



A serial mediation model of sense of belonging to university and life satisfaction: The role of social loneliness and depression

Hadi Samadieh^{*}, Mehdi Rezaei

Department of Psychology, University of Birjand, Birjand, Iran

ARTICLE INFO

Keywords:

University students
Sense of belonging
Social loneliness
Depression
Life satisfaction

ABSTRACT

The impact of a sense of belonging (SOB) on life satisfaction is acknowledged. However, research focusing on this dynamic within higher education is sparse. Additionally, the mechanisms underlying this association warrant further investigation. This study aimed to determine the serial mediation effects of loneliness and depression on the relationship between SOB and life satisfaction among college students. A cross-sectional survey was conducted with 345 college students ($M_{\text{age}} = 22.16$, $SD = 4.48$). The survey instruments included the Satisfaction with Life Scale (SWLS), the Social and Emotional Loneliness Scale for Adults (SELSA-S), the Depression, Anxiety, and Stress Scale (DASS), and the Institutional Integration Scale (IIS). The serial mediation effects were analyzed utilizing Model 6 of Hayes' PROCESS macro in SPSS. The results showed that the sense of belonging to the university had no direct effect on life satisfaction (Effect = 0.105, 95 % CI: -0.076 to 0.286). Loneliness and depression serially mediated the relationship between a sense of belonging to the university and life satisfaction (Effect = 0.029, 95 % CI: 0.012 to 0.051). Depression independently mediated the association between SOB and life satisfaction (Effect = 0.160, 95 % CI: 0.10 to 0.221), whereas loneliness did not serve as a significant independent mediator in the relationship between belonging to the university and life satisfaction (Effect = 0.014, 95 % CI: -0.006 to 0.039). This research enhances comprehension of the fundamental processes linking students' sense of belonging (SOB) with their life satisfaction, offering valuable perspectives for academic institutions to develop strategies to elevate university students' well-being.

1. Introduction

The transition from school to university is often taxing for students, particularly undergraduate students. Adjusting to new academic roles and campus life requires building strong social networks. Furthermore, this period is characterized by significant changes in personal and community identity, the pursuit of purpose, autonomy, and obtaining appropriate social support systems, all of which are crucial for academic success (Smyth et al., 2021). Many students face various obstacles during this transition, and often feel isolated in the first few months of university (Scanlon et al., 2020). Evidence suggests that fostering a sense of belonging at the university is essential in alleviating the difficulties associated with this transition period (Tett et al., 2017).

According to Strayhorn (2018, p. 27), a sense of belonging (SOB) to university is delineated as students' perception of receiving social support from the institution, alongside feelings of connectedness and significance. A lack of belonging is associated with negative outcomes, such as dissatisfaction, low self-esteem, depression, substance abuse, and

suicide (Hagerty et al., 2002). Additionally, some studies have shown that a robust sense of belonging is intricately linked with heightened levels of academic motivation (Gillen-O'Neel, 2021), greater life satisfaction (Avci, 2023), and improved psychological health (Haim-Litevsky et al., 2023). Despite the recognized impact of a sense of belonging (SOB) on life satisfaction, there is a lack of research exploring the underlying processes among college students. In particular, the emotional and behavioral issues that result from a lack of sense of belonging, such as depression and loneliness, have been infrequently examined as significant factors in the potential pathways of this effect.

1.1. SOB and life satisfaction

According to Diener (1984, p. 277), life satisfaction is defined as "an overall assessment of feelings and attitudes about one's life at a particular point in time, ranging from negative to positive". Empirical evidence indicates that life satisfaction is strongly linked to individuals' willingness to change their living conditions, their goal-oriented

^{*} Corresponding author.

E-mail addresses: h.samadieh@birjand.ac.ir (H. Samadieh), mehdi.rezaei15@birjand.ac.ir (M. Rezaei).

behavior, and their overall physical and psychological well-being (Kim et al., 2021; Luhmann & Hennecke, 2017).

Some recent studies have found a positive linkage between sense of belonging or similar constructs, such as belongingness with life satisfaction (Avci, 2023; Howard et al., 2023; Samadieh & Tanhaye Reshvanloo, 2023; Yildiz, 2016) and other mental health outcomes including well-being (Allan et al., 2024; Haim-Litevsky et al., 2023). When people maintain close interpersonal relationships and feel valued by others, they show improved performance, greater stress resilience, and fewer psychological issues (Reeve, 2018). Consequently, individuals may experience greater life satisfaction. Furthermore, according to the belongingness theory put forward by Baumeister and Leary (1995), while everyone has the basic urge to belong, it becomes especially important during the transitional stages of adolescence. As young people begin to develop their own identities, they increasingly interact in social settings beyond their family, seeking support from peers and other adults. Therefore, understanding the key role of belonging to a university and its effects is crucial. In summary, hypothesis H1 is proposed:

H1 There is a significant effect of sense of belonging on life satisfaction.

1.2. The mediating role of loneliness

Numerous studies have documented a strong link between SOB and decreased loneliness (Kusci et al., 2023; Mellinger et al., 2023). Various mechanisms may account for the beneficial impact of a sense of belonging on reducing feelings of loneliness. First, the lack of belonging and acceptance in social groups leads to the feelings of social exclusion, which can, in turn, cause feelings of inadequacy, guilt, anxiety, and loneliness. (Baumeister & Tice, 1990; Kusci et al., 2023). Conversely, a strong sense of belonging can mitigate mental health problems and, therefore, loneliness (Arslan, 2021). Second, according to Baumeister and Leary (1995) in belongingness hypothesis, the need to belong as a fundamental motivation in humans to form positive and lasting relationships can be a potential moderator in the relationship between sense of belonging and mental health outcomes. Third, some studies found that reduced social support and insufficiently perceived interactions heightened the level of loneliness (Simegn et al., 2023).

The experience of loneliness emerges as a significant determinant of life satisfaction. Reduced feelings of loneliness promote greater self-compassion and mindfulness, which in turn can lead to more positive views of life (Suh & Lee, 2023). Furthermore, a study found that unmet belongingness need can increase feelings of loneliness, which in turn reduces life satisfaction (Mellor et al., 2008). Based on Baumeister and Leary's (1995) belongingness theory, unfulfilled belongingness demands may cause social isolation, alienation, and loneliness. As a result, a feeling of belonging is critical not just for building social ties, but also for preventing loneliness. Some studies showed that increased belongingness within university settings enhances life satisfaction through promoting social connectedness (Avci, 2023). In summary, hypothesis H2 is proposed:

H2 Loneliness mediates the relationship between sense of belonging and life satisfaction.

1.3. The mediating role of depression

Depression is characterized by a persistent mood of sadness, feelings of low self-worth or guilt, and a diminished ability to enjoy life. (Nestler et al., 2002). Depression's etiology is multifaceted, involving factors, such as genetics, brain chemistry, personality, and environmental influences (Saveanu & Nemeroff, 2012). A review and meta-analysis study examining the prevalence of depression among students from 1991 to 2019 found that approximately 50 % of Iranian students show the symptoms of depression. The analysis indicated a significant increase in the prevalence of depression among Iranian college students over the study period (Jaafari et al., 2021). The sense of belonging has been

identified as a significant factor affecting depression. Research indicates that a low sense of belonging can predict depressive symptoms (Hagerty & Williams, 1999; Sargent et al., 2002; Tholen et al., 2022), implying that the quality of relationships within a university setting can directly affect mental health. A study conducted among university students in the United States found that a student's daily sense of belonging at the beginning of their freshman semester predicted their depression symptoms at the end of the semester (Dutcher et al., 2022). Another study examined the relationship between social exclusion and depression among undergraduate students, highlighting the mediating roles of rejection sensitivity and social self-efficacy. This research indicated that social exclusion, which can be seen as a lack of belonging, was positively associated with depression (Niu et al., 2023).

Depression among students can lead to various mental health issues, and greatly reduce life satisfaction. For example, Ooi et al. (2022) found that the students with lower levels of depression and anxiety reported higher life satisfaction. Conversely, severe depression was strongly linked to low life satisfaction. Another study revealed a significant negative correlation between depression and life satisfaction among undergraduate students (Jenkins et al., 2013). These findings indicate that depression not only affects students' emotional states but also has a broader impact on their overall mental well-being and satisfaction with life. In summary, hypothesis H3 is proposed:

H3 Depression mediates the relationship between sense of belonging and life satisfaction.

1.4. The serial mediating role of loneliness and depression

The relationship between loneliness and depression has been previously explored (Pak & Bae, 2023). Loneliness can be defined as an unpleasant emotional state that arises when people perceive a discrepancy between an individual's preferred and actual social relationships (Perlman & Peplau, 1982, p. 4). Theoretical frameworks propose that loneliness can lead to social, cognitive, and biological effects, which may increase the risk of developing depression later on. Potential mechanisms underlying this association encompass negative perceptions of social interactions, adverse cognitive schemas (such as low self-belief), expectations of social threat, heightened stress, diminished self-esteem, and biological impacts on the stress response and inflammation (Hawley & Cacioppo, 2010). According to Cacioppo's evolutionary theory of loneliness (ETL), the significance of social connectedness implies that long-term and severe loneliness can predict depressive symptoms among people (Cacioppo et al., 2006; Cacioppo et al., 2010; Erzen & Çikrikçi, 2018; Wang et al., 2021). For instance, the conceptualizations of depression highlight that insufficient social connections and problematic interpersonal relationships may play a crucial role in the development and persistence of depression, while underscoring the protective role of social support (Koenig et al., 1994). Cacioppo et al. (2010) conducted a recent 5-year longitudinal study, revealing that loneliness predicted a rise in depressive symptoms annually, whereas depressive symptoms did not predict an increase in loneliness during the same period. Accordingly, these findings support the notion that loneliness is predictive of depression.

The theory explaining the mediating role of loneliness and depression in the relationship between sense of belonging and life satisfaction is based on the evolutionary theory of loneliness (ETL). ETL defines a sense of belonging as the ability to be a part of a supportive social network, which has historically increased the likelihood of survival and reproduction. Loneliness is precipitated by the disruption of this sense of belonging. Loneliness acts as an evolutionary signal, indicating insufficient social connections, which could threaten survival. Feeling lonely can lead to increased stress, negative thinking, and a sense of helplessness. When someone is depressed, they often experience negative emotions, such as sadness, hopelessness, and a lack of interest in activities they once enjoyed. This emotional state can reduce their overall quality of life and satisfaction. (Cacioppo et al., 2010; Cacioppo &

Cacioppo, 2018; Goossens, 2018).

Moreover, some studies have indicated that loneliness can mediate the relationship between social support (a component of the sense of belonging) and depressive symptoms, further affecting life satisfaction (Hou et al., 2021). This aligns with ETL's emphasis on belonging and its impact on an individual's well-being. Thus, interventions aimed at enhancing social support and reducing loneliness are considered beneficial for improving life satisfaction and mitigating depressive symptoms. These findings provide evidence linking SOB to life satisfaction sequentially through loneliness and depression. In summary, hypothesis H4 is proposed:

H4 Loneliness and depression chain mediate the effect of sense of belonging on life satisfaction among university students.

1.5. The present study

The present research aimed to clarify how students' sense of belonging at university affects their overall life satisfaction. The study suggests that loneliness and depression are key factors in this process. It specifically looks at how a strong sense of belonging—or the lack of it—can influence students' feelings of loneliness and depression, ultimately impacting their life satisfaction. Using validated psychological scales to measure these factors, the research provides evidence for the theory that increasing the sense of belonging can reduce loneliness and depression, thereby improving life satisfaction among university students. This study not only adds to the academic discussion on student well-being, but also offers practical suggestions for university policies and mental health interventions.

2. Methods

2.1. Participants and procedure

Based on some guidelines (Fritz & MacKinnon, 2007), 200 participants are the minimum sample size for conducting mediational research with 0.80 statistical power and a medium (0.30) effect size. In this study, 370 participants completed the survey, meeting and exceeding the minimum sample size; However, 25 questionnaires were invalid or incomplete. The final sample included 345 volunteer students from a university in eastern Iran, selected through convenience sampling. The participants' ages ranged from 18 to 53 years, with an average age of 22.16 years ($SD = 4.48$). Participants were predominantly female, with 259 women (75.1%), compared to 86 men (24.9%). Regarding marital status, 294 participants (85.2%) were single, while 51 (14.8%) reported being married. As for employment, 83 students (24.1%) indicated they were working, whereas 262 (75.9%) were not employed. Regarding the grade level, 292 individuals (84.6%) were studying at the undergraduate level and 53 students (15.4%) were pursuing master's and doctoral degrees. Participants first gave electronic informed consent and then completed an anonymous questionnaire in about 10 min.

2.2. Measures

2.2.1. Satisfaction with life scale

The satisfaction with life scale (Diener et al., 1985) was used to assess individual's overall cognitive judgments of their life satisfaction. This scale comprises five items and rated on a 7-point Likert scale from 'strongly disagree' (1) to 'strongly agree' (7). Its psychometric properties is robust, exhibiting high internal consistency, with Cronbach's alpha typically above 0.80 (Pavot & Diener, 1993), and strong test-retest reliability over significant periods (Diener et al., 1985). A sample item is 'In most ways, my life is close to my ideal'. In the current study, Cronbach's α and McDonald's ω coefficients were 0.88 and 0.89, respectively.

2.2.2. The social and emotional loneliness scale for adults

The social loneliness subscale was selected from the short version of the Social and Emotional Loneliness Scale for Adults (SELSA-S), developed by DiTommaso et al. (2004). The subscale employs a 5-point Likert scale ranging from 'completely disagree' (1) to 'completely agree' (5) for scoring. It comprises five items, with higher scores indicating increased social loneliness, and requires reverse scoring. The scale demonstrated adequate evidence of reliability and validity (DiTommaso et al., 2004). A typical item is 'My friends understand my motives and reasoning'. In the current study, the Cronbach's alpha and McDonald's ω coefficients were 0.93 and 0.94 respectively.

2.2.3. Depression, anxiety, stress scale

The Depression Subscales was selected from the short form of the Depression, Anxiety, and Stress Scale (DASS-21), developed by Lovibond and Lovibond (1995), was used to measure the severity of depressive symptoms. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia and inertia. It employs a 4-point Likert scale ranging from 'never' (0) to 'always' (3), and comprises seven items, with higher scores indicating greater symptom prevalence. Scores for depression are calculated by summing the scores for the relevant items. Lovibond and Lovibond (1995) reported favorable exploratory factor validity and convergent validity with the Beck Depression Inventory, evidenced by a correlation coefficient of 0.73. The Cronbach's α for depression, was 0.91. A sample item is 'I felt I wasn't worth much as a person'. In the present study, Cronbach's α and McDonald's ω coefficients were 0.89 and 0.89, respectively.

2.2.4. Institutional integration scale

The institutional commitment subscale of the institutional integration scale (IIS), developed by Pascarella and Terenzini (1980), was utilized to measure sense of belonging to university. The subscale employs a 5-point Likert scale ranging from 'completely disagree' (1) to 'completely agree' (5) for scoring. It comprises five items, with higher scores indicating increased belonging to university. The IIS has been validated through principal components factor analysis, demonstrating reliable factor structures and predictive validity in assessing student retention (Pascarella & Terenzini, 1980). A sample item is 'I am confident that I made the right decision in choosing to attend this university'. In the present study, Cronbach's α and McDonald's ω coefficients were 0.72 and 0.72, respectively.

2.3. Analysis strategy

Data analyses were performed using IBM SPSS version 26.0. Descriptive statistics were employed to present participants' demographic characteristics. The PROCESS macro for SPSS (Model 6) was then used to test the serial mediation effect. Serial mediation analysis is a statistical method used to understand the causal sequence by which an antecedent variable influences a dependent variable through multiple mediator variables in a specific order. This method helps elucidate the pathways and mechanisms underlying the relationships between variables, making it an appropriate choice for our study (VanderWeele, 2016). A bootstrap test with 5000 repeat samplings was used to test the statistical robustness, with a 95% confidence interval (CI).

3. Findings and results

The Harman single-factor test was performed to test for the common method bias, with the total variance extracted by the first factor below 50% (33.080) representing the recommended threshold. The variance inflation factor (VIF) was performed to test for the multicollinearity of the study variables, with the VIF value of each variable below 5 representing a low concern for multicollinearity. Table 1 presents the means, standard deviations (SD), and Pearson's correlation coefficients for

Table 1
Descriptive statistics and Pearson correlations of the study variables.

Variable	1	2	3	4
Sense of Belonging	1			
Loneliness	-0.20**	1		
Depression	-0.355**	0.335**	1	
Life Satisfaction	0.257**	-0.258**	-0.577**	1
<i>M</i>	19.13	11.29	5.44	19.99
<i>SD</i>	3.773	4.707	4.693	7.334

Note.; *M* = mean; *SD* = standard deviation. ***p* < 0.01.

research variables.

Table 1 presents the means, standard deviations (SD), and Pearson's correlation coefficients for sense of belonging, loneliness, depression, and life satisfaction. The results demonstrated a significant correlation between the study variables. Sense of belonging was significantly negatively correlated with loneliness ($r = -0.20, p < 0.01$), and depression ($r = -0.355, p < 0.01$), whereas it was significantly positively correlated with life satisfaction ($r = 0.257, p < 0.01$). Loneliness was significantly positively correlated with depression ($r = 0.335, p < 0.01$) and significantly negatively correlated with life satisfaction ($r = -0.258, p < 0.01$). Depression was significantly and negatively correlated to life satisfaction ($r = -0.577, p < 0.01$).

3.1. Testing the serial mediation effect

Model 6 in the SPSS PROCESS macro was used to test the serial mediation effect. The results of the regression analysis (Table 2) show that sense of belonging was significantly negatively associated with loneliness ($\beta = -0.20, p < 0.001$), which in turn was negatively, but not significantly associated with life satisfaction ($\beta = -0.068, p > 0.001$); However, the direct effect of sense of belonging on life satisfaction was not significant ($\beta = 0.54, p > 0.001$); Moreover, sense of belonging was significantly negatively associated with depression ($\beta = -0.30, p < 0.001$), which in turn was significantly negatively associated with life satisfaction ($\beta = -0.53, p < 0.001$). Finally, loneliness was significantly positively associated with depression ($\beta = 0.275, p < 0.001$). The detailed path model is shown in Fig. 1.

The bootstrap test results (Table 3) showed that loneliness and depression fully mediated the relationship between sense of belonging and life satisfaction, with a total indirect effect of 0.203, accounting for 40.6 % of the total effect. Specifically, the mediating effect was composed of indirect effects generated by two pathways: (1): sense of belonging → depression → life satisfaction (effect = 0.160, 95 % CI: 0.10 to 0.221), accounting for 32 % of the total effect; (2) sense of belonging → loneliness → depression → life satisfaction (effect = 0.029, 95 % CI: 0.012 to 0.051), accounting for 5.8 % of the total effect.

Table 2
The regression equation of chain mediation.

Regression eq. (<i>N</i> = 345)		Fit indicator			Coefficient and significance	
Outcome variable	Predictor variable	<i>R</i>	<i>R</i> ²	<i>F</i>	β	<i>t</i>
Loneliness	Sense of belonging	0.20	0.040	14.319	-0.20***	-3.784
Depression	Sense of belonging	0.446	0.199	42.369	-0.30***	-6.067
	Loneliness				0.275***	5.569
Life Satisfaction	Sense of belonging	0.257	0.066	24.306	0.257***	4.930
Life Satisfaction	Sense of belonging	0.583	0.340	58.479	0.054	1.141
	Loneliness				-0.068	-1.445
	Depression				-0.535***	-10.880

Note: The study variables were standardized in the model. *** *p* < 0.001.

4. Discussion

4.1. SOB and life satisfaction

The results of the present study showed that the direct effect of SOB on life satisfaction is not significant. Consequently, the first hypothesis was not supported. While the positive correlation between the sense of belonging and life satisfaction in the current study aligns with previous research (Avci, 2023; Civitci, 2015), the direct impact of university-specific belonging on life satisfaction, considering other mediators, remains underexplored. A study found that SOB significantly predicts life satisfaction, but social connectedness has an indirect and significant influence on this link (Avci, 2023). This implies that while belonging contributes to life satisfaction, other factors like social connectedness are crucial to mediate this relationship. Another study showed that school-related factors like parental involvement and a sense of fairness had a more direct association with life satisfaction, while the sense of belonging did not show a direct effect (Ahmadi & Ahmadi, 2020). These studies suggest that while a sense of belonging is important, it may not directly influence life satisfaction. Instead, belonging could influence life satisfaction through other mediating factors like loneliness and depression.

4.2. The mediating role of loneliness

This study found that while an absence of SOB is a notable predictor of social loneliness, the independent mediating role of social loneliness in the link between belonging to university and overall satisfaction with life was not substantiated. Hence, the second hypothesis was not supported. The complexity of loneliness may offer an explanation. Genetic and observational evidence indicates that loneliness is not a primary determinant of health. Specifically, a recent study found that socioeconomic factors, health-related behaviors, metabolic factors, comorbidities, and depressive symptoms account for approximately 80 % of the relationship between loneliness and health (Liang et al., 2024). Other studies have demonstrated that mediating variables, such as depression, self-esteem, and subjective happiness significantly influence the relationship between sense of belonging and related constructs (e.g., social connectedness) with loneliness, as well as the relationship between loneliness and life satisfaction (Ahadi & Hassani, 2021; Kapikran, 2013; Satici et al., 2016). Another possible explanation could be related to cultural differences. In collectivist cultures (e.g., Iran), where social bonds and community ties are strong, the impact of loneliness on health may be less pronounced. The emphasis on family and community support can mitigate the negative effects of loneliness (Taniguchi & Kaufman, 2022).

Broaden-and-Build Theory of Positive Emotions suggests that positive emotions expand individuals' thought-action repertoires and help build lasting personal resources (Milicev et al., 2023). While social loneliness can lead to negative emotions, which theoretically could narrow one's mindset and reduce life satisfaction, the presence of positive emotions and experiences can counteract this effect, leading to a

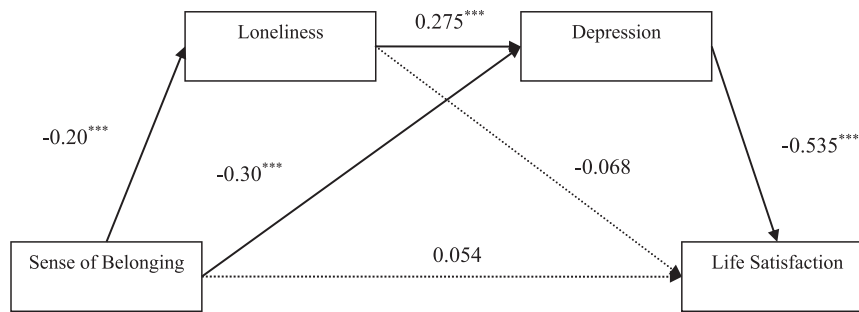


Fig. 1. The serial mediation effects (model 6) for loneliness and depression as mediators. Note: The dotted lines indicate nonsignificant pathways. *** $p < 0.001$.

Table 3
The total, direct, and indirect effect of sense of belonging on life satisfaction.

	Effects	Boot SE	Boot LLCI	Boot ULCI
Total effect	0.50	0.101	0.301	0.70
Direct effect	0.105	0.092	-0.076	0.286
Total indirect effect	0.203	0.034	0.138	0.271
Indirect effect 1	0.014	0.011	-0.006	0.039
Indirect effect 2	0.160	0.031	0.10	0.221
Indirect effect 3	0.029	0.010	0.012	0.051

Note: Boot SE, Boot LLCI, and Boot ULCI refer to the standard error and the upper and lower bounds of the 95 % confidence intervals of the indirect effects estimated by the bootstrap method, respectively. Indirect effect 1: sense of belonging → loneliness → life satisfaction; indirect effect 2: sense of belonging → depression → life satisfaction; indirect effect 3: sense of belonging → loneliness → depression → life satisfaction.

non-significant direct relationship between social loneliness and life satisfaction. Furthermore, Cognitive Dissonance Theory explains how people strive for internal consistency. When experiencing social loneliness, individuals may change their attitudes and perceptions about their social needs and life satisfaction to reduce dissonance. This adjustment leads to a non-significant direct relationship between social loneliness and life satisfaction (Szczeniak et al., 2020). These theories help explain why social loneliness does not necessarily lead directly to lower life satisfaction.

4.3. The mediating role of depression

The results indicated that depression mediates the relationship between SOB and life satisfaction, supporting Hypothesis H3. A secure attachment to significant communities, such as a university, provides a sense of safety and well-being. When students feel they belong, they are less likely to experience depression, which in turn positively influences their life satisfaction (Parpottas et al., 2023). A sense of belonging, is crucial for students' life satisfaction. When students feel connected and valued within their university community, it can enhance their overall well-being. However, if students experience depression, it can disrupt this sense of belonging and, consequently, diminish their life satisfaction. The Baumeister and Leary's Belongingness Hypothesis posits that humans have a fundamental need to form and maintain strong, stable interpersonal relationships (Dutcher et al., 2022). When this need is not met, such as through a lack of belonging to significant communities like a university, it can lead to feelings of social isolation and depression.

4.4. The serial mediating role of loneliness and depression

The key finding of this study was that the association between SOB and life satisfaction was fully mediated by loneliness and depression through a sequential pathway, supporting Hypothesis H4. Students who perceive a strong sense of belonging to their university firmly believe

they are integral members of the institution. They feel assured that supportive individuals and resources are available to assist them in times of need (Hurtado & Carter, 1997). This sense of security motivates them to engage with others, such as forming friendships (Walton & Cohen, 2007), leading to a more positive overall life evaluation (Avci, 2023). Conversely, students with a diminished sense of belonging tend to feel alienated, socially isolated, lonely, and marginalized. Prolonged exposure to such conditions can result in feelings of sadness, anxiety, boredom, and a lack of interest in social activities, which are indicative of depression (Dutcher et al., 2022; Hagerty & Williams, 1999). Additionally, these experiences can cause students to perceive a significant disparity between their actual university life and their expectations, thereby reducing their satisfaction with their living conditions. Based on Hawkey and Cacioppo's model of loneliness, lonely individuals tend to process social information in a biased manner, perceiving social cues as more threatening and recalling more negative interactions. This cognitive bias can exacerbate feelings of loneliness and lead to depression, further diminishing life satisfaction (Suh & Lee, 2023). Thus, students who do not feel SOB may experience social loneliness, lower motivation, and increased depression, making problems with outlook on life. Therefore, the serial mediation model in this study provides new insights into the psychosocial consequences of sense of belonging to university, with loneliness and depression mediating the negative effect of SOB on life satisfaction.

4.5. Limitation

Some limitations of this study should be addressed. First, the cross-sectional design prevents us from making causal inferences, as the data represent a single point in time. Second, the reliance on self-administered questionnaires may introduce bias, as responses could be influenced by participants' social desirability. Third, the sampling method limits the generalizability of the findings, as it may not accurately reflect the broader student population. Fourth, conducting the study within a single university setting further limits the applicability of the results to other institutions. Finally, one limitation of our study is the lack of control for personality traits, which have been shown to significantly influence both depression (Kang et al., 2024) and life satisfaction (Malvaso & Kang, 2022). These limitations highlight the need for longitudinal studies, alternative data collection methods, probability sampling methods, multi-university participation, and controlling other variables to strengthen future research in this area.

4.6. Implications

This study provides significant theoretical and practical contributions to the understanding of the relationship between sense of belonging (SOB) to university and life satisfaction among college students, mediated by social loneliness and depression.

4.6.1. Theoretical implications

This research extends existing models of SOB by incorporating the sequential mediating roles of loneliness and depression. While previous studies have explored the direct effects of SOB on life satisfaction, this study elucidates the underlying mechanisms, offering a more comprehensive understanding of how SOB influences life satisfaction through psychological pathways. The findings integrate and support key psychological theories, such as Hawkley and Cacioppo's model of loneliness.

First, future research should explore the underlying mechanisms by which sense of belonging to the university, loneliness, and depression influence students' life satisfaction across various educational contexts. Investigating additional mediators, such as social support, self-esteem, perceived self-worth, and self-efficacy, could offer a more comprehensive understanding of the factors impacting students' life satisfaction and subjective well-being (Çiçek, 2021; Gummadam et al., 2016; Kapikiran, 2013; Tu & Zhang, 2015). Second, it is pivotal to extend these findings by including marginalized people, such as minority groups, first generation students, and students with low socio-economic status to understand the unique challenges they may face (Strayhorn, 2018). Fourth, given the different factors determining a sense of belonging to the university across various educational levels (O'Meara et al., 2017), it is recommended to investigate the specific role of the sense of belonging during different educational periods and across different cultures. Finally, conducting longitudinal studies could provide valuable insights into the dynamics and long-term effects of the identified variables on students' life satisfaction.

4.6.2. Practical implications

First, universities should develop and implement support programs aimed at enhancing SOB among students. Initiatives such as peer mentoring, social events, and inclusive campus activities can foster a sense of community and belonging, thereby reducing feelings of loneliness and depression (Fernandes et al., 2017; Raymond & Sheppard, 2018; van der Velden et al., 2023). Second, the study underscores the importance of accessible mental health services on campus. Universities should prioritize mental health resources, including counseling services, mental health workshops, and stress management programs, to address the psychological needs of students and improve their overall life satisfaction. Third, the study highlights the need for targeted interventions for students who may be at risk of experiencing low SOB, loneliness, and depression. Identifying and supporting these students through tailored programs can help mitigate the negative effects on their life satisfaction and academic performance.

5. Conclusion

The current research elucidates the serial mediating roles of loneliness and depression in the relationship between SOB and life satisfaction. The study's contribution lies in its illumination of the intricate dynamics that underpin students' well-being. It underscores the significance of fostering a sense of belonging within the university environment to mitigate feelings of loneliness and depression, thereby enhancing life satisfaction. The research suggests that implementing support systems and mental health resources can significantly impact students' university experience. The current study should support policies that create a supportive educational environment, thereby improving students' quality of life and potentially boosting academic outcomes.

Funding

The research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethics approval and consent to participate

Informed consent was obtained from all individual participants involved in the study. Participation was contingent upon the acknowledgement and acceptance of the study's informed consent agreement. The survey was conducted anonymously to ensure participants' privacy. All data collected were handled with strict confidentiality. The research adhered to the ethical standards of the American Psychological Association and was reviewed by the ethics committee of the university. The nature of the study, involving standardized self-report questionnaires without deception or intervention, qualified for an exemption from formal ethics approval.

CRedit authorship contribution statement

Hadi Samadieh: Writing – review & editing, Writing – original draft, Resources, Investigation, Conceptualization. **Mehdi Rezaei:** Writing – review & editing, Methodology, Investigation, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The authors would like to extend their deepest gratitude to all the participants who contributed their time and insights to this study.

Data availability

The data sets examined in the present study can be obtained from the corresponding author on reasonable request.

References

- Ahadi, B., & Hassani, B. (2021). Loneliness and quality of life in older adults: The mediating role of depression. *Ageing International*, 46(3), 337–350. <https://doi.org/10.1007/s12126-021-09408-y>
- Ahmadi, F., & Ahmadi, S. (2020). School-related predictors of students' life satisfaction: The mediating role of school belongingness. *Contemporary School Psychology*, 24(2), 196–205. <https://doi.org/10.1007/s40688-019-00262-z>
- Allan, I., Ammi, M., & Dedewanou, F. A. (2024). The impact of sense of belonging on health: Canadian evidence. *Applied Economics*, 1-13. <https://doi.org/10.1080/00036846.2024.2364075>
- Arslan, G. (2021). School belongingness, well-being, and mental health among adolescents: Exploring the role of loneliness. *Australian Journal of Psychology*, 73(1), 70–80. <https://doi.org/10.1080/00049530.2021.1904499>
- Avci, M. (2023). Belongingness, social connectedness, and life satisfaction in college students after COVID-19 pandemic. *Journal of Happiness and Health*, 3(2), 23–36. <https://doi.org/10.47602/johah.v3i2.43>
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497.
- Baumeister, R. F., & Tice, D. M. (1990). Point-counterpoints: Anxiety and social exclusion. *Journal of Social and Clinical Psychology*, 9(2), 165–195. <https://doi.org/10.1521/jscp.1990.9.2.165>
- Cacioppo, J. T., & Cacioppo, S. (2018). Loneliness in the modern age: An evolutionary theory of loneliness (ETL). In , Vol. 58. *Advances in experimental social psychology* (pp. 127–197). Elsevier. <https://doi.org/10.1016/bs.aesp.2018.03.003>
- Cacioppo, J. T., Hawkley, L. C., & Thisted, R. A. (2010). Perceived social isolation makes me sad: 5-year cross-lagged analyses of loneliness and depressive symptomatology in the Chicago health, aging, and social relations study. *Psychology and Aging*, 25(2), 453. <https://psycnet.apa.org/doi/https://doi.org/10.1037/a0017216>
- Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006). Loneliness as a specific risk factor for depressive symptoms: Cross-sectional and longitudinal analyses. *Psychology and Aging*, 21(1), 140. <https://psycnet.apa.org/doi/https://doi.org/10.1037/0882-7974.21.1.140>
- Çiçek, İ. (2021). Mediating role of self-esteem in the association between loneliness and psychological and subjective well-being in university students. *International Journal of Contemporary Educational Research*, 8(2), 83–97. <https://doi.org/10.33200/ijcer.817660>
- Civiti, A. (2015). Perceived stress and life satisfaction in college students: Belonging and extracurricular participation as moderators. *Procedia-Social and Behavioral Sciences*, 205, 271–281. <https://doi.org/10.1016/j.sbspro.2015.09.077>

- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95(3), 542. <https://psycnet.apa.org/doi/https://doi.org/10.1037/0033-2909.95.3.542>.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13
- DiTommaso, E., Brannen, C., & Best, L. A. (2004). Measurement and validity characteristics of the short version of the social and emotional loneliness scale for adults. *Educational and Psychological Measurement*, 64(1), 99–119. <https://doi.org/10.1177/0013164403258450>
- Dutcher, J. M., Lederman, J., Jain, M., Price, S., Kumar, A., Villalba, D. K., ... Riskin, E. (2022). Lack of belonging predicts depressive symptomatology in college students. *Psychological Science*, 33(7), 1048–1067. <https://doi.org/10.1177/09567976211073135>
- Erzen, E., & Çikrikci, Ö. (2018). The effect of loneliness on depression: A meta-analysis. *International Journal of Social Psychiatry*, 64(5), 427–435. <https://doi.org/10.1177/0020764018776349>
- Fernandes, A., Ford, A., Rayner, G., & Pretorius, L. (2017). Building a sense of belonging among tertiary commuter students: The Monash non-residential colleges program. *Student Success*, 8(2), 31–42. <https://doi.org/10.5204/ssj.v8i2.380>
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, 18(3), 233–239. <https://doi.org/10.1111/j.1467-9280.2007.01882.x>
- Gillen-O'Neel, C. (2021). Sense of belonging and student engagement: A daily study of first-and continuing-generation college students. *Research in Higher Education*, 62(1), 45–71. <https://doi.org/10.1007/s11162-019-09570-y>
- Goossens, L. (2018). Loneliness in adolescence: Insights from Cacioppo's evolutionary model. *Child Development Perspectives*, 12(4), 230–234. <https://doi.org/10.1111/cdep.12291>
- Gummadam, P., Pittman, L. D., & Ioffe, M. (2016). School belonging, ethnic identity, and psychological adjustment among ethnic minority college students. *The Journal of Experimental Education*, 84(2), 289–306. <https://doi.org/10.1080/00220973.2015.1048844>
- Hagerty, B. M., & Williams, A. (1999). The effects of sense of belonging, social support, conflict, and loneliness on depression. *Nursing Research*, 48(4), 215–219. <https://doi.org/10.1097/00006199-199907000-00004>
- Hagerty, B. M., Williams, R. A., & Oe, H. (2002). Childhood antecedents of adult sense of belonging. *Journal of Clinical Psychology*, 58(7), 793–801. <https://doi.org/10.1002/jclp.2007>
- Haim-Litevsky, D., Komemi, R., & Lipskaya-Velikovsky, L. (2023). Sense of belonging, meaningful daily life participation, and well-being: Integrated investigation. *International Journal of Environmental Research and Public Health*, 20(5), 4121. <https://doi.org/10.3390/ijerph20054121>
- Hawkey, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine*, 40(2), 218–227. <https://doi.org/10.1007/s12160-010-9210-8>
- Hou, T., Xie, Y., Mao, X., Liu, Y., Zhang, J., Wen, J., ... Cai, W. (2021). The mediating role of loneliness between social support and depressive symptoms among Chinese rural adolescents during COVID-19 outbreak: A comparative study between left-behind and non-left-behind students. *Frontiers in Psychiatry*, 12, Article 740094. <https://doi.org/10.3389/fpsy.2021.740094>
- Howard, A. H., Dadirai Gwenz, G., Newsom, L., Gebru, B. T., & Gilbertson Wilke, N. (2023). The relationship between sense of belonging and well-being outcomes in emerging adults with care experience. *International Journal of Environmental Research and Public Health*, 20(13), Article 6311. <https://doi.org/10.3390/ijerph20136311>
- Hurtado, S., & Carter, D. F. (1997). Effects of college transition and perceptions of the campus racial climate on Latino college students' sense of belonging. *Sociology of Education*, 324–345. <https://doi.org/10.2307/2673270>
- Jaafari, Z., Farhadi, A., Lari, F. A., Mousavi, F. S., Moltafet, H., Dashti, E., & Marzban, M. (2021). Prevalence of depression in Iranian college students: A systematic review and meta-analysis. *Iranian Journal of Psychiatry and Behavioral Sciences*, 15(1). <https://doi.org/10.5812/ijpbs.101524>
- Jenkins, S. R., Belanger, A., Connolly, M. L., Boals, A., & Durón, K. M. (2013). First-generation undergraduate students' social support, depression, and life satisfaction. *Journal of College Counseling*, 16(2), 129–142. <https://doi.org/10.1002/j.2161-1882.2013.00032.x>
- Kang, W., Tiego, J., Hellyer, P. J., Trender, W., Grant, J. E., Chamberlain, S. R., & Hampshire, A. (2024). Validation of an abbreviated big five personality inventory at large population scale: Psychometric structure and associations with common psychiatric and neurological disorders. *Comprehensive Psychiatry*, 134, Article 152514. <https://doi.org/10.1016/j.comppsy.2024.152514>
- Kapikiran, Ş. (2013). Loneliness and life satisfaction in Turkish early adolescents: The mediating role of self esteem and social support. *Social Indicators Research*, 111(2), 617–632. <https://doi.org/10.1007/s12126-021-09408-y>
- Kim, E. S., Delaney, S. W., Tay, L., Chen, Y., Diener, E., & Vanderweele, T. J. (2021). Life satisfaction and subsequent physical, behavioral, and psychosocial health in older adults. *The Milbank Quarterly*, 99(1), 209–239. <https://doi.org/10.1111/1468-0009.12497>
- Koenig, L. J., Isaacs, A. M., & Schwartz, J. A. (1994). Sex differences in adolescent depression and loneliness: Why are boys lonelier if girls are more depressed? *Journal of Research in Personality*, 28(1), 27–43. <https://doi.org/10.1006/jrpe.1994.1004>
- Kusci, I., Öztosun, A., & Arli, N. B. (2023). Mediating role of social exclusion in the relationship between sense of belonging and loneliness in international students. *Educational Policy Analysis and Strategic Research*, 18(3), 297–315. doi:http://doi.org/10.29329/epasr.2023.600.14.
- Liang, Y. Y., Zhou, M., He, Y., Zhang, W., Wu, Q., Luo, T., ... Ai, S. (2024). Observational and genetic evidence disagree on the association between loneliness and risk of multiple diseases. *Nature Human Behaviour*, 1–13. <https://doi.org/10.1038/s41562-024-01970-0>
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the Beck depression and anxiety inventories. *Behaviour Research and Therapy*, 33(3), 335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)
- Luhmann, M., & Hennecke, M. (2017). The motivational consequences of life satisfaction. *Motivation Science*, 3(1), 51. doi:https://psycnet.apa.org/doi/https://doi.org/10.1037/mot0000048.
- Malvaso, A., & Kang, W. (2022). The relationship between areas of life satisfaction, personality, and overall life satisfaction: An integrated account. *Frontiers in Psychology*, 13, Article 894610. <https://doi.org/10.3389/fpsyg.2022.894610>
- Mellinger, C., Fritzon, A., Park, B., & Dimidjian, S. (2023). Developing the sense of belonging scale and understanding its relationship to loneliness, need to belong, and general well-being outcomes. *Journal of Personality Assessment*, 1–14. <https://doi.org/10.1080/00223891.2023.2279564>
- Mellor, D., Stokes, M., Firth, L., Hayashi, Y., & Cummins, R. (2008). Need for belonging, relationship satisfaction, loneliness, and life satisfaction. *Personality and Individual Differences*, 45(3), 213–218. <https://doi.org/10.1016/j.paid.2008.03.020>
- Milicev, J., Qualter, P., Goodfellow, C., Inchley, J., Simpson, S. A., Leyland, A. H., ... Long, E. (2023). The prospective relationship between loneliness, life satisfaction and psychological distress before and during the COVID-19 pandemic in the UK. *Journal of Public Health*, 31(9), 1417–1431. <https://doi.org/10.1007/s10389-022-01719-x>
- Nestler, E. J., Barrot, M., DiLeone, R. J., Eisch, A. J., Gold, S. J., & Monteggia, L. M. (2002). Neurobiology of depression. *Neuron*, 34(1), 13–25. <https://doi.org/10.1186/1756-6606-3-8>
- Niu, G.-f., Shi, X.-h., Yao, L.-s., Yang, W.-c., Jin, S.-y., & Xu, L. (2023). Social exclusion and depression among undergraduate students: The mediating roles of rejection sensitivity and social self-efficacy. *Current Psychology*, 42(28), 24198–24207. <https://doi.org/10.1007/s12144-022-03318-1>
- O'Meara, K., Griffin, K. A., Kuvaeva, A., Nyunt, G., & Robinson, T. N. (2017). Sense of belonging and its contributing factors in graduate education. *International Journal of Doctoral Studies*, 12, 251–279. <https://doi.org/10.28945/3903>
- Ooi, P. B., Khor, K. S., Tan, C. C., & Ong, D. L. T. (2022). Depression, anxiety, stress, and satisfaction with life: Moderating role of interpersonal needs among university students. *Frontiers in Public Health*, 10, Article 958884. <https://doi.org/10.3389/fpubh.2022.958884>
- Pak, G., & Bae, S.-M. (2023). Influences of loneliness, life purpose, and aging satisfaction on depression in older US adults: Analysis of 12-year longitudinal data. *International Journal of Mental Health and Addiction*, 1–13. <https://doi.org/10.1007/s11469-023-01184-x>
- Parpottas, P., Vogazianos, P., & Pezirkianidis, C. (2023). Attachment, resilience and life satisfaction of university students in Cyprus after the fourth wave of COVID-19. *International Journal of Environmental Research and Public Health*, 21(1), 22. <https://doi.org/10.3390/ijerph21010022>
- Pascarella, E. T., & Terenzini, P. T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education*, 51(1), 60–75. <https://doi.org/10.1080/00221546.1980.11780030>
- Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, 5(2), 164. doi:https://psycnet.apa.org/doi/https://doi.org/10.1037/1040-3590.5.2.164.
- Perlman, D., & Peplau, L. A. (1982). Theoretical approaches to loneliness. *Loneliness: A sourcebook of current theory, research and therapy*, 36, 123–134.
- Raymond, J. M., & Sheppard, K. (2018). Effects of peer mentoring on nursing students' perceived stress, sense of belonging, self-efficacy and loneliness. *Journal of Nursing Education and Practice*, 8(1), 16–23. <https://doi.org/10.5430/jnep.v8n1p16>
- Reeve, J. (2018). *Understanding motivation and emotion*. John Wiley & Sons.
- Samadieh, H., & Tanhaye Reshvanloo, F. (2023). The relationship between sense of belonging and life satisfaction among university students: The mediating role of social isolation and psychological distress. *Iranian journal of educational sociology*, 6(3), 11–24. <https://doi.org/10.61186/ijes.6.3.11>
- Sargent, J., Williams, R. A., Hagerty, B., Lynch-Sauer, J., & Hoyle, K. (2002). Sense of belonging as a buffer against depressive symptoms. *Journal of the American Psychiatric Nurses Association*, 8(4), 120–129. <https://doi.org/10.1067/mpn.2002.127290>
- Satici, S. A., Uysal, R., & Deniz, M. E. (2016). Linking social connectedness to loneliness: The mediating role of subjective happiness. *Personality and Individual Differences*, 97, 306–310. <https://doi.org/10.1016/j.paid.2015.11.035>
- Saveanu, R. V., & Nemeroff, C. B. (2012). Etiology of depression: Genetic and environmental factors. *Psychiatric Clinics*, 35(1), 51–71. <https://doi.org/10.1016/j.psc.2011.12.001>
- Scanlon, M., Leahy, P., Jenkinson, H., & Powell, F. (2020). 'My biggest fear was whether or not I would make friends': Working-class students' reflections on their transition to university in Ireland. *Journal of Further and Higher Education*, 44(6), 753–765. <https://doi.org/10.1080/0309877X.2019.1597030>
- Simegn, W., Sisay, G., Seid, A. M., & Dagne, H. (2023). Loneliness and its associated factors among university students during late stage of COVID-19 pandemic: An online cross-sectional study. *PLoS One*, 18(7), Article e0287365. <https://doi.org/10.1371/journal.pone.0287365>
- Smyth, K., Salloum, A., & Herring, J. (2021). Interpersonal functioning, support, and change in early-onset bipolar disorder: A transcendental phenomenological study of emerging adults. *Journal of Mental Health*, 30(1), 121–128. <https://doi.org/10.1080/09638237.2020.1713997>
- Strayhorn, T. L. (2018). College students' sense of belonging: A key to educational success for all students. *Routledge*. <https://doi.org/10.4324/9781315297293>

- Suh, H., & Lee, J. H. (2023). Linking loneliness and meaning in life: Roles of self-compassion and interpersonal mindfulness. *International Journal of Applied Positive Psychology*, 8(2), 365–381. <https://doi.org/10.1007/s41042-023-00094-6>
- Szcześniak, M., Bielecka, G., Madej, D., Pieńkowska, E., & Rodzeń, W. (2020). The role of self-esteem in the relationship between loneliness and life satisfaction in late adulthood: Evidence from Poland. *Psychology Research and Behavior Management*, 1201-1212. <https://doi.org/10.2147/PRBM.S275902>
- Taniguchi, H., & Kaufman, G. (2022). Family, collectivism, and loneliness from a cross-country perspective. *Applied Research in Quality of Life*, 17(3), 1555–1581. <https://doi.org/10.1007/s11482-021-09978-8>
- Tett, L., Cree, V. E., & Christie, H. (2017). From further to higher education: Transition as an on-going process. *Higher Education*, 73, 389–406. <https://doi.org/10.1007/s10734-016-0101-1>
- Tholen, R., Wouters, E., Ponnet, K., de Bruyn, S., & Van Hal, G. (2022). Academic stress, anxiety, and depression among Flemish first-year students: The mediating role of sense of belonging. *Journal of College Student Development*, 63(2), 200–217. <https://doi.org/10.1353/csd.2022.0015>
- Tu, Y., & Zhang, S. (2015). Loneliness and subjective well-being among Chinese undergraduates: The mediating role of self-efficacy. *Social Indicators Research*, 124, 963–980. <https://doi.org/10.1007/s11205-014-0809-1>
- van der Velden, G. J., Meeuwssen, J. A., Fox, C. M., Stolte, C., & Dilaver, G. (2023). Peer-mentorship and first-year inclusion: Building belonging in higher education. *BMC Medical Education*, 23(1), 833. <https://doi.org/10.1186/s12909-023-04805-0>
- VanderWeele, T. J. (2016). Mediation analysis: A practitioner's guide. *Annual Review of Public Health*, 37(1), 17–32. <https://doi.org/10.1146/annurev-publhealth-032315-021402>
- Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, 92(1), 82. <https://psycnet.apa.org/doi/https://doi.org/10.1037/0022-3514.92.1.82>
- Wang, P., Wang, J., Yan, Y., Si, Y., Zhan, X., & Tian, Y. (2021). Relationship between loneliness and depression among Chinese junior high school students: The serial mediating roles of internet gaming disorder, social network use, and generalized pathological internet use. *Frontiers in Psychology*, 11, Article 529665. <https://doi.org/10.3389/fpsyg.2020.529665>
- Yildiz, M. A. (2016). Serial multiple mediation of general belongingness and life satisfaction in the relationship between attachment and loneliness in adolescents. *Educational sciences: Theory and practice*, 16(2), 553–578. <https://psycnet.apa.org/doi/10.12738/estp.2016.2.0380>