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Emotion Regulation Difficulties and Rumination as Serial Mediators in the Relationship Between Psychological Resilience and Loneliness

Psikolojik Sağlamlık ile Yalnızlık Arasındaki İlişkide Duygu Düzenleme Güçlüğü ve Ruminasyonun Seri Aracı Rolü

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ABSTRACT

Objective: This study examined the serial mediating roles of emotion regulation difficulties and rumination in the relationship between psychological resilience and loneliness among university students.

Method: A total of 425 university students aged 18–29 years (74.4% women) voluntarily participated in the study. Data were collected using the Brief Resilience Scale, the UCLA Loneliness Scale–Short Form, the Difficulties in Emotion Regulation Scale–Short Form, and the Ruminative Response Scale–Short Form. Relationships among the variables were examined using Pearson correlation analyses, and the serial mediation model (Model 6) was tested using the PROCESS macro (v4.2) with a bootstrapping procedure.

Results: Psychological resilience negatively predicted emotion regulation difficulties and rumination, whereas emotion regulation difficulties and rumination positively predicted loneliness. Mediation analyses controlling for gender indicated that emotion regulation difficulties and rumination each independently mediated the relationship between psychological resilience and loneliness. The serial mediating role of emotion regulation difficulties and rumination in this relationship was also statistically significant.

Conclusion: The findings suggest that the relationship between psychological resilience and loneliness may be explained by specific and serial indirect pathways through emotion regulation difficulties and rumination.

Keywords: Resilience, loneliness, emotion regulation, emotion regulation difficulties, rumination

ÖZ

Amaç: Bu araştırmada, üniversite öğrencilerinde psikolojik sağlamlık ile yalnızlık arasındaki ilişkide duygu düzenleme güçlüğü ve ruminasyonun seri aracı rolleri incelenmiştir.

Yöntem: Çalışmaya 18-29 yaşlarında 425 üniversite öğrencisi (%74,4 kadın) gönüllü olarak katılmıştır. Ölçüm araçları olarak Kısa Psikolojik Sağlamlık Ölçeği, UCLA Yalnızlık Ölçeği- Kısa Formu, Duygu Düzenlemede Güçlükler Ölçeği Kısa Formu ve Ruminatif Tepkiler Ölçeği- Kısa Formu kullanılmıştır. Değişkenler arasındaki ilişkiler Pearson korelasyon analizleriyle incelenmiş, seri aracılık modeli (Model 6) ise PROCESS Macro (v4.2) eklentisi kullanılarak bootstrap yöntemiyle test edilmiştir.

Bulgular: Psikolojik sağlamlığın duygu düzenleme güçlüğünü ve ruminasyonu negatif yönde yordadığını; duygu düzenleme güçlüğü ile ruminasyonun ise yalnızlığı pozitif yönde yordadığını göstermiştir. Cinsiyetin kontrol edildiği aracılık analizleri, psikolojik sağlamlık ile yalnızlık arasındaki ilişkide hem duygu düzenleme güçlüğünün hem de ruminasyonun tek başlarına anlamlı aracı rol üstlendiğini ortaya koymuştur. Ayrıca, psikolojik sağlamlık ile yalnızlık arasındaki ilişkide duygu düzenleme güçlüğü ve ruminasyonun seri aracı rolünün de anlamlı olduğu bulunmuştur.

Sonuç: Araştırma bulguları, psikolojik sağlamlık ile yalnızlık arasındaki ilişkinin duygu düzenleme güçlüğü ve ruminasyon üzerinden gerçekleşen tekil ve seri dolaylı yollarla açıklanabildiğini göstermektedir.

Anahtar sözcükler: Psikolojik sağlamlık, yalnızlık, duygu düzenleme, duygu düzenleme güçlüğü, ruminasyon

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Introduction

Loneliness is a subjective and distressing psychological experience that arises when individuals perceive that their existing social relationships do not adequately meet their needs for belonging and meaningful social connections (Perlman and Peplau 1981, Hawkley and Cacioppo 2010, Luhmann et al. 2023). Unlike objective social isolation, loneliness is related less to the number of social relationships individuals have than to how they evaluate the quality and adequacy of those relationships (Hawkley and Cacioppo 2010). Thus, individuals with extensive social networks may still feel lonely, whereas some individuals with limited social relationships may not experience loneliness. Today, loneliness is regarded not only as an experience that adversely affects individual well-being but also as a major public health concern associated with depression, anxiety, cognitive decline, and premature mortality (Holt-Lunstad et al. 2015, Jaffe 2023). In recent years, growing awareness of the individual and societal impacts of loneliness has brought reducing loneliness through strengthening social connections to the forefront of the international public health agenda (Office of the Surgeon General 2023). In this context, university students have been identified as among the groups most at risk of loneliness (Ellard et al. 2023). University life entails numerous developmental and environmental stressors, including leaving the family home, adapting to new social environments, coping with academic responsibilities, financial difficulties, and uncertainties about the future (Avcı 2024, Ball et al. 2024, Sundqvist et al. 2024). During this period, students strive both to develop new interpersonal relationships and to adjust psychologically to changing life circumstances. Research indicates that loneliness among university students is associated with depressive symptoms, anxiety, low life satisfaction, reduced psychological well-being, and difficulties with academic adjustment (Diehl et al. 2018, Lim et al. 2020). Recent studies emphasize that loneliness cannot be explained solely by the quantity or quality of interpersonal relationships but is also closely associated with individuals' emotional and cognitive regulation processes (e.g., Luo and Shao 2023). Consistent with this perspective, a recent meta-analysis demonstrated that loneliness was significantly and positively associated with dysfunctional emotion regulation processes and significantly and negatively associated with adaptive emotion regulation strategies, such as cognitive reappraisal (Patrichi et al. 2025).

In this context, psychological resilience, regarded as one of the key psychological mechanisms that may play a protective role against loneliness (Ahluwalia et al. 2025), is defined as an individual's capacity to adapt to adverse experiences, maintain psychological functioning, and recover from adversity (Southwick et al. 2014, Troy et al. 2023). However, contemporary theoretical approaches propose that psychological resilience is not merely an individual personality trait but a dynamic process of adaptation shaped by the interaction of cognitive, emotional, and behavioral processes (Kalisch et al. 2017). Individuals with higher levels of psychological resilience have been shown to cope more effectively with stress, appraise adverse life events in more functional ways, and maintain their psychological well-being more successfully (Southwick et al. 2014, Kalisch et al. 2017). The relationship between psychological resilience and loneliness is also supported by empirical research. Recent studies conducted with university students indicate that higher levels of psychological resilience are associated with lower levels of loneliness, demonstrating a negative relationship between the two variables (Ataman-Bor et al. 2025, Çağlar et al. 2025).

The relationship between psychological resilience and loneliness is thought to be explicable through various psychological processes associated with individuals' emotional and cognitive functioning. Emotion regulation, considered one of the key mechanisms involved in these processes, is conceptualized within Gross's (1998, 2015) Process Model of Emotion Regulation. This model proposes that psychological adjustment is related to how individuals manage their emotions rather than to the intensity of the emotions they experience. According to the model, individuals employ various regulatory strategies at different stages of their emotional experiences. The effective use of these strategies supports psychological adjustment, whereas difficulties in emotion regulation processes lead to intensified negative emotions, prolonged stress responses, and impaired psychological adjustment (Gross 2015). These findings in the literature suggest that psychological resilience is one of the key resources that strengthen emotion regulation capacity. Individuals with higher levels of psychological resilience have been shown to appraise stressful life events more flexibly, regulate their negative emotions more effectively, and use adaptive coping strategies more frequently (Kalisch et al. 2017, Troy et al. 2023). Conversely, individuals with lower

levels of psychological resilience have been reported to experience greater difficulties in emotion regulation when faced with intense negative emotions (Hu et al. 2014, Tanacıoğlu Aydın and Pekşen Süslü 2023). Recent research examining the association between emotion regulation difficulties and loneliness indicates that individuals who experience greater difficulties regulating their emotions report higher levels of loneliness, demonstrating a positive relationship between emotion regulation difficulties and loneliness (e.g., Akbulut et al. 2025). Furthermore, emotion regulation difficulties affect not only individuals' emotional experiences but also their cognitive processes. In particular, the inability to regulate negative emotions effectively may lead individuals to focus their attention repetitively and passively on negative experiences, thereby engaging in ruminative thought patterns (Lincoln et al. 2022, Miethe et al. 2023). From this perspective, rumination is regarded as one of the key cognitive processes associated with emotion regulation difficulties. Rumination, which refers to repetitive thinking about one's negative emotions and experiences, may contribute to the persistence of negative emotional states and difficulties in psychological adjustment (Nolen-Hoeksema et al. 2008). Response Styles Theory, considered one of the principal theories explaining the role of rumination in this process, proposes that individuals' cognitive responses to negative mood determine their psychological adjustment (Nolen-Hoeksema 1991). According to this theory, individuals who engage in ruminative thinking in response to negative experiences exhibit more persistent psychological distress, stronger negative cognitive schemas, and impaired functional problem-solving processes (Nolen-Hoeksema et al. 2008). Empirical research supporting this theoretical framework has also shown that emotion regulation difficulties strongly predict rumination and that individuals who struggle to accept, make sense of, and regulate their emotions are more prone to focusing repetitively on negative thoughts (Aldao et al. 2010, Schäfer et al. 2017). Moreover, systematic reviews conducted in recent years indicate that the relationship between maladaptive emotion regulation strategies and rumination is consistently observed across different age groups and cultures (Patrichi et al. 2025). The effect of rumination on loneliness is explained in terms of cognitive appraisal processes (Yun et al. 2023). Individuals who persistently dwell on negative experiences tend to interpret social interactions more negatively, have heightened expectations of rejection, and perceive their existing social support as inadequate (Cacioppo and Hawkley 2009). Over time, this pattern contributes to withdrawal from interpersonal relationships and the maintenance of feelings of loneliness. Indeed, recent research demonstrates a positive relationship between rumination and loneliness (Yun et al. 2023, Patrichi et al. 2025).

Taken together, the theoretical background and empirical findings suggest that emotion regulation and cognitive processes may play an important role in the relationship between psychological resilience and loneliness. Psychological resilience is thought to support more effective emotion regulation, which may, in turn, contribute to lower levels of loneliness by reducing the tendency to engage in ruminative thinking. The capacity of psychological resilience to support emotional adjustment in the face of stressful and adverse experiences, together with the possibility that emotion regulation difficulties may increase the tendency toward ruminative thinking when negative emotions cannot be managed effectively, suggests that these variables can be considered interrelated processes. The association of ruminative thinking with more negative appraisals of social interactions and withdrawal from interpersonal relationships, through a sustained cognitive focus on negative experiences, further illustrates the connection between this process and loneliness. However, existing studies have largely been limited to examining pairwise relationships among these variables, and research jointly addressing the sequential roles of emotion regulation difficulties and rumination in this relationship remains scarce. In this respect, the present study differs from previous research by moving beyond establishing the relationship between psychological resilience and loneliness to examine the emotional and cognitive processes through which this relationship may be explained. One of the study's novel contributions is its consideration of emotion regulation difficulties and rumination within a sequential framework, in which difficulties in emotion regulation may be linked to repetitive negative thinking, rather than as independent mediating processes. Accordingly, this study aims to examine the individual and serial mediating roles of emotion regulation difficulties and rumination in the relationship between psychological resilience and loneliness. The study therefore proposes four hypotheses: (1) The relationships among psychological resilience, emotion regulation difficulties, rumination, and loneliness are significant. (2) Emotion regulation difficulties

significantly mediate the relationship between psychological resilience and loneliness. (3) Rumination significantly mediates the relationship between psychological resilience and loneliness. (4) Emotion regulation difficulties and rumination significantly serially mediate the relationship between psychological resilience and loneliness.

Method

Sample

The required sample size was determined using the Monte Carlo Power Analysis for Indirect Effects proposed by Schoemann et al. (2017), which is appropriate for testing indirect effects in serial mediation models. For the model comprising two serial mediators, expected path coefficients were specified based on effect sizes reported in previous research. The Monte Carlo power analysis indicated that a minimum of 180 participants was required to achieve statistical power of .95 at a significance level of .05. To reduce potential data loss and improve the reliability of the estimates, convenience sampling was employed based on participant accessibility, and 425 university students (74.4% female) were voluntarily enrolled in the study. Participants had a mean age of 21.13 years (SD = 1.78), with ages ranging from 18 to 29 years. The inclusion criterion was being a university student, whereas the exclusion criterion was having a diagnosis of a psychotic or cognitive disorder. Accordingly, 13 participants who were not university students were excluded from the study. In response to the question about income level, 81.4% of participants reported a middle income level.

Procedure

Ethical approval for the study was obtained from the Pamukkale University Social Sciences and Humanities Scientific Research and Publication Ethics Committee (Approval No.: 68282350, Date: December 30, 2025). The online form, prepared by the researcher using Google Forms, was pilot-tested by three individuals before data collection began.

The form comprised five screens and approximately 50 questions, including demographic questions, and took approximately 10 minutes to complete. During the three-month data collection period, the form link was distributed to university students via email, social media, and student communication groups, accompanied by an announcement inviting voluntary participation in the study. The first section of the form explained the purpose of the study, the voluntary nature of participation, participants' right to withdraw without providing a reason before submitting the form, and that the data would be used solely for scientific purposes. Only participants who provided informed consent could proceed to the questions. Responses to all questions were mandatory, and participants were allowed to return to previous screens to modify their responses. Because data were also collected in shared computer laboratories and practices such as user registration were considered inappropriate in terms of participant privacy, no restriction was imposed to prevent individuals from submitting multiple responses.

Measures

A Personal Information Form developed by the researchers to assess participants' demographic characteristics, such as age, gender, and income level, was administered alongside the standardized measures described below.

Ruminative Response Scale–Short Form (RRS-SF)

The short form was developed by Treynor et al. (2003) by removing items that overlapped with depressive symptoms from the 21-item Ruminative Responses Scale, originally developed by Nolen-Hoeksema and Morrow (1991) to assess the extent to which individuals use a ruminative coping style. The scale consists of 10 items rated on a 4-point Likert scale (1 = Never, 4 = Always). It comprises two subscales: "brooding," which refers to a passive comparison of one's current circumstances with unmet expectations, and "reflection," which refers to mental efforts aimed at overcoming problems and difficulties. Higher scores

indicate a greater tendency to engage in ruminative coping. Cronbach's alpha internal consistency coefficients for the Turkish version were reported as 0.85 for the total scale, 0.77 for the reflection subscale, and 0.75 for the brooding subscale (Erdur-Baker and Bugay 2010). In the present study, Cronbach's alpha internal consistency coefficient for the scale was 0.87.

Brief Resilience Scale

The scale was developed by Smith et al. (2008) to assess individuals' capacity for psychological adjustment and recovery in the face of stressful and challenging life events and was adapted into Turkish by Doğan (2015). It consists of six items rated on a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Total scores range from 6 to 30. Higher scores indicate higher levels of psychological resilience. An examination of the psychometric properties of the Turkish version yielded an internal consistency coefficient of 0.81 (Doğan 2015). In the present study, Cronbach's alpha internal consistency coefficient for the scale was 0.85.

Difficulties in Emotion Regulation Scale–Short Form

The scale was developed by Bjureberg et al. (2016) to assess the difficulties individuals encounter in emotion regulation processes and was adapted into Turkish by Yiğit and Guzey Yiğit (2019). It consists of 16 items covering five subscales: clarity, goals, impulse, strategies, and nonacceptance. Items are rated on a 5-point Likert scale ranging from 1 (Almost never) to 5 (Almost always). Higher scores indicate greater difficulties in emotion regulation. The Turkish adaptation study reported a Cronbach's alpha internal consistency coefficient of 0.92 for the full scale and demonstrated that the scale was a valid and reliable measure (Yiğit and Guzey Yiğit 2019). In the present study, Cronbach's alpha internal consistency coefficient for the scale was 0.92.

UCLA Loneliness Scale–6-Item Short Form

The scale was developed by Wongpakaran et al. (2020) to assess individuals' loneliness levels while preserving the psychometric properties of the 20-item UCLA Loneliness Scale. The Turkish adaptation was conducted by Elbi et al. (2023). The scale consists of six items rated on a 4-point Likert scale. Items are scored from 1 (Never) to 4 (Often), yielding total scores ranging from 6 to 24. Higher scores indicate higher levels of perceived loneliness. The Turkish adaptation study reported that the scale was a valid and reliable measure (Elbi et al. 2023). In the present study, Cronbach's alpha internal consistency coefficient for the scale was 0.91.

Statistical Analysis

The data were analyzed using IBM SPSS Statistics 31.0. Before conducting the analyses, the data were assessed to determine whether they met the basic assumptions of parametric analyses. Normality was examined using skewness and kurtosis coefficients, with values between –2 and +2 considered acceptable in accordance with the recommendations of George and Mallery (2010). As all variables met the normality assumption, parametric methods were used.

The direction and strength of the linear relationships among the study variables were examined using Pearson correlation analysis. To test the study hypotheses, serial mediation analysis (Model 6) was conducted using the PROCESS macro (Version 4.2) developed by Hayes (2022). Psychological resilience was entered as the independent variable, loneliness as the dependent variable, and emotion regulation difficulties and rumination as the serial mediators, in that order. Gender was included as a covariate because recent studies conducted with university students have shown that loneliness levels may differ by gender and that these differences may vary according to sample characteristics (Akkaya and Duy 2024, Tan and Xiao 2025).

The significance of the indirect effects was assessed using 95% confidence intervals obtained from 5,000 bootstrap resamples. An indirect effect was considered statistically significant when its confidence interval did not include zero (Hayes, 2022). The findings were reported using unstandardized regression coefficients (B), standard errors (SE), t values, p values, and 95% confidence intervals (CIs).

Results

The results of the Pearson correlation analysis presented in Table 1 indicate that psychological resilience was significantly and negatively associated with emotion regulation difficulties, rumination, and loneliness. Significant positive associations were also found between emotion regulation difficulties and both rumination and loneliness, as well as between rumination and loneliness (all $p < .001$).

Table 1. Means and standard deviations of the variables and Pearson correlation coefficients among the variables.

	Mean	SD	1	2	3	4
1. Psychological Resilience	18.45	4.57				
2. Emotion Regulation Difficulties	43.05	12.57	-.56			
3. Rumination	22.92	6.39	-.41	.59		
4. Loneliness	14.29	4.85	-.25	.43	.53	-

N = 425. All Pearson correlation coefficients are statistically significant at $p < .001$.; SD: standart devaition

The serial mediation analysis conducted using PROCESS Macro Model 6 (Hayes, 2022), with gender included as a covariate, revealed a significant total effect of psychological resilience on loneliness (B = -0.26, SE = 0.05, t = -4.97, $p < .001$). When emotion regulation difficulties and rumination were included in the model, the direct effect of psychological resilience on loneliness was no longer significant (B = 0.05, SE = 0.05, t = 0.98, p = 0.33). This finding indicates that the relationship between psychological resilience and loneliness was largely accounted for by the mediating variables (Figure 1).

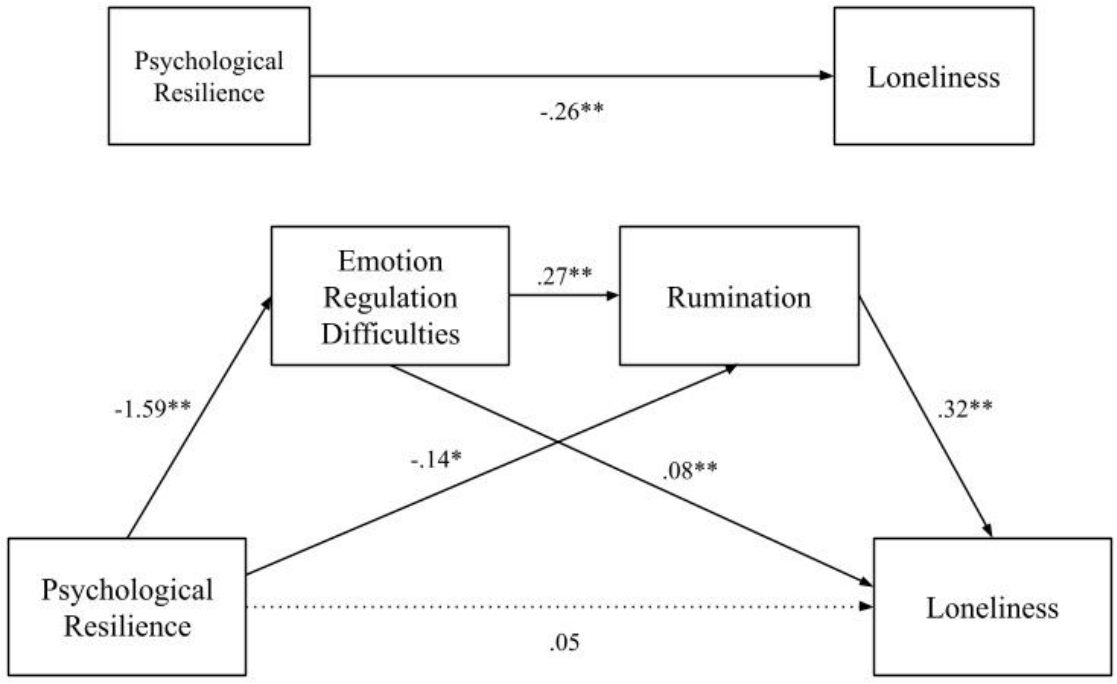


Figure 1. Results of the serial mediation model (Model 6; see Hayes, 2022)

**p < .001, *p < .05; Unstandardized regression coefficients (B) are presented. The effect of gender was controlled for. Dashed lines indicate nonsignificant paths.

Psychological resilience significantly and negatively predicted emotion regulation difficulties (B = -1.59, SE = 0.11, t = -13.88, $p < .001$). Psychological resilience also significantly and negatively predicted rumination (B = -0.14, SE = 0.07, t = -2.10, p = .04). Emotion regulation difficulties significantly and positively predicted rumination (B = 0.27, SE = 0.02, t = 11.36, $p < .001$). Furthermore, both emotion regulation difficulties (B = 0.080, SE = 0.022, t = 3.67, $p < .001$) and rumination (B = 0.32, SE = 0.04, t = 8.25, $p < .001$) significantly and positively predicted loneliness. The significance of the indirect effects was assessed using 5,000

bootstrap resamples. The results indicated that all indirect effects of psychological resilience on loneliness were significant: the individual indirect effects through emotion regulation difficulties (B = -0.13, BootSE = 0.04, 95% CI [-0.20, -0.06]) and rumination (B = -0.05, BootSE = 0.02, 95% CI [-0.09, -0.004]), as well as the serial indirect effect through emotion regulation difficulties and rumination (B = -0.14, BootSE = 0.02, 95% CI [-0.19, -0.10]) (Table 2).

Table 2. Regression coefficients for the serial mediation model.

	Emotion Regulation Difficulties						**Rumination**						**Loneliness**					
Predictor	B	SE	t	p	95% Bca CI		B	SE	t	p	95% BCa CI		B	SE	t	p	95% BCa CI	
					LL	UL					LL	UL					LL	UL
Constant	70.5	2.30	30.69	<.001	65.98	75.01	14.06	2.04	6.91	<.001	10.06	18.07	3.06	1.71	1.79	.07	-.30	6.42
Gender	1.45	1.20	1.21	.23	-.90	3.80	-.20	.59	-.34	.74	-1.36	.96	-.41	.47	-.87	.38	-1.33	.51
PR	-1.59	.11	-13.88	<.001	-1.81	-1.36	-.14	.07	-2.10	.04	-.28	-.01	.05	.05	.98	.33	-.05	.16
ERD							.27	.02	11.36	<.001	.23	.32	.08	.02	3.67	<.001	.04	.12
Rumination													.32	.04	8.25	<.001	.24	.40
R^2	.32						.36						.30					
F	99.59 (p<.001)						79.76 (p<.001)						45.54 (p<.001)					

Unstandardized beta coefficients are reported. The effect of gender was controlled for.; ERD: Emotion Regulation Difficulties; PR: Psychological Resilience; BCa CI: Bias-Corrected and Accelerated Confidence Interval; SE: Standard Error; LL: Lower Limit; UL: Upper Limit; Bootstrap sample size: 5,000..

Discussion

his study examined the serial mediating roles of emotion regulation difficulties and rumination in the relationship between psychological resilience and loneliness. The findings revealed that the total effect of psychological resilience on loneliness was significant, whereas the direct effect was no longer significant when emotion regulation difficulties and rumination were included in the model. Furthermore, the individual and serial indirect effects through emotion regulation difficulties and rumination were significant. These findings suggest that the relationship between psychological resilience and loneliness may be linked to emotional and cognitive processes, such as emotion regulation difficulties and rumination.

First, the correlation analyses revealed a significant negative relationship between psychological resilience and loneliness. This result is consistent with previous research identifying psychological resilience as a protective characteristic against loneliness (Southwick et al. 2014, Kalisch et al. 2017, Troy et al. 2023). Individuals with higher levels of psychological resilience are known to appraise stressful life events in more functional ways, cope more effectively with interpersonal difficulties, and maintain their psychological well-being (Kalisch et al. 2017). However, the finding that the direct effect of psychological resilience on loneliness was no longer significant after the mediators were included in the model indicates that a substantial portion of this relationship may be explained by psychological processes such as emotion regulation difficulties and rumination. This suggests that the relationship between psychological resilience and loneliness may be closely linked to individuals' tendencies to regulate negative emotional experiences and to think repetitively about these experiences. The association of psychological resilience with emotion regulation difficulties, and of emotion regulation difficulties with rumination and loneliness, indicates that a substantial portion of the observed relationship between psychological resilience and loneliness may be explained by these emotional and cognitive processes. From this perspective, psychological resilience may be considered a broader psychological resource associated with loneliness, whereas emotion regulation difficulties and rumination may represent more proximal psychological processes within this relationship. This finding also aligns with recent studies reporting that rumination mediates the relationship between psychological resilience and loneliness (Çağlar et al. 2025). The finding that psychological resilience negatively predicted emotion regulation difficulties supports its protective role in emotional self-regulation processes (Diehl et al. 2022, Mastrokoukou et al. 2024). According to Kalisch et al.'s (2017) Positive Appraisal Theory, psychologically resilient individuals can reappraise stressful life events more flexibly and manage the impact of negative emotions more successfully. Similarly, Troy et al. (2023) noted that psychological resilience relies substantially on effective emotion

regulation processes. Recent research conducted with university students also indicates that psychological resilience strengthens emotion regulation skills, thereby enhancing psychological adjustment (Li and Zheng 2025). Thus, this finding suggests that the relationship between psychological resilience and loneliness may be closely linked to individuals' emotion regulation processes.

The finding that emotion regulation difficulties significantly and positively predicted rumination is also consistent with theoretical expectations. According to Response Styles Theory, individuals who cannot effectively regulate their negative emotions become more prone to thinking repetitively about these experiences (Nolen-Hoeksema 1991, Nolen-Hoeksema et al. 2008). Emotion regulation difficulties are thought to be associated with the maintenance of negative cognitive content and the persistence of ruminative thinking. This finding is also supported by meta-analyses demonstrating that the relationship between emotion regulation difficulties and repetitive negative thinking is consistent across cultures and samples (Schäfer et al. 2017, Patrichi et al. 2025).

Another important finding of the study is that both emotion regulation difficulties and rumination significantly predicted loneliness. This result supports the finding that loneliness cannot be explained solely by the quantity of social relationships and that how individuals appraise and process their social experiences is also important (McKenna-Plumley et al. 2023). Individuals who struggle to regulate their emotions are known to perceive negative interpersonal experiences more intensely, whereas those who engage in ruminative thinking continually reprocess these experiences mentally (Cacioppo and Hawkley 2009). This process may contribute to individuals perceiving their existing social support as inadequate and to the persistence of feelings of loneliness over time. Indeed, the meta-analysis by Patrichi et al. (2025) demonstrated that loneliness showed moderate and consistent associations with both emotion regulation difficulties and rumination.

The findings may also be considered in relation to the developmental period represented by the sample. The university years involve important developmental changes, including becoming relatively independent from one's family, establishing new social relationships, restructuring close relationships, exploring one's identity, and assuming greater individual responsibilities. Although these changes offer individuals new social opportunities, they may also provide an important context for loneliness because of changes in existing social ties and the need to adapt to new social environments. Psychological resilience is regarded as an important psychological resource for coping with the academic, social, and interpersonal difficulties encountered during this period, whereas emotion regulation difficulties and rumination are thought to be linked to the persistence of negative experiences associated with these difficulties.

The central finding of this study is that emotion regulation difficulties and rumination serially mediate the relationship between psychological resilience and loneliness. This finding indicates that the effect of psychological resilience operates through sequential emotional and cognitive processes rather than through a single mechanism. Although a substantial proportion of previous research has examined pairwise relationships among psychological resilience, emotion regulation, rumination, and loneliness, studies considering these variables jointly within sequential mechanisms remain scarce. Accordingly, the present study makes an important contribution to the literature by explaining the psychological processes underlying loneliness within a more comprehensive model. From a theoretical perspective, the findings indicate that Gross's (2015) Process Model of Emotion Regulation and Nolen-Hoeksema's (1991) Response Styles Theory provide complementary explanations. Difficulties in emotion regulation lead to the persistence of negative emotions, while processing these emotions ruminatively may lead individuals to appraise their social experiences more negatively and experience heightened perceptions of loneliness. Furthermore, the finding that the model comprising psychological resilience, emotion regulation difficulties, rumination, and the covariate explained 30% of the variance in loneliness indicates that the psychological processes examined in this study account for a substantial proportion of the variance in loneliness. However, the substantial proportion of unexplained variance also suggests that loneliness is a multidimensional construct that extends beyond individual emotional and cognitive characteristics.

Based on these findings, interventions targeting loneliness among university students may benefit from addressing psychological processes such as psychological resilience, emotion regulation skills, and

ruminative thinking alongside increasing social interaction. Indeed, a recent systematic review indicated that interventions targeting psychological processes such as cognitive reappraisal, coping skills, and, in some approaches, emotion regulation may contribute to reducing loneliness (Birken et al. 2026).

Despite its strengths, this study has several limitations. Its cross-sectional design precludes definitive conclusions regarding causal relationships among the variables. In particular, although the serial mediation model tested in this study is based on a theoretically proposed sequence involving psychological resilience, emotion regulation difficulties, rumination, and loneliness, cross-sectional data do not allow the temporal ordering of these variables to be verified. Therefore, the observed indirect effects should not be interpreted as reflecting a causal process, and the possibility of relationships operating in alternative directions should also be considered. Future research employing longitudinal designs that assess the variables at different time points and compare alternative mediation models may contribute to a better understanding of the temporal relationships among these variables. Furthermore, assessing all variables using self-report scales at the same time point means that the measurements rely on participants' subjective perceptions and appraisals and introduces the possibility of common method bias. Future research may benefit from supplementing self-report measures with other data sources, such as behavioral assessments, peer reports, or experience sampling methods.

The sample's exclusive inclusion of university students recruited through convenience sampling limits the generalizability of the findings to other age and sociodemographic groups. Furthermore, the predominance of female participants (74.4%) is another limitation that should be considered regarding the generalizability of the findings across genders. Although gender was included as a covariate in the analyses, future research is encouraged to retest the model using more heterogeneous samples with a more balanced gender distribution and representation from different universities and sociodemographic groups.

Conclusion

The findings of this study indicate that the relationship between psychological resilience and loneliness among university students is linked to emotion regulation difficulties and rumination. However, loneliness may also be associated with variables not included in this model, such as perceived social support, social network characteristics, attachment styles, and psychological flexibility. Incorporating these variables into the model and comparing alternative models in future research will contribute to a more comprehensive understanding of loneliness. Furthermore, longitudinal studies assessing the variables at different time points will allow the temporal ordering, which cannot be verified using cross-sectional data, to be tested. Reexamining the model across different age groups and in samples with a more balanced gender distribution is also important for assessing the generalizability of the findings. Finally, intervention studies aimed at enhancing psychological resilience and emotion regulation skills or reducing rumination are expected to clarify the practical relevance of these processes for loneliness.

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