sample of Turkish adolescents. The sample consisted of 406 adolescents aged 14–18 years (M_{age} = 16.01, SD = 1.15; 62.32% girls). We collected the data using the Mindful Attention Awareness Scale-Adolescent (MAAS-A), the Perceived Competence Scale (PCS-S), the Rosenberg Self-Esteem Scale (RSES), and the Satisfaction with Life Scale (SWLS). The findings revealed significant positive correlations between mindfulness, social competence, self-esteem, and life satisfaction. Our findings support two ways of explaining this relationship: the mediating role of self-esteem (indirect effect = 0.04; 95% CI: 0.03—0.06), accounting for a total effect of 0.06 and a ratio of 66.67%, and the serial mediating role of social competence and self-esteem (indirect effect = 0.02; 95% CI: 0.01—0.03), accounting for a total effect of 0.06 and a ratio of 33.33%. In addition, the results of the multi-group analysis showed no significant difference between boys and girls in a model where mindfulness predicts life satisfaction. Overall, our study may shed light on a possible process in which mindfulness boosts life satisfaction among adolescents.

Keywords Mindfulness · Social competence · Self-esteem · Life satisfaction · Adolescent

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1 Introduction

Adolescence is conceived of as a time of storms and stress. In parallel to this thought, many studies focus on adverse events in youth but relatively few focus on positive situations and underlying factors. Concentrating only on problem situations is like zooming in on a single piece of the puzzle rather than the complete one (Lerner, 2007); however, it is needed to look beyond problem situations to understand adolescence fully. Such a need has led to a paradigm shift in psychology, too. The movement powered by this shift (aka positive psychology) eventually focuses on studying positive aspects of human development, including personality traits such as optimism, creativity, life satisfaction, hope, well-being, and self-determination (Seligman & Csikszentmihalyi, 2000, 2014). The growing research interest is now expanding its focus on such traits in youth (Baker et al., 2003; Clonan et al., 2004).

One of the key concepts in positive psychology is life satisfaction, a component of subjective well-being (Gilman & Huebner, 2003). Relevant research reported that increased life satisfaction contributes to mental health (Proctor et al., 2017). The ups and downs in adolescence can lead to changes in perceived life satisfaction (Leung & Leung, 1992), and a rapid decrease in life satisfaction in adolescence (Daly, 2022) is considered a developmental phenomenon (Goldbeck et al., 2007). Indeed, there is an increasing interest in identifying the psychological factors contributing to life satisfaction in this period (Ramos-Díaz et al., 2019), motivating the starting point of the current research. Therefore, we explored life satisfaction through mindfulness, social competence, and self-esteem in this study.

1.1 Life Satisfaction and Mindfulness

Life satisfaction is "a cognitive assessment of satisfaction with life as a whole" (Diener et al., 1985). Concerning many social, psychological, behavioral, and internal variables, including personal abilities, contextual variables, and social and personal resources (Veenhoven, 1994), life satisfaction is essential for enhancing adolescents' adaptability (Antaramian et al., 2008). In the literature, mindfulness becomes a central concept linked with adolescent life satisfaction (Brown & Ryan, 2003; Wang & Kong, 2014). It is a state of increased attention on and awareness toward previous or current experiences in one's mind, body, and environment at the moment (Brown & Ryan, 2003). It enables one to pay attention to current inner and outer experiences with a non-judgmental attitude, unbiased acceptance, curiosity, and openness (Hölzel et al., 2011). In their study, Brown et al. (2011) reported that the participating adolescents demonstrating greater mindfulness had greater life satisfaction than those with poor mindfulness. Similarly, many other studies put forward proof of a positive relationship between mindfulness and life satisfaction (Bajaj & Pande, 2016; Fenzel & Richardson, 2022; Kong et al., 2014; Stolarski et al., 2016; Tan et al., 2016; Wang & Kong, 2014, 2020). Furthermore, it was previously demonstrated that mindfulness interventions with meditation might contribute to life satisfaction (Gupta & Verma, 2019; Henriksson et al., 2016).

Based on previous empirical evidence, despite being reasonable to conclude that life satisfaction is significantly predicted by mindfulness, any underlying mechanism to explain such a relationship has not been fully elucidated. Social competence and self-esteem may be two underlying mechanisms involved in the association between mindfulness and life-satisfaction.

1.2 Mediating Roles of Social Competence and Self-Esteem

Satisfaction with life is also often linked to social components, one of which is perceived social competence referring to one's effectiveness in social interaction with others (Junge et al., 2020; Rubin et al., 2006). Ryan and Deci (2001) uttered that socially competent children perceive themselves as happier. Recent studies unfolded a significant positive association between social competence and satisfaction with life (Calmeiro et al., 2018; Caqueo-Urízar et al., 2022). What is highlighted here is the impact of social competence, influenced by positive experiences with others, on self-esteem (Bedard et al., 2020). In their study, Caqueo-Urízar et al. (2022) reported that social competence directly affects self-esteem and indirectly affects life satisfaction. Riggio et al. (1990) stated that socially competent individuals might have a positive self-assessment probably because they establish effective social interactions. Therefore, it is reasonable to assert that people with poorer social skills exhibit fruitless self-esteem (Dembińska et al., 2022).

Another personal resource related to life satisfaction is self-esteem. Rosenberg (1965) characterized *self-esteem* as "one's considerations and sentiments almost their worth and importance." It can fluctuate and be dynamic, sensitive to the effect of inner and outer experiences (e.g., life events, family/friend relations) during adolescence (Baldwin & Hoffmann, 2002a, b; Erol & Orth, 2011). Both self-esteem and life fulfillment infer one's general assessments (Diener & Diener, 2009) but completely diverse concepts (Çivitci & Çivitci, 2009). Whereas self-esteem reflects one's recognitions and estimates of oneself, life fulfillment alludes to one's assessments of diverse domains of life (e.g., school, family, and companions) (Çivitci & Çivitci, 2009). The self-determination hypothesis proposes that human needs decide vital welfare conditions (Deci & Ryan, 2000). In this regard, self-esteem, recognized among fundamental needs (Baumeister et al., 1993), can be associated with well-being. Indeed, the previous studies suggested a link between self-esteem and life satisfaction (Diener & Diener, 2009; Gilman & Huebner, 2006; Lázaro-Visa et al., 2019; Pérez-Fuentes et al., 2019; Proctor et al., 2009) and that self-esteem strongly predicts life satisfaction (Diener, 1995; Zhang & Leung, 2002).

The relevant literature suggests that both social competence and self-esteem are associated with mindfulness. In their study, Schonert-Reichl and Lawlor (2010) reported that the mindfulness intervention program positively affected the participating adolescents' social competence and self-perceptions. Özer et al. (2016) also drew attention to the link between social competence and self-awareness. Fathi et al. (2021) also concluded that mindfulness has a significant positive relationship with social competence. In another study, mindfulness and compassion training for teachers and school-age children contributed

to their interpersonal and personal skills (Tarrasch & Berger, 2022). Therefore, it seems that mindfulness may be a significant predictor of social competence. It is noteworthy that the relationship between mindfulness and self-esteem has become a prominent subject in the relevant literature. A systematic review by Randal et al. (2015) suggested that cross-sectional studies often concluded a significant positive relationship between mindfulness and self-esteem. Moreover, a series of mindfulness-based interventions led to positive changes in self-esteem among adolescents (Biegel et al., 2009; Hölzel et al., 2011; Naseh, 2019; Tan & Martin, 2013). It should be noted that although previous research demonstrated that greater mindfulness may contribute to life satisfaction, less is unclosed about such an association and the mechanisms potentially explaining it during adolescence. Accordingly, we attempted to uncover self-esteem and social competence's potential role in adolescents' mindfulness-life satisfaction relationship.

1.3 Current Study

In this study, we explored the role of self-esteem and social competence in the mindfulness-life satisfaction relationship. Thus, in light of the relevant literature, we considered mindfulness and life satisfaction the predictor and outcome variables, respectively, while social competence and self-esteem were assigned as mediators. The sociometer theory (Leary et al., 1995) proposes that assessments from the social environment steer one's self-esteem. For example, one's self-esteem is improved when being appreciated, loved, or recognized in a social environment (Saricam et al., 2012). Social competence is guided by one's relations with their environment (Özer et al., 2016), so social competence may be considered a predictor of self-esteem. Previous research showed that social competence has a direct effect on self-esteem (Caqueo-Urízar et al., 2022). Therefore, we drew a path from social competence to self-esteem in the model above, assuming that social competence and self-esteem might have a serial mediating effect on the relationship between mindfulness and life satisfaction. Relying on the previous research, we held the following hypotheses:

Hypotheses 1. Mindfulness, social competence, and self-esteem are associated with life satisfaction among adolescents.
Hypotheses 2. Self-esteem mediates the mindfulness-life satisfaction relationship in adolescents.
Hypotheses 3. Social competence mediates the mindfulness-self esteem relationship in adolescents.
Hypotheses 4. Self-esteem mediates the social competence-life satisfaction relationship in adolescents.
Hypotheses 5. Life satisfaction is predicted by mindfulness through the serial mediating effect of self-esteem and social competence in adolescents.

In addition to the hypotheses above, we noted a frequent emphasis on potential gender-specific differences in life satisfaction (e.g., Aymerich et al., 2021; Chen

et al., 2020; Goldbeck et al., 2007; Moksnes & Espnes, 2013) and self-esteem (e.g., Bachman et al., 2011; Bleidorn et al., 2016; Moksnes & Espnes, 2013) in adolescence. It should also be noted that gender-specific differences may appear in mindfulness (e.g., Brown et al., 2011; Tan & Martin, 2016) and social competence (e.g., Bédard et al., 2014; Demirci, 2020; Kuranchie & Addo, 2021). Moreover, we thought it would be misleading to draw straight conclusions as previous studies could not settle on the potential role of gender in the findings related to the variables above. Therefore, we also attempted to introduce an additional understanding of potential gender-specific differences in our sample.

2 Method

2.1 Participants and Procedure

The sample consisted of students attending secondary education institutions affiliated with the Ankara Provincial Directorate of National Education. The local educational statistics demonstrated that the number of adolescents attending secondary education institutions in the Yenimahalle and Cankaya districts of Ankara was 63.060 as of 2020 (Milli Eğitim Bakanlığı, 2020a). Accordingly, the sample size was calculated using Israel's (1992) table and concluded that the minimum sample size to be drawn from the target population was 394 at a 5% sensitivity and a 95% confidence interval (CI). We attempted to collect data in a way that would not fall below the minimum sample size against the possibility of missing data.

We obtained approval from the Hacettepe University Ethics Commission (Approval No. 35853172–302.08) and relevant permissions from the Ministry of National Education (MoNE) prior to conducting the research. The schools and classrooms where we would collect the data were selected using the "random number table." We invited 500 students from 25 randomly selected classrooms in the three schools between February 15-March 10, 2020 to participate in the present study. The potential participants were also informed about the purpose and duration of the study, the confidentiality of data, and the right to withdraw from the study at any time. The voluntary students gave their written informed consent to participate in the study. Besides, parental consent forms were delivered to the parents through the participants, and the participants were informed of the deadline for parental consent forms and data collection day. Accordingly, 26 of the 500 participants were excluded since they could not present a signed parental consent form. To ensure the internal validity of the research, the corresponding researcher was present to provide a quiet environment and to answer possible questions from the participants. Adolescents participated in the study voluntarily and were assured that all their information would be treated confidentially and anonymously. The participants filled out a questionnaire booklet covering measurement tools in one class hour (40 min).

Government officials initiated some measures immediately after the first case of COVID-19 was reported in our country on March 11, 2020. All schools were initially shut down for a short time within these measures, forcibly interrupting the data collection process. However, the rapid spread of the virus mandated keeping schools closed

and shifting to distance education practices in all educational institutions (Milli Eğitim Bakanlığı, 2020b). We then decided not to continue the data collection process online or with a different method on the grounds that we considered the pandemic a key risk factor for one's unpredictable psychological reactions and concomitant adverse situations (Ammar et al., 2020; von Soest et al., 2020). Eventually, we collected the data from a total of 474 adolescents in three schools. Initially, the data of 58 participants who provided incomplete or incorrect responses to the measurement tools were removed from the dataset. For a cleaner data concern, we excluded 10 participants' data with outliers. We calculated the completion rate of the instruments to be 87.76% and the response rate to be 83.20%. Figure 1 presents a sampling flowchart.

2.2 Data Collection Tools

2.2.1 Mindful Attention and Awareness Scale-A

Developed by Brown et al. (2011), the Mindful Attention Awareness Scale-Adolescent (MAAS-A) is a single-factor 14-item tool designed to measure the fundamental

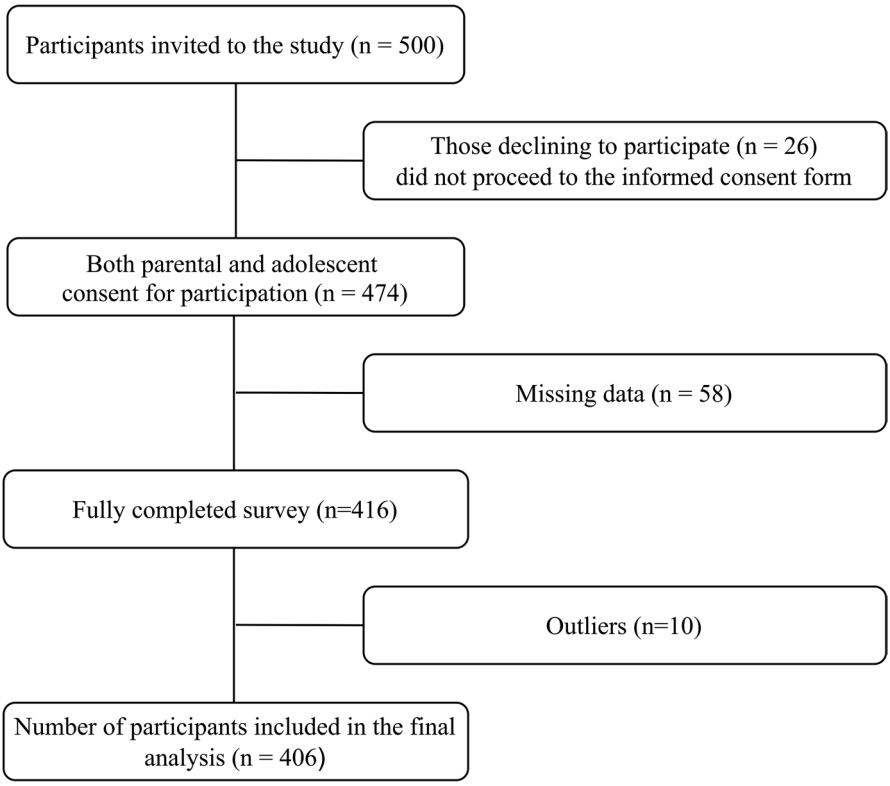

Fig. 1 Sampling flowchart

features of mindfulness in adolescents aged 14–18 years (e.g., "I snack without being aware that I'm eating," "I find myself doing things without paying attention"). Responses are scored on a Likert-type scale ranging from "1 (almost always)" to "6 (almost never)", and higher scores on the scale indicate greater mindfulness and awareness. Sünbül (2016) carried out the adaptation study of the MAAS-A in Turkey. We discovered the MAAS-A to provide good internal consistency for our sample ($\alpha = 0.84$).

2.2.2 Perceived Competence Scale

Developed by Özer et al. (2016), the Perceived Competence Scale (PCS) is a 30-item tool to evaluate high school students' perceptions of competence. It assesses two dimensions of competence: academic competence (16 items) and social competence (14 items). Responses to the items are scored on a Likert-type scale ranging from "1 (not fit me at all)" to "5 (completely fit me)". Higher scores on the scale imply higher levels of competence perception. In this study, we utilized only the social competence subscale (PCS-S; e.g., "I care about the feelings of others," "I enjoy meeting new people") and calculated its internal consistency to be $\alpha = 0.87$ for our sample.

2.2.3 The Rosenberg Self-Esteem Scale

Rosenberg (1965) created the scale to measure self-esteem among adolescents. While it consists of 63 items within 12 subscales, the present study adopted only the self-esteem subscale. The Rosenberg Self-Esteem Scale (RSES) is a single-factor, 10-item tool to measure one's overall assessment of their self-worth (e.g., "I feel that I am a person of worth, at least on an equal plane with others," "I wish I could have more respect for myself"). It is among the most popular tool to measure adolescent self-esteem globally and was consistently shown to yield good reliability. On the RSES, the responses are scored on a Likert-type scale ranging from "1 (strongly agree)" to "4 (strongly disagree)", and high scores indicate higher self-esteem. Çuhadaroğlu (1986) adapted the RSES into Turkish, and we calculated its internal consistency to be $\alpha = 0.89$ for our sample.

2.2.4 The Satisfaction with Life Scale

Developed by Diener et al. (1985), the Satisfaction with Life Scale (SWLS) is a single-factor, 5-item instrument designed to evaluate one's satisfaction with their life as a whole rather than in any particular domain (e.g., "I am satisfied with my life," "In most ways, my life is close to my ideal"). Responses on the SWLS are scored on a Likert-type scale ranging from "1 (strongly disagree)" to "7 (strongly agree)", and higher scores on the scale refer to greater life satisfaction. Yetim (1993) adapted the scale in Turkish, and we calculated its internal consistency to be $\alpha = 0.84$ for our sample.

2.3 Data Analysis

We utilized IBM SPSS 25 and AMOS 24 to analyze the data. Initially, we checked the adequacy of sample size, missing values, normality, multicollinearity, and outliers. We checked the normality of distribution by referring to descriptive statistics, graphs, and skewness-kurtosis values. It is a rule of thumb that the data does not deviate excessively from a normal distribution when skewness and kurtosis values fall between -1.5 and +1.5 (Tabachnick & Fidell, 2013). We then resorted to Pearson's correlation coefficients to investigate the associations between the variables. In addition, we found out that the multicollinearity-related values were within acceptable limits (see Table 2).

Since the literature on structural equation modeling (SEM) recommends testing any gender-specific difference in endogenous or exogenous variables to reveal whether the model is testable with the whole sample (Schumacker & Lomax, 2004), we also checked the normality by gender. Then, we performed independent samples *t*-test to compare the participants' total scores for each variable (mindfulness, social competence, self-esteem, and life satisfaction) by gender. We accepted the significance level as $p < 0.05$ and reported the 95% confidence intervals (CI). In addition, we interpreted the effect size by considering the criteria proposed by Cohen (small = 0.20, medium = 0.50, and large = 0.80; 1988).

The compatibility of the data with the measurement model and the structural model was tested with the Structural Equation Model (SEM) (Kline, 2015). Since the latent variables were single-factor (MAAS-A: 14 items; PCS-S: 14 items; RSES: 10 items; SWLS: 5 items; 33 indicators in total), the item parceling technique was utilized to reduce the number of observed variables and contribute to normality (Bandalos & Finney, 2001; Nasser & Wisenbaker, 2003). In this technique, we adopted the balancing approach according to the item-total correlations (Little et al., 2002, 2013). Accordingly, we generated three parcels for each of the latent variables of the MAAS-A (mindfulness), the RSES (self-esteem), and the PCS-S (social competence). Since the SWLS (life satisfaction) consists of only five items, the parcels for life satisfaction were defined using all these five items. Overall, we included a total of 14 observed and four latent variables in the analysis. In the analysis, we followed a two-stage structural equation procedure to detect and eliminate possible errors due to the measurement model (Anderson & Gerbing, 1988; Kline, 2015). While performing confirmatory factor analysis (CFA) to test model-data fit in the first stage, we tested the hypothetical structural model in the second stage. The model-data fit was explored by referring to Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Root Mean Square Errors of Approximation (RMSEA), and Standardized Root-Square-Mean-Squares (SRMR). While GFI and CFI above 0.90 show good model-data fit, it is obtained when RMSEA and SRMR values become 0.08 or less (Kline, 2015; Tabachnick & Fidell, 2013; Thompson, 2000). We used the chi-square (χ^2) difference test for model comparisons and performed the bootstrap analysis at a 95% confidence interval (CI) with 5000 resamples to test the indirect effect between variables in the structural model.

We considered the effect significant in the bootstrap analysis when the confidence intervals did not contain zero (Preacher & Hayes, 2008).

3 Results

3.1 Participants' Sociodemographic Characteristics

A total of 406 high school students aged between 14 and 18 years ($M = 16.01$, $SD = 1.15$; 62.32% females) participated in the present study. About one-third (32.51%) of the participants attended the ninth grade, 29.56% were tenth-graders, 18.47% were eleventh-graders, and 19.46% were twentieth-graders. The participants' sociodemographic characteristics are presented in Table 1.

3.2 Common Method Bias

We sought the common method variance using Harman's single-factor test since the data were collected through self-report measures (Podsakoff et al., 2003, 2012). Accordingly, the mentioned instruments were subjected to explanatory factor analysis (EFA). The findings revealed nine factors with eigenvalues greater than one and that the initial eigenvalue of the first factor was 9.15. Since it explained 19.56% of the variance (less than the cut-off value of 40%), we can assert that the data showed no severe common method variance.

Table 1 Participants' sociodemographic characteristics (n = 406)

Sociodemographic characteristics	Frequency	Percentage (%)
Gender		
Girl	253	62.32
Boy	153	37.68
Age (year)		
14	28	6.89
15	131	32.27
16	101	24.88
17	98	24.14
18	48	11.82
School		
Anatolian high school	260	64.04
Vocational high school	146	35.96
Grade		
9	132	32.51
10	120	29.56
11	75	18.47
12	79	19.46

3.3 Preliminary Analyses

Descriptive, skewness-kurtosis values, and correlations pertinent to our latent variables are presented in Table 2.

As summarized in Table 3, we concluded that the variables had significant relationships. The findings demonstrated significant positive relationships between mindfulness and social competence ($r=0.26$, $p<0.01$), self-esteem ($r=0.38$, $p<0.01$), and life satisfaction ($r=0.19$, $p<0.01$). In addition, social competence was found to positively correlated with self-esteem ($r=0.44$, $p<0.01$) and life satisfaction ($r=0.18$, $p<0.01$). It was also the case between life satisfaction and self-esteem ($r=0.40$, $p<0.01$). It is evident that there was no multicollinearity issue in our dataset since we concluded no correlation coefficient above 0.90 (Tabachnick & Fidell, 2013). As a preliminary analysis, we also tested if the study variables differed by gender (Table 3).

We discovered gender-specific differences only in self-esteem and life satisfaction. Accordingly, girls had significantly lower self-esteem ($t_{404}=$-2.84, 95% CI [-2.99,-0.55], $p<0.05$) and life satisfaction ($t_{404}=$-3.33, 95% CI [-3.88, -1.00], $p<0.05$). However, the effect size of gender was small for both self-esteem ($d=0.29$) and life satisfaction ($d=0.34$). Therefore, we can assert that gender yielded a negligible effect on our participants' self-esteem and life satisfaction scores.

Table 2 Descriptive statistics, skewness-kurtosis values, and correlations pertinent to the latent variables (n = 406)

Variable	$M \pm SD$	Skewness	Kurtosis	1	2	3	4
1. Mindfulness	55.06 ± 12.70	-0.20	-0.35	1	0.26**	0.38**	0.19**
2. Social competence	57.43 ± 8.31	-0.92	1.01		1	0.44**	0.18**
3. Self-esteem	28.68 ± 6.12	-0.16	-0.45			1	0.40**
4. Life satisfaction	20.45 ± 7.23	-0.32	-0.44				1

**Correlation is significant at the 0.01 level (2-tailed)

Table 3 Differences in the study variables by gender

Variable		$M \pm SD$	Range	Skewness	Kurtosis	t	p	d
1. Mindfulness	Girls	54.15 ± 12.27	14–84	-0.11	-0.36	-1.86	0.06	0.19
	Boys	56.56 ± 13.30	14–84	-0.37	-0.23			
2. Social competence	Girls	57.68 ± 8.17	14–70	-0.97	1.17	0.78	0.44	0.08
	Boys	57.02 ± 8.56	14–70	-0.85	0.84			
3. Self-esteem	Girls	28.01 ± 6.21	10–40	-0.07	-0.48	-2.84	0.00*	0.29
	Boys	29.78 ± 5.81	10–40	-0.29	-0.28			
4. Life satisfaction	Girls	19.53 ± 7.06	5–35	-0.27	-0.51	-3.33	0.00*	0.34
	Boys	21.97 ± 7.29	5–35	-0.47	-0.20			

*Correlation is significant at the 0.05 level (2-tailed)

Effect size (d): 0.20 = small, 0.50 = medium, and 0.80 = large

3.4 Measurement Model

Before exploring the structural model, we analyzed the measurement model hosting our four latent variables (mindfulness, self-esteem, social competence, and life satisfaction) and 14 observed variables using the maximum likelihood method. We found the standardized regression coefficients in the model to range between 0.74—0.86 for mindfulness, 0.81—0.92 for self-esteem, 0.82—0.87 for social competence, and 0.54—0.85 for life satisfaction. Thus, we can assume that all observed variables represented relevant latent factors. Moreover, we referred to *t*-values to investigate the significance of the relationships between the observed and latent variables and between the-latent variables and concluded that all the relationships were significant. In addition, the χ^2 value was found to be significant, χ^2 (71, N = 406) = 126.31, $p < 0.01$. Since the χ^2 value is highly influenced by sample size, it may lead to misinterpretations; therefore, we also considered other fit indices. Accordingly, our measurement model yielded a good fit to the data, χ^2/df = 1.78, CFI = 0.98, GFI = 0.96, AGFI = 0.94, SRMR = 0.04, and RMSEA = 0.04 (RMSEA = 0.03—0.06; 90% CI). The results also revealed that the correlations between the predictor (mindfulness), mediator (social competence and self-esteem), and outcome latent variable (life satisfaction) were all significant ($r = 0.22$—0.52; $p < 0.00$), confirming our first hypothesis. In summary, we achieved a reliable measurement model, and the findings of the model yielded an acceptable fit to the data to test the structural model.

3.5 Model Testing

Initially, we built Model 1 with mindfulness (predictor), life satisfaction (outcome), and social competence and self-esteem (mediators). We first connected mindfulness and life satisfaction with a direct path. Then, we drew two indirect paths between these variables to social competence and self-esteem, respectively, and a path from social competence to self-esteem. Given the same number of parameters in Model 1, the findings yielded exactly the same fit indices as the measurement model. However, since not producing significant results, we removed the paths between mindfulness and life satisfaction and social competence and life satisfaction ($\beta = 0.05$, $p > 0.05$ and $\beta = -0.01$, $p > 0.05$, respectively) and generated Model 2. Accordingly, we found the following fit indices for Model 2: χ^2 (73, N = 406) = 126.94, χ^2/df = 1.74, $p < 0.01$, CFI = 0.98; GFI = 0.96, SRMR = 0.04, and RMSEA = 0.04 (RMSEA = 0.03—0.05; 90% CI). Besides, we performed a χ^2 difference test to uncover whether the model-data fit significantly differed when removing non-significant paths. The results showed the difference in χ^2 to be insignificant ($\Delta\chi^2 = 0.63$, $p > 0.05$); that is, the two paths, from mindfulness to life satisfaction and from social competence to life satisfaction, did not significantly contribute to the model-data fit (Fig. 2).

Figure 2 presents the final mediation model. Accordingly, 20% of the variance on the SWLS explained the variables in the model. Moreover, while the MAAS-A explained 9% of the change in the PCS-S, the MAAS-A and the PCS-S together explained 35% of the variance on the RSES.

We also performed bootstrap analysis to examine the indirect effects in the final model. The results gave birth to a significant indirect effect of mindfulness on life satisfaction through self-esteem (indirect effect = 0.04; 95% CI: 0.03—0.06), accounting for a total effect of 0.06 and a ratio of 66.67%. It was also the case for mindfulness on self-esteem through social competence (indirect effect = 0.07; 95% CI: 0.05—0.10), accounting for a total effect of 0.27 and a ratio of 25.93%. We also found the indirect effect of social competence on life satisfaction through self-esteem to be significant (indirect effect = 0.09; 95% CI: 0.06—0.12), accounting for a total effect of 0.09 and a ratio of %100. What is more is that the serial mediating effect of mindfulness on life satisfaction through social competence and self-esteem was significant (indirect effect = 0.02; 95% CI: 0.01—0.03), accounting for a total effect of 0.06 and a ratio of 33.33% (Table 4).

3.6 Supplementary Analyses

Based on the finding that the participants' self-esteem and life satisfaction scores differed by gender, we decided on supplementary analysis considering the current literature. Accordingly, we attempted to determine if the model differed significantly for boys and girls in this sample using multi-group analysis. To be able to catch gender-specific differences, we compared the first model allowing structural paths to vary by gender and the second model restricting these paths from being equal by gender. The findings revealed that the boys and girls did not significantly differ in the model where mindfulness predicted life satisfaction, $\Delta\chi^2$ (4, $N = 406$) = 6.144, $p > 0.05$.

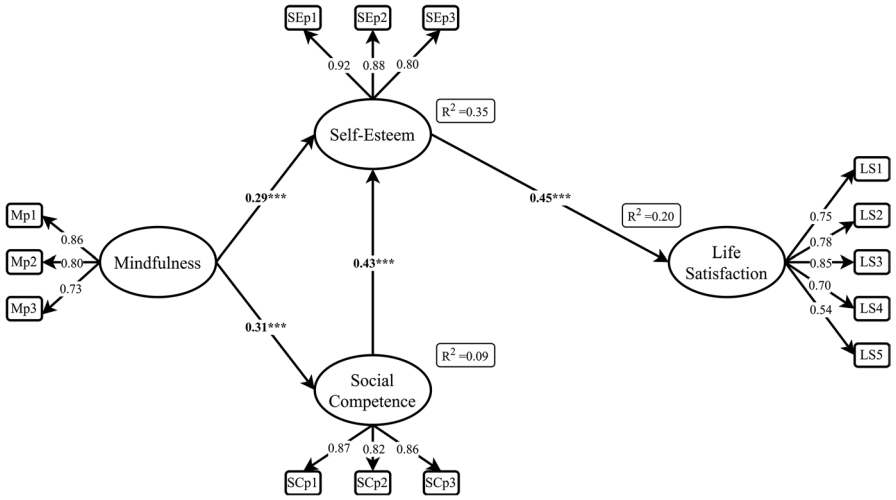

Fig. 2 The second model on the data of 406 participants. Standardized regression weights are indicated. Mp1–Mp3 = three parcels of Mindfulness; SEp1–SEp3 = three parcels of self-esteem; SCp1–SCp3 = three parcels of social competence; LS1–LS5 = SWLS items. *** $p < 0.001$

Table 4 Total effects, indirect effects, and percent mediation for the second model

Model pathways	Total effect		Indirect effect		95% CI		Ratio
	B	*p*-value	B	*p*-value	Lower	Upper	
H_2: Mindfulness → self esteem → life satisfaction	0.06	0.00	0.04	0.00	0.03	0.06	66.67%
H_3: Mindfulness → social competence → self-esteem	0.27	0.00	0.07	0.00	0.05	0.10	25.93%
H_4: Social competence → self-esteem → life satisfaction	0.09	0.00	0.09	0.00	0.06	0.12	100%
H_5: Mindfulness → social competence → self-esteem → life satisfaction	0.06	0.00	0.02	0.00	0.01	0.03	33.33%

4 Discussion

In this study, we investigated the mediating roles of social competence and self-esteem in the relationship between mindfulness and life satisfaction in a sample of high school-attending adolescents in Ankara, Turkey. Although the previous research scrutinized self-esteem as a potential mediator of the mentioned relationship (e.g., Pepping et al., 2013; Wang & Kong, 2020), to our knowledge, this is the first study to consider the mediating roles of self-esteem and social competence in the specified relationship. Not surprisingly, our findings demonstrated significant positive correlations between the study variables, overlapping with previous findings suggesting an association between mindfulness and social competence (Fathi et al., 2021), self-esteem (Randal et al., 2015), and life satisfaction (Fenzel & Richardson, 2022; Tan et al., 2016; Wu et al., 2021). In addition, we found a significant positive correlation between social competence and self-esteem, consistent with previous studies (Bedard et al., 2020; Caqueo-Urízar et al., 2022).

We concluded that mindfulness was directly and positively associated with self-esteem, which, in turn, exerted an indirect effect on life satisfaction. Particularly, those with greater mindfulness had higher self-esteem, leading to greater life satisfaction. This finding also overlaps with previous research suggesting that mindfulness contributes positively to life satisfaction and self-esteem (Lee et al., 2022; Wang & Kong, 2020). It was previously noted that mindfulness meditations contribute to adopting a more positive self-representation (higher self-esteem and self-acceptance) (Hölzel et al., 2011) and that higher mindfulness helps encourage behaviors compatible with one's true self and values (Heppner & Kernis, 2007). Accordingly, adolescents are likely to have more positive self-representations when adopting higher mindfulness. A positive self-representation can serve high self-esteem, which, in turn, nurtures life satisfaction. Despite a direct and positive relationship between mindfulness and social competence, we could not find that social competence directly affected life satisfaction. Indeed, Proctor et al. (2009) stated in their review that adolescents' perceptions of social competence skills would not directly affect their life satisfaction but that this perception would only contribute to a higher level of socialization. Increased social performance grants greater satisfaction with life and emotional stability (Proctor et al., 2009). Our results implied that self-esteem might bear a significant place in the mindfulness-life satisfaction

relationship. Carr (2013) drew attention to a prominent finding of theoretical and empirical studies on self-assessment that high self-esteem contributes significantly to one's personal power. In this sense, our finding that self-esteem had a higher contribution to the model might be because the self is perceived as a key construct in adolescent development and the positive contributions of high self-esteem to an adolescent's life. In addition, we found a serial mediating effect of social competence and self-esteem on this relationship. This serial mediating effect also revealed that social competence had an indirect effect on the relationship between mindfulness and self-esteem. As mentioned before, mindfulness contributes to developing personal and interpersonal skills (Tarrasch & Berger, 2022). In this sense, adolescents with high mindfulness seem likely to describe themselves as more socially competent. Considering the importance of social ties and relationships in self-representation (Yıldız & Karadaş, 2017) and as uttered by Caqueo-Urízar et al. (2022), it seems likely that adolescents engaging in meaningful social relationships and receiving positive feedback from their environment will have higher self-esteem, which is expected to increase their satisfaction with life.

In addition, we found significant but negligible gender-specific differences, particularly in self-esteem and life satisfaction. In other words, the girls had lower self-esteem and life satisfaction scores than the boys. The gender-specific differences made us think that girls might have more negative assessments of self and life than boys. Nevertheless, our finding on self-esteem is consistent with previous research (Bachman et al., 2011; Baldwin & Hoffmann, 2002a, b; Bleidorn et al., 2016; Frost & McKelvie, 2004; Kling et al., 1999; Moksnes & Espnes, 2013). On the other hand, the findings on gender-specific differences in life satisfaction are remarkable. A recent meta-analysis study (a child and adolescent sample) reported that life satisfaction does not differ by gender despite only a slight difference in favor of males (Chen et al., 2020). On the contrary, a plethora of studies reported that girls may have poorer life satisfaction than boys, consistent with our finding (Aymerich et al., 2021; Goldbeck et al., 2007; Moksnes & Espnes, 2013). These differences may mainly be due to gender-specific hormonal changes and a number of possible reasons, such as girls' entering puberty earlier, starting to care more about their physical appearance with puberty, experiencing conflicts related to the perception of culture-specific beauty more, having a negative body image, being less satisfied with their physical appearance, being more sensitive to stress factors (being more pessimistic), and perceptions of gender roles (Dolgin, 2011; Santrock, 2011; Steinberg, 2020). Contrary to self-esteem and life satisfaction, we found no significant gender-specific differences in mindfulness and social competence. However, we discovered that the boys had slightly higher mindfulness scores. In their study, Brown et al. (2011) also reported that boys scored higher in mindfulness than girls by a small margin. Considering that mindfulness is a state of awareness that one focuses their attention on the non-judgmental acceptance of both internal and external experiences in the present moment without over-identifying with or trying to suppress them, it may be reasonable that girls, who have the potential to evaluate daily life events developmentally more negatively than boys in adolescence (Dolgin, 2011; Santrock, 2011; Steinberg, 2020), have relatively lower mindfulness scores in adolescence. Yet, rather close social competence

scores of the girls and boys could be considered another noteworthy finding. The findings of Kuranchie and Addo (2021) support our finding; nevertheless, while boys had higher social competence scores in the study by Bédard et al. (2014), it was vice versa in the research by Demirci (2020). Overall, these results suggest that further research is needed to understand gender-specific differences in the said variables. In this sense, due to gender-specific differences in self-esteem and life satisfaction, we also tested if our model differed by gender using multi-group analysis. The findings yielded that the final model had no gender differences. In other words, our finding may imply that the relationship between mindfulness and life satisfaction has an overlapping mechanism in both girls and boys. To sum up, our findings suggested that mindfulness may increase adolescents' social competence and self-esteem and, ultimately, contribute to their satisfaction with life.

This study is not free of a few limitations. First, we employed a cross-sectional design in the research; therefore, we cannot mention causal relationships between the variables. Prospective researchers may carry out longitudinal or experimental studies to test mediation models to offer an in-depth developmental understanding of these variables. Secondly, self-report measurement often brings with it the disadvantage of eliciting only socially desirable responses, shadowing internal validity. At this point, utilizing more than one measurement technique (e.g., parent and/or peer reports) may minimize the impact of subjectivity. Third, we selected our sample among high school students in Ankara, Turkey; thus, further research is still needed to improve the generalizability of our findings. Fourth, even though we prevented a significant potential residual confounding by deciding to cease the data collection process due to the pandemic (for details, see Participants and Procedure section), this situation led to the lack of diversity in terms of gender (see Table 1), which may have had some impacts on our gender-specific findings. Fifth, in addition to gender, many factors whose developmental importance is highly emphasized during adolescence (e.g., psychosocial self-discovery and self-understanding (identity), developing an appropriate sense of independence (autonomy), establishing close and caring relationships with others (intimacy), recognizing sexual feelings and enjoying physical contact with others (sexuality), and desiring to be a socially competent and successful individual (achievement) might appear as residual confounding. Given these limitations, future research is highly needed with diverse and larger samples in different settings to better assess the relationships between our variables and improve the generalizability of our findings.

Despite these limitations, we think that our study deserves scholarly interest in that it emphasizes the roles of self-esteem and social competence in the relationship between mindfulness and life satisfaction among adolescents. As uttered before, although the rapid decline in life satisfaction in adolescence is considered a developmental phenomenon (Daly, 2022; Goldbeck et al., 2007), recent years have witnessed an increased interest in uncovering the factors contributing to life satisfaction in this period (Ramos-Díaz et al., 2019). Although we cannot claim causality in our study, the variables in our study cover unique elements that should be encouraged in relation to life satisfaction in adolescence. Therefore, we think that our findings have the potential to inform the practices of positive psychology. Our results may also help counselors and other professionals, who engage in initiatives to increase and strengthen life satisfaction in adolescents,

recognize the direct and indirect paths to which life satisfaction is related. In this sense, our results may be a fruitful focus for future prevention and response efforts. In addition, future research may attempt to expand this serial mediation path by considering other possible mediators within positive psychology (e.g., gratitude, humor, optimism, and positive affect) as well as test the current model in different samples.

In conclusion, the present study documented the roles of self-esteem and social competence in the mindfulness-life satisfaction relationship in adolescents. Our findings support two ways of explaining this relationship: the mediating role of self-esteem and the serial mediating role of social competence and self-esteem. Additionally, our study may shed light on understanding how mindfulness-oriented intervention programs improve adolescents' satisfaction with life.

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Authors' Contributions RYD participated in designing the study, collecting the data, running statistical analysis of the data, interpreting the findings, and drafting and finalizing the paper; ENM provided feedback, supervised the study, and edited the final draft. All authors have approved the final version of the manuscript.

Data Availability The datasets generated and/or analyzed in the study are not publicly released but are only available from the corresponding author upon a reasonable request.

Declarations

Ethical Approval All procedures followed in this study involving human participants comply with ethical principles in the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Ethics Committee of Hacettepe University also granted ethical approval to this study. The data were collected upon relevant permissions from the Ministry of National Education.

Informed Consent We sought written informed consent from the participants and their parents prior to data collection. Adolescents participated in the study voluntarily and were assured that all information would be treated confidentially and anonymously.

Data Sharing and Declaration The datasets generated and/or analyzed in the study are not publicly released but are only available from the corresponding author upon a reasonable request.

Conflict of Interest The authors declare no competing interests.

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