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Study engagement in university students: A longitudinal study

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ABSTRACT Study engagement plays a crucial role for students' negative and positive academic outcomes which is related to various factors. This study investigated the associations among university students' study engagement, school burnout, resilience, and self-regulation, as well as temporal changes and directional relationships between these variables. The sample comprised 362 undergraduate students (M = 21.93, SD = 2.58). Significant correlations were observed among all constructs at both Time 1 and Time 2. Findings from the cross-lagged panel analysis indicated a decrease in study engagement over time, with earlier engagement predicting subsequent increases in school burnout. School burnout also showed an upward trend and exerted a negative influence on later study engagement. Furthermore, self-regulation was found to increase across the two time points but demonstrated a negative association with resilience. In turn, resilience declined over time, while positively predicting self-regulation and negatively predicting study engagement. The implications of these findings are discussed with reference to the existing literature, along with recommendations for future research and educational practice.

Keywords: *Cross-lagged panel model, Resilience, School burnout, Self-regulation, Study engagement*

Üniversite öğrencilerinde çalışma bağlılığı: Boylamsal bir çalışma

ÖZ Çalışma bağlılığı, öğrencilerin hem olumlu hem de olumsuz akademik sonuçlarında kritik bir rol oynamakta olup çeşitli faktörlerle ilişkilidir. Bu çalışma, üniversite öğrencilerinin çalışma bağlılığı, okul tükenmişliği, psikolojik dayanıklılık ve öz-düzenleme düzeyleri arasındaki ilişkileri, zaman içerisindeki değişimlerini ve bu değişkenler arasındaki karşılıklı etkileşimleri incelemektedir. Araştırmanın katılımcılarını, yaş ortalaması 21,93 (SS = 2,58) olan 362 üniversite öğrencisi oluşturmuştur. Zaman 1 ve Zaman 2 ölçümlerinde tüm değişkenler arasında anlamlı korelasyonlar bulunmuştur. Çapraz zaman gecikmeli panel desen analizi, çalışma bağlılığının zaman içinde azaldığını ve öğrencilerin bağlılık düzeylerinin daha sonraki okul tükenmişliğini etkilediğini ortaya koymuştur. Ayrıca, okul tükenmişliğinin zamanla arttığı ve çalışma bağlılığını olumsuz etkilediği belirlenmiştir. Analiz, öz-düzenlemenin zamanla arttığını ancak psikolojik dayanıklılık üzerinde olumsuz bir etkisinin olduğunu, öte yandan psikolojik dayanıklılığın zaman içinde azaldığını fakat öz-düzenlemeyi olumlu, çalışma bağlılığını ise olumsuz yönde etkilediğini göstermiştir. Bulgular ilgili alanyazın çerçevesinde tartışılmış ve gelecekteki araştırmalar ile uygulamalara yönelik öneriler sunulmuştur.

Anahtar Sözcükler: *Çalışma bağlılığı, Çapraz zaman gecikmeli panel desen, Okul tükenmişliği, Öz-düzenleme, Yılmazlık*

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INTRODUCTION

Students' academic development is substantially shaped by the educational opportunities and support services offered within the school environment, as well as the quality of their interpersonal relationships with both peers and teachers. One of the important concepts in examining educational experiences is study engagement, which encompasses students' feelings, thoughts, and behaviors related to academic life. A growing body of literature conceptualizes study engagement as a study-related mental state that encompasses energy (vigor), involvement (dedication), and deep concentration (absorption) in academic tasks (Salmela-Aro & Read, 2017; Salmela-Aro & Upadyaya, 2012).

Study engagement includes the active participation of students in tasks or activities and the intensity of their involvement (Fredricks et al., 2004). Beyond academic connections, study engagement also encompasses a feeling of connectedness and identification with the school environment (Libbey, 2004). Highly engaged students exhibit intrinsic motivation-based behaviors such as dedicating time and effort to learning, attending classes regularly, and engaging in learning-related tasks (Siu et al., 2014). Moreover, intrinsic motivation influences both academic achievement and engagement (Law et al., 2012; Lee et al., 2010). This interaction can persist throughout a student's academic journey (Zyngier, 2008). Research suggests that sustained study engagement contributes to positive educational trajectories, particularly in terms of academic achievement (Şirin & Rogers Şirin, 2004) and adjustment (Chai et al., 2022).

This study aims to examine students' study engagement throughout a semester and how it is affected by, and in turn affects, specific variables. Additionally, the research seeks to understand the mechanisms underlying study engagement and offers practical suggestions for enhancing engagement and related factors.

Conceptual Background

The study of engagement has been a longstanding focus within educational and psychological research (Newmann, 1991). While early studies explored engagement through its cognitive, emotional, and behavioral dimensions (Appleton et al., 2006; Fredricks et al., 2004), more recent research approaches engagement within a comprehensive conceptual framework. This modern perspective, rooted in a person-centered approach, includes dimensions such as energy directed toward academic processes, dedication and absorption to academic tasks, and absorption in the tasks (Salmela-Aro & Upadyaya 2012).

Vigor is classified as a state of mind encompassing the work process, characterized by diligence and the ability to make high-energy decisions (Salmela-Aro & Read, 2017). Dedication relates to the meaningfulness and significance attributed to work, reflecting the cognitive component of study engagement (Upadyaya & Salmela-Aro, 2015). Absorption refers to a deep state of concentration in which individuals become fully immersed in a task, often losing awareness of time and their surroundings. The presence of each individual component enhances study engagement, while the simultaneous presence of all three denotes a consistent and purposeful involvement

Study engagement is a key predictor of critical academic outcomes such as early school leaving, graduation (e.g., high school graduation), and career transitions (Collie et al., 2025; Finn, 2006; Fraysier & Reschly, 2025). While study engagement supports positive academic and psychological outcomes, research indicates that negative attitudes towards school and low study engagement are associated with negative academic outcomes. Burnout, often considered as the opposite of engagement (Schaufeli et al., 2002), also emerges as an important concept in preventing negative educational outcomes and supporting positive academic behaviors.

Exposure to stressful conditions in academic and everyday life contexts may contribute to the

development of burnout among students. School burnout is conceptualized as a school-related condition characterized by exhaustion resulting from academic demands, cynicism toward school-related tasks and responsibilities, and a persistent sense of inadequacy in meeting academic expectations (Salmela-Aro et al., 2009). Burnout can occur due to the inconsistency between a student's expectations for their success and the expectations of peers and teachers (Fan & Hui, 2025; Ryan, 2001), as well as the pressure from excessive school demands (Yang & Farn, 2005). Symptoms of school burnout include difficulties with social skills, low academic achievement, and an increased risk of dropping out (Yang & Farn, 2005). Factors such as difficult choices, academic anxiety, and school-related stress can manifest as emotional fatigue, even in high-achieving students. Negative attitudes toward school may undermine students' sense of belonging, thereby heightening their vulnerability to school burnout. Higher education, in particular, is a critical period for young people (Salmela-Aro & Read, 2017). University students, who are close to completing their education, face unique stressors as they transition to working life. This phase can bring anxiety, including economic, relational, and professional concerns. During this time, intense worries about employment and academic performance can overwhelm students, making them more prone to academic burnout (Jagodics & Szabó, 2022; Shankland et al., 2018). Resilience, as a personal resource, has the potential to buffer against the detrimental consequences of school burnout.

People face and cope with difficult choices and experiences throughout their lives. Resilience refers to an individual's ability to effectively cope with and adapt to stressful or adverse conditions that may hinder developmental processes (Masten, 2014). Resilience is considered the capacity to become more adaptable after facing difficult experiences. In the context of university students, these experiences often include academic pressure, identity development challenges, uncertainty about future career paths, and the need to balance personal and academic responsibilities. Such challenges typically arise during their educational journeys, particularly in higher education. In the school context, resilience is considered as a coping process describing how students handle difficulties, threats, and failures related to academic tasks (Skinner & Wellborn, 1994). Some students effectively meet school expectations and adapt to challenging situations by leveraging their available resources. These adaptive skills influence students' engagement with school and education. Engagement serves as a powerful resource for students to cope with school-related difficulties by enhancing their motivation (Martin & Marsh, 2009). Highly engaged students are less affected by academic stressors and employ more constructive coping strategies, such as help-seeking. Such resilience may play a pivotal role in fostering students' persistence and sustaining their commitment to academic pursuits (Bagdžiūnienė et al., 2025).

The school context is regarded as an encouraging and protective environment for young people (Man et al., 2024). Nevertheless, university students are often confronted with a range of concurrent stressors—including rigorous academic demands, personal and interpersonal challenges, financial strain, student debt, and heavy course loads (Linden et al., 2023). These stressors can lead to psychological distress and diminished academic performance. Consequently, these challenges impact students' ability to continue their education and achieve academic success.

In academic settings, self-regulation facilitates students' capacity to strategically plan and allocate the resources necessary for successful learning. Self-regulation refers to an individual's ability to plan, carry out, and persist in behaviors that align with their personal goals (Brown et al., 1999) Conceptually, self-regulation entails a proactive learning process whereby individuals define goals and exert control over their cognitive processes, emotional engagement, and behavioral efforts (Pintrich, 2000). Poor self-regulation skills may undermine students' academic performance by reducing their sense of self-efficacy and contributing to unsuccessful learning outcomes (Fernandez-Rio et al., 2017; Shareefa et al., 2025). These negative outcomes can lead to more severe consequences, such as burnout. High self-regulation in academic contexts is linked not only to motivation and goal-directed behavior, but also to enhanced resilience through school support systems and reduced risk of school burnout. Furthermore, in examining the cognitive dimension of study engagement, self-regulation skills and effective learning strategies are considered essential components (Alam & Mohanty, 2024).

Emerging adulthood, which typically includes the university years, is characterized by rapid changes in identity formation, autonomy, goal setting, and the ability to manage academic and personal stressors (Arnett, 2000; Arnett, 2022). Because these developmental tasks require sustained motivation, effective self-regulatory capacity, and adaptive coping skills, study engagement, school burnout, resilience, and self-regulation become particularly dynamic during this stage. Engagement may fluctuate as students confront increasing academic demands and growing expectations for independent learning, while insufficient coping resources can lead to heightened burnout across the semester (Salmela-Aro & Read, 2017). At the same time, resilience and self-regulation serve as key protective mechanisms that help emerging adults maintain persistence, manage stress, and adapt to academic challenges (Masten, 2014; Pintrich, 2000). Longitudinal evidence further suggests that self-regulation and engagement influence one another over time, underscoring the developmental interdependence of motivational and self-regulatory processes in this period (Heikkinen et al., 2025). Therefore, examining the reciprocal relationships among engagement, burnout, resilience, and self-regulation within the developmental context of emerging adulthood offers a theoretically grounded framework for understanding fluctuations in students' academic adjustment.

Given the temporally sensitive nature of these processes, examining how academic and psychological factors change and interact over time provides meaningful insight into students' developmental trajectories. Longitudinal approaches are uniquely suited to capturing both intra-individual change and reciprocal influences among variables, enabling researchers to understand not only whether a variable changes, but how and why these changes unfold across critical academic periods (Hamaker et al., 2015; Wang et al., 2015). Designing the study with two time points across a single academic term is theoretically appropriate, as it reflects a period in which students commonly experience shifts in motivation, stress, and engagement—from the initial enthusiasm at the beginning of the term to heightened demands and potential strain toward its end.

The Current Study

According to available data, the percentage of higher education graduates in Turkey is lower than expected when compared to OECD (Organization for Economic Co-operation and Development) and other partner countries (OECD 2017). Turkey's early dropout rate from education is highest (27.5 % of young men and 25.8 % of young women) among the candidate countries (Eurostat, 2020). These statistics provide insight into students' school engagement rates. Although many factors contribute to school dropouts, such as personal, economic, and familial issues, the impact of school burnout should not be overlooked. School burnout can lead to dropout (Salmela-Aro & Upadyaya, 2012), with the dropout rate for students experiencing school burnout reported to be four times higher (Bask & Salmela-Aro, 2013). Student engagement emerges as a critical issue for early intervention to prevent factors that negatively affect academic and career development, such as school dropout, semester suspension, or continuous absenteeism. Therefore, enhancing students' interest and engagement in school and academic studies is crucial. Conversely, school burnouts have numerous negative consequences. While study engagement supports students' well-being and learning processes, school burnout has been associated with dropout and depression (Salmela-Aro, 2017; Zhang et al., 2025). Increasing students' engagement in school and work is critical to supporting both their career development and psychological well-being.

Resilience, encompassing dimensions such as social and academic competence, problem-solving ability, autonomy, and goal-directedness, is another factor that influences the experience of school burnout (Simonsen et al., 2025). Students who effectively use their personal and academic resources show higher resilience, experience less school burnout and maintain sustained engagement in school-related and work-related activities. The use of resources, students' self-regulation skills, and their effective use of cognitive processes affect their engagement and academic success. Examining these variables is important for strengthening engagement and reducing risk factors such as school burnout, low academic skills, and school absenteeism.

In selecting the variables of burnout, resilience, and self-regulation, the present study draws on

theoretical models that conceptualize study engagement as a dynamic process shaped by both academic demands and students' personal resources. Within the demands–resources framework (Bakker et al., 2014; Salmela-Aro & Upadyaya, 2014), school burnout represents a core *risk factor* that undermines engagement by reflecting the emotional cost of sustained academic pressure. In contrast, resilience and self-regulation function as *protective personal resources* that help students maintain motivation, manage challenges, and persist in academic goals (Heikkinen et al., 2025; Masten et al., 2025). These variables were therefore not chosen for descriptive purposes, but because theory and empirical evidence consistently highlight them as mechanisms through which engagement fluctuates across a semester. Considering these complementary roles, examining how these risk and protective factors jointly predict changes in study engagement aligns with contemporary developmental and motivational models and provides a comprehensive view of students' academic adjustment over time.

This study explores the roles of school burnout, resilience, and self-regulation as key factors that may impact university students' study engagement. Specifically, it investigates the changes in students' study engagement, resilience, self-regulation skills, and school burnout over a four-month period, as well as the relationships between these variables. Guided by the demands–resources framework (Bakker et al., 2014) and developmental perspectives on emerging adulthood (Arnett, 2022), the present study focused on study engagement as the central construct and examined how it develops and interacts with burnout, resilience, and self-regulation across a semester. Given evidence that university students often experience decreasing motivation and increasing strain toward the end of an academic term (Salmela-Aro & Read, 2017; Widlund et al., 2021), we first hypothesized that study engagement would decline from Time 1 to Time 2. Consistent with the demands–resources model, we further expected that higher engagement at Time 1 would protect against later burnout, whereas higher burnout would undermine subsequent engagement (Salmela-Aro & Upadyaya, 2014). Because resilience is conceptualized as a promotive personal resource that supports persistence and sustained effort, we hypothesized that resilience at Time 1 would positively predict engagement at Time 2 (Liu, 2024). Similarly, given the role of self-regulation in sustaining goal-directed academic behavior, we anticipated that self-regulation at Time 1 would positively predict later engagement (De La Fuente et al., 2020). Finally, considering theoretical models suggesting reciprocal processes among personal resources and motivational outcomes, we also examined whether engagement at Time 1 would predict changes in resilience and self-regulation over time. Taking together, these hypotheses place study engagement at the core of the longitudinal model and clarify how both risk factors (e.g., burnout) and personal resources (e.g., resilience, self-regulation) contribute to its development across an academic semester.

METHODS

Participants and Procedures

The study employed a convenience sampling method to recruit participants. A total of 540 students (Mage = 21.99 years; 85.9% female) completed the survey at T1 (February–March 2021). Four months after the initial data collection, the same participant group was recontacted for the second wave (T2, May–June 2021), and the longitudinal analysis was conducted with 362 students (Mage = 21.92; 91% female). The data were obtained through an online survey administered in 2021, necessitated by the pandemic and the shift to online education. All questionnaires were prepared using Google Forms, and the survey link was distributed to participants during their online courses at both time points. Ethical approval was obtained from the Ankara University Ethics Committee (Approval Code: 2021/3–38), and informed consent was collected from all participants.

The selection of February–March for T1 and May–June for T2 was theoretically grounded. Prior research shows that study engagement tends to be higher at the beginning of the semester and decreases toward the end as academic workload and exam pressure intensify, whereas burnout increases during this same period (Salmela-Aro & Read, 2017). Capturing these two key transition points therefore

provides a meaningful opportunity to observe within-semester change in engagement, burnout, resilience, and self-regulation. In addition, methodological work on longitudinal modeling highlights that the spacing of measurement occasions must align with the expected temporal dynamics of the psychological processes under study, as overly long intervals can obscure reciprocal effects and lead to incorrect inferences (Hamaker et al., 2015). For these reasons, a two-wave design within a single semester was deemed methodologically appropriate for the aims of the study.

Measures

Personal Information Form

In order to gather data regarding the participants' age, department and grade, approximate number of books at home, high school grade (100 scale) and information about the education level of the parents, a personal information form was used.

Study Engagement

Study engagement was assessed using the short version of the Utrecht Work Engagement Scale—Student Form (UWES-SF), originally developed by Schaufeli et al. (2002) and later adapted into a 9-item form encompassing three dimensions—vigor, dedication, and absorption—by Schaufeli and Bakker (2004). The items were answered on a 5-point Likert-type scale, ranging from never (1) to always (5). UWES-SF has shown adequate psychometric properties with Turkish students (Çapri et al., 2017). Cronbach's alpha coefficients demonstrated strong internal reliability across both time points: .91 at T1 and .92 at T2.

School Burnout

School burnout was assessed using the School Burnout Inventory (SBI), developed by Salmela-Aro et al. (2009). The inventory consists of 9 items and three dimensions (Exhaustion, cynicism and sense of inadequacy). Participants responded to the items using a five-point Likert scale, with response options ranging from 1 (strongly disagree) to 5 (strongly agree). Çam and Öğülmüş (2017) have provided evidence for the inventory's reliability and validity with Turkish students. The Cronbach alpha internal consistency coefficients for this study were 0.87 at T1 and 0.89 for T2.

Resilience

The Resilience Scale for Adults (Friborg et al., 2003) served as the instrument to assess individual resilience in this study. The Resilience Scale for Adults includes 33 items distributed across six dimensions: perception of self, perception of future, structured style, social competence, family cohesion, and social resources. The Turkish adaptation of the scale was conducted by Basım and Çetin (2011). Items were rated using a 5-point semantic differential scale, with each item anchored by two opposing descriptors at either end of the continuum. The Cronbach alpha internal consistency scores for this study were 0.88 at T1 and 0.89 for T2.

Self-Regulation

To measure self-regulation, the Self-Regulation Questionnaire (Brown et al., 1999) was utilized. Adapted to Turkish by Aydın et al. (2013), the scale includes 51 items and measures self-regulation through three dimensions: self-monitoring, self-evaluation, and self-reinforcement. Items were rated on a six-point Likert scale, with response options ranging from 1 (strongly disagree) to 6 (strongly agree). The Cronbach alpha internal consistency scores for this study were 0.90 at T1 and 0.91 for T2.

Data Analysis

First, the preliminary analyses were conducted using SPSS 25To explore the initial associations among the key variables, descriptive statistics and bivariate correlation analyses were performed for each time. Second, the relationships among school burnout, resilience, self-regulation and study engagement were examined using a cross-lagged analysis (Hamaker et al., 2015) with Mplus 8.0. In line with standard CLPM specifications, all variables measured at the same time point were allowed to covary rather than being linked through directional within-time paths. Because concurrent measurements do not provide temporal precedence, imposing directional effects among T1 or T2 variables would incorrectly imply a causal ordering that cannot be justified. Allowing covariances at each wave therefore offers an appropriate representation of their simultaneous associations while preserving the temporal interpretation of the cross-lagged paths (Little, 2013; Kline, 2016). The analyses were conducted using Maximum Likelihood Robust (MLR) estimation to account for non-normality in the data. As the data were collected via an online survey, there were no missing data.

Model fit was evaluated using multiple fit indices, in line with established recommendations (Kline, 2016). According to Hu and Bentler (1999), values greater than .90 for the Tucker-Lewis Index (TLI) and the Comparative Fit Index (CFI) indicate acceptable fit, while values of .95 or higher reflect a good fit. For the Root Mean Square Error of Approximation (RMSEA), values below .08 suggest acceptable fit, and values below .05 are indicative of a good fit.

RESULTS

Descriptive Statistics and Correlations among the Variables

The data analysis is completed in two steps. In the initial stage of the analysis, the study variables were examined using descriptive statistics (means and standard deviations) and Pearson correlation coefficients, the results of which are presented in Table 1.

Table 1.
Descriptive Statistics and Correlations (Pearson Coefficients) between Examined Variables

Variable	*n*	*M*	*SD*	Skewness	Kurtosis	1	2	3	4	5	6	7	8
1. Study Engagement T1	540	26.14	7.30	.18	-.43	-							
2. Study Engagement T2	366	23.73	7.28	.30	-.12	.67**							
3. School Burnout T1	540	23.27	7.48	.27	-.33	-44**	-40**						
4. School Burnout T2	366	26.46	8.04	.15	-.41	-38**	-52**	.65**					
5.Self-Regulation T1	540	181.38	19.32	-.20	.28	.51**	.34**	-47**	-.35**				
6. Self-Regulation T2	366	178.69	20.25	-.44	-.08	.45**	.49**	-37**	-.44**	.69**			
7. Resilience T1	540	123.63	16.89	-.32	-.26	.42**	.35**	-49**	-.36**	.64**	.50**		
8. Resilience T2	366	121.59	16.74	-.37	-1.46	.40**	.46**	-43**	-.46**	.49**	.64**	.78**	-

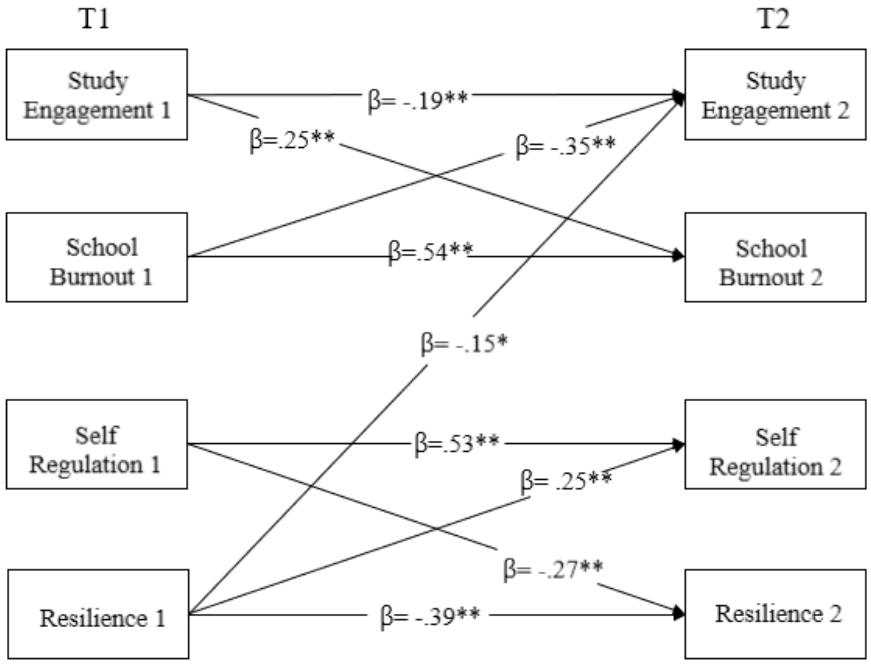
T1 = Time 1; T2 = Time 2; $^{**}p < .01$ $^{**}p < .01$, $^{*}p < .05$

The results indicated significant correlations between all variables at both Time 1 and Time 2. The correlations were positive and moderate for study engagement (r = .67), school burnout (r = .65), and self-regulation (r = .69) between T1 and T2. The correlation for resilience between T1 and T2 was positive and high (r = .78). Study engagement was positively related to self-regulation and resilience at both times and negatively related to school burnout at both times. Similarly, school burnout exhibited negative relationships with the other variables at both times. Pearson correlation coefficients are categorized as weak between .00 and .30, moderate between .40 and .70, and strong between .70 and 1.00 (Dancey and Reidy 2007).

Crossed-Lagged Analysis

Following the examination of descriptive statistics and bivariate correlations, the longitudinal associations among self-regulation, resilience, school burnout, and study engagement were tested through a cross-lagged path model. The model represented in Fig 1 which includes significant standardized path coefficients and excludes non-significant paths.

Figure 1.
Cross-Lagged Association Between Study Engagement, School Burnout, Self-Regulation and Resilience at Time 1 (T1) and Time 2 (T2)



Note. ** p < .001, *p < .01

The full model includes autoregressive and cross-lagged paths demonstrated an acceptable fit ($\chi 2$ = 6.059, df = 6, $\chi 2$/df = 1.059; RMSEA = 0.00; TLI = 1.00; CFI = 1.00). Although the fit indices indicated an excellent level of model fit (χ^2 = 6.059, df = 6, χ^2/df = 1.059, RMSEA = .00, TLI = 1.00, CFI = 1.00), such near-perfect values should be interpreted with caution in the context of two-wave cross-lagged models. Methodological research shows that CLPMs with only two time points and relatively simple structures tend to produce artificially high fit indices because of their limited degrees of freedom (Marsh et al., 2004). In the present study, the large sample size, the short interval between T1 and T2, and the increased homogeneity associated with pandemic-related online education may have further contributed to the exceptionally high global fit. Therefore, while these indices confirm that the model adequately represents the data, they should not be interpreted as evidence of a perfect developmental structure, but rather as a function of the model's parsimony and the measurement conditions under which the data were collected. All the autoregressive paths from T1 to T2 have found significant. The significant autoregressive coefficients were for study engagement (β = -.19**, p < .001), for school burnout is (β = .54, p < .001), for self-regulation is (β = .53, p < .001) and for resilience is (β = -.39, p < .001). The results show a low autoregression for study engagement and a medium autoregression for school burnout, self-regulation, and resilience.

The cross lagged paths from study engagement T1 to school burnout T2 were significant and positive (β = .25, p < .001), from school burnout T1 to study engagement T2 was significant and negative (β = -.35, p < .001). The paths from self-regulation T1 to resilience T2 were significant and negative (β = -.27, p < .001). Lastly the paths from resilience T1 to study engagement T2 was significant and negative (β = -.15, p < .001) and to self-regulation T2 was significant and positive (β = .25, p < .001).

Although some variables showed positive correlations at the bivariate level, several cross-lagged coefficients were negative when examined within the full structural model. This pattern is not uncommon in cross-lagged panel analyses, as the cross-lagged estimates reflect the unique predictive effect of each variable after controlling for autoregressive stability and the simultaneous influence of other predictors. When strong autoregressive paths are present—as in the current study—the remaining variance available for cross-lagged prediction is reduced, which may lead to changes in the direction or magnitude of the coefficients. In addition, the inclusion of multiple correlated predictors can produce suppression effects, whereby controlling for shared variance alters the sign of a regression coefficient. Prior methodological work has noted that such discrepancies between bivariate correlations and cross-lagged estimates do not indicate a model misfit but rather reflect the multivariate and temporal structure of CLPMs (Hamaker et al., 2015).

DISCUSSION

The present study employed a two-wave cross-lagged panel design to examine the temporal associations among study engagement, school burnout, self-regulation, and resilience during emerging adulthood. While this approach allows for the examination of directional relationships over time, it is important to acknowledge that a two-wave CLPM does not permit strong causal inferences. With only two measurement occasions, stable between-person differences cannot be fully disentangled from within-person change processes. Accordingly, the cross-lagged findings should be interpreted as indicative of temporal ordering and directional tendencies rather than definitive causal effects (Hamaker et al., 2015). Future studies using multi-wave longitudinal designs and random-intercept models may provide a more refined understanding of these developmental dynamics.

Consistent with Hypothesis 1, study engagement showed a decline across the semester, reflecting developmental and contextual patterns documented in recent longitudinal research (Heikkinen et al., 2025; Salmela-Aro & Read, 2017). From a developmental perspective, the university years correspond to emerging adulthood, a period characterized by increasing academic responsibility, future-oriented concerns, and heightened performance expectations, which may make students particularly sensitive to fluctuations in motivational resources (Arnett, 2022). As academic demands accumulate across the semester, sustaining engagement requires continuous cognitive and emotional investment, which may become increasingly difficult over time. Recent longitudinal evidence indicates that such cumulative demands are associated with normative declines in academic engagement and parallel increases in strain-related outcomes, including burnout and emotional exhaustion (Madigan et al., 2024). Within this context, the observed decrease in study engagement may reflect a situational and developmentally normative response to escalating academic demands, rather than an indicator of individual inadequacy.

Regarding Hypothesis 2, the cross-lagged effects between engagement and burnout highlighted a reciprocal process. The finding that initial engagement predicted subsequent burnout may indicate that students who begin the semester with high energy and strong academic investment may later encounter resource depletion, particularly under heavy workload or high-performance expectations. This interpretation aligns with motivational and resource-based models suggesting that sustained effort without adequate recovery increases vulnerability to burnout (Wang et al., 2015). Conversely, the negative effect of burnout on later engagement supports well-established evidence that emotional exhaustion, cynicism, and feelings of inadequacy undermine students' academic motivation and persistence (Salmela-Aro & Upadyaya, 2014). This bidirectional pattern suggests a self-reinforcing cycle in which it declines in engagement and increases in burnout accumulate over time.

In relation to Hypothesis 3, self-regulation exhibited moderate stability over time, consistent with evidence suggesting that self-regulatory behaviors develop gradually and remain relatively stable across short measurement intervals (Billen et al., 2023). However, the negative cross-lagged effect of self-regulation on resilience diverges from prior studies reporting positive associations between these

constructs (Artuch-Garde et al., 2017). One plausible explanation is that under conditions of sustained academic strain, self-regulation may entail substantial cognitive and emotional costs. When students are required to continuously plan, monitor, and control their learning behaviors in response to heightened demands, self-regulatory effort may function more as a compensatory process than as a protective resource. Recent evidence indicates that prolonged exposure to academic stressors, particularly in contexts characterized by limited structural and social support, can intensify psychological load and challenge students' adaptive coping capacities (Linden et al., 2023). Within the context of remote learning during the pandemic, students may have been compelled to intensify their self-regulatory efforts to manage academic responsibilities in the absence of structured learning environments and immediate feedback, such that high levels of self-regulation temporarily supported academic functioning while simultaneously straining resilience over time.

Turning to Hypothesis 4, resilience demonstrated the expected temporal stability over time (Kimhi et al., 2017) and positively predicted later self-regulation, consistent with theoretical perspectives suggesting that resilient individuals are better equipped to regulate emotions, mobilize coping resources, and maintain goal-directed behavior in the face of challenges (De la Fuente et al., 2014; Gardner et al., 2008). Unexpectedly, however, resilience negatively predicted subsequent study engagement. Rather than indicating maladaptive functioning, this finding may reflect an adaptive and context-sensitive regulation of effort. As academic demands intensify toward the end of the semester, students commonly experience heightened stress, uncertainty, and motivational fatigue (White, 2020). Under such conditions, resilient students may strategically reallocate their resources by prioritizing emotional balance, recovery, and longer-term adjustment over sustained academic investment. From this perspective, resilience may facilitate flexible adaptation to academic demands, even when such adaptation is accompanied by temporarily lower levels of observable engagement.

Overall, the findings highlight the dynamic interplay of risk (burnout) and protective (resilience, self-regulation) processes shaping changes in study engagement during emerging adulthood. Rather than functioning as static traits, these processes appear sensitive to contextual conditions such as academic workload and learning environments. This underscores the importance of intervention approaches that support students across the academic cycle, particularly during periods when engagement naturally declines and vulnerability to burnout increases.

Limitations and Future Directions

This study acknowledges several limitations. First, the research was conducted using a two-wave design, which may not adequately reflect the long-term trajectories and reciprocal effects among the variables. Future research employing extended longitudinal designs could provide a more in-depth understanding of these relationships. Second, the sample consisted predominantly of female participants, which may restrict the generalizability of the findings to more gender-balanced populations. Future studies should investigate these variables in more gender-homogeneous samples. Finally, self-reporting may introduce response bias, affecting the data with deviations.

The findings of the present study offer several practical implications for higher education institutions seeking to support students' academic engagement and well-being during emerging adulthood. First, given the normative decline in study engagement across the semester, universities may benefit from implementing periodic monitoring systems—particularly during mid- to late-semester periods—to identify students who may be at increased risk of declining engagement or burnout. Early identification may enable timely academic guidance and psychological support before difficulties intensify.

Second, intervention programs aimed at enhancing study engagement should place emphasis not only on increasing motivation and effort, but also on promoting sustainable study practices. The reciprocal relationship between engagement and burnout highlights the importance of helping students balance academic investment with adequate recovery, rather than encouraging persistent high effort without regard to emotional and cognitive costs. Such approaches are consistent with evidence showing that

engagement-focused intervention programs are associated with positive educational outcomes, including improved attendance, reduced dropout risk, and sustained participation in educational activities (Sinclair et al., 2005).

Third, the findings related to self-regulation suggest that training programs should move beyond a sole focus on planning, monitoring, and goal-setting skills. While self-regulation is essential for academic success, excessive reliance on effortful control under high academic demands may strain students' adaptive resources. Accordingly, self-regulation interventions may be most effective when combined with components that foster flexibility, emotional regulation, and opportunities for rest and recovery.

Finally, the results concerning resilience indicate that resilience does not necessarily manifest as continuous high academic engagement. Support services should therefore recognize adaptive fluctuations in students' academic involvement and encourage flexible adjustment of engagement levels in response to contextual demands. Counseling services, academic advising, and faculty mentoring can play a key role in helping students interpret temporary declines in engagement as manageable and reversible, rather than as indicators of individual failure.

CONCLUSIONS

The findings of this study offer valuable insights into the experiences of Turkish university students, while also highlighting the global relevance and widespread nature of the issue. Students' positive orientation towards academic factors declines during the semester, leading to negative outcomes such as school burnout. School burnout has become an increasingly prevalent issue in educational settings, with numerous studies identifying a growing trend among students. Prior research indicates that risk factors—such as school dropout and absenteeism—are inversely associated with student study engagement (Li & Xue, 2023; Szabó et al., 2025). Thus, enhancing student engagement is crucial for early intervention and prevention of factors that negatively affect academic and vocational life, such as school dropout, taking breaks, and continuous absenteeism. Therefore, increasing students' engagement in school and work is critical to supporting both their career development and psychological well-being. Study engagement is also influenced by resilience, a construction that includes goal orientation, autonomy, problem-solving ability, and competence in both academic and social domains (Waxman et al., 2003). Students who effectively use their personal and academic resources show higher resilience, experience less school burnout, and exhibit higher engagement in school. Examining these variables is essential for strengthening study engagement and reducing risk factors such as school burnout, low academic skills, and school absenteeism.

This study contributes to the field of educational psychology by offering empirical insights into the dynamic interplay among key psychological constructs during the period of emerging adulthood. The findings emphasize the interconnected nature of study engagement, school burnout, self-regulation, and resilience, illuminating how changes in one area may precipitate shifts in others over time. Notably, the significant cross-lagged paths indicate a complex interplay where factors like burnout and resilience not only persist but also reciprocally influence each other, shaping students' academic experiences. For example, the positive effect of early school burnout on later study engagement underscores potential cumulative risks that may hinder long-term academic commitment, while the resilience to self-regulation path suggests possible protective effects. These results highlight the enduring role of social-emotional factors in student development, supporting a holistic approach within educational psychology.

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TÜRKÇE GENİŞLETİLMİŞ ÖZET

Bu çalışma, üniversite öğrencilerinin akademik yaşantılarına yönelik duygusal, bilişsel ve davranışsal bağlılıklarını ifade eden çalışma bağlılığının (study engagement) zaman içerisindeki değişimini ve bu değişimin okul tükenmişliği, yılmazlık ve öz-düzenleme becerileriyle ilişkisini boylamsal bir desenle incelemektedir. Öğrencilerin derslere, okula ve akademik sorumluluklara olan bağlılıkları hem akademik başarıları hem de psikolojik iyi oluşları açısından önemli bir gösterge olarak değerlendirilmektedir (Salmela-Aro & Read, 2017). Bununla birlikte, üniversite yılları boyunca artan akademik yük, geleceğe ilişkin belirsizlikler ve çeşitli çevresel stresörler, çalışma bağlılığında azalmaya; tükenmişlik, devamsızlık ve hatta okul terki gibi olumsuz sonuçlara yol açabilmektedir (Schaufeli vd., 2002). Bu nedenle, çalışma bağlılığının kısa bir dönem içerisinde nasıl değiştiğinin ve hangi bireysel ve akademik süreçlerle ilişkili olduğunun anlaşılması, öğrencilerin akademik ve ruhsal iyi oluşunu desteklemek açısından önem taşımaktadır.

Çalışmada ele alınan değişkenler; okul tükenmişliği, yılmazlık ve öz-düzenleme becerileridir. Okul tükenmişliği, öğrencilerin akademik talepler nedeniyle yaşadığı duygusal yorgunluk, duyarsızlaşma ve yetersizlik duygularıyla tanımlanan, okul temelli bir tükenmişlik biçimidir (Salmela-Aro vd., 2009). Yılmazlık, bireylerin gelişimlerini tehdit eden güçlükler ve olumsuzluklar karşısında uyum sağlayabilme ve toparlanabilme kapasitesini ifade etmektedir (Masten, 2014). Öz-düzenleme ise öğrencinin kendi öğrenme sürecini planlama, izleme ve değerlendirme becerisini içeren, hedefe yönelik ve bilinçli bir süreçtir (Pintrich, 2000). Özellikle genç yetişkinlik döneminde, öğrencilerin akademik yaşama ilişkin tutumları ve bu tür bireysel başa çıkma kaynakları, uzun vadeli akademik ve mesleki gelişim açısından belirleyici bir rol oynamaktadır. Bu bağlamda, araştırma üniversite öğrencilerinin çalışma bağlılığını sürdürebilmeleri için hangi bireysel faktörlerin risk ve hangilerinin koruyucu rol oynadığını ortaya koymayı amaçlamaktadır.

Araştırma kapsamında, 2021 yılının Şubat–Mart aylarında (Zaman 1) ve Mayıs–Haziran aylarında (Zaman 2) olmak üzere iki ölçüm dalgasında veri toplanmıştır. İlk aşamada 540, ikinci aşamada ise 362 öğrencinin verilerine ulaşılmıştır ($\bar{X}$ = 21,92; %91 kadın). Veriler çevrim içi anket yoluyla toplanmış ve çalışma bağlılığı, okul tükenmişliği, yılmazlık ve öz-düzenleme düzeyleri, Türkçe uyarlama çalışmaları yapılmış geçerli ve güvenilir ölçme araçlarıyla değerlendirilmiştir (Çapri vd., 2017; Çam ve Öğülmüş, 2017; Basım ve Çetin, 2011; Aydın vd., 2013). Değişkenler arasındaki ilişkileri incelemek için önce betimsel istatistikler ve Pearson korelasyonları hesaplanmış, ardından çapraz zaman gecikmeli panel modeli (cross-lagged panel model; CLPM) kullanılarak zamanlar arası nedensel yönelimler test edilmiştir (Hamaker vd., 2015). Kurulan model iyi düzeyde uyum indeksleri vermiştir ($\chi 2/df$ = 1,059; RMSEA = ,00; CFI = 1,00; TLI = 1,00).

Bulgular, öğrencilerin çalışma bağlılığında dönem boyunca belirgin bir azalma olduğunu ortaya koymuştur. Dönem başında akademik içeriklere yönelik enerji, adanmışlık ve yoğunlaşmanın daha yüksek olduğu, dönem sonunda ise bu olumlu duygu, düşünce ve davranışların zayıfladığı görülmüştür. Bu sonuç, alanyazında çalışma bağlılığının dönem ilerledikçe azaldığını gösteren bulgularla uyumludur (Salmela-Aro & Read, 2017). Ayrıca, çalışma bağlılığı ile okul tükenmişliği arasında çift yönlü bir ilişki saptanmıştır. Dönem başında yüksek çalışma bağlılığı sergileyen öğrencilerin dönem sonunda daha yüksek düzeyde okul tükenmişliği yaşadığı; buna karşılık, yüksek okul tükenmişliğinin de sonraki dönemde çalışma bağlılığını olumsuz yönde yordadığı bulunmuştur. Bu karşılıklı etki, öğrencilerin yüksek motivasyon ve yüksek beklentilerle başladıkları dönemin, yoğun akademik talepler karşısında zaman içinde tükenmişliğe dönüşebileceğine ve tükenmişliğin de bağlılığı giderek aşındırabileceğine işaret etmektedir (Salmela-Aro & Upadyaya, 2014).

Öz-düzenleme ve yılmazlık değişkenleri, iki zaman noktası arasında orta düzeyde bir kararlılık göstermiştir. Çapraz gecikmeli sonuçlar, öz-düzenlemenin sonraki dönemde yılmazlığı olumsuz yönde yordadığını ortaya koymuştur. Bu beklenmedik bulgu, verilerin COVID-19 pandemisi döneminde, çevrim içi eğitim koşullarında toplanmış olmasıyla ilişkilendirilebilir. Öğrencilerin yüz yüze etkileşim

ve sosyal destekten görece yoksun olduğu bu dönemde, akademik sorumlulukları sürdürmek için yoğun öz-düzenleme çabasına ihtiyaç duymaları, psikolojik kaynaklar üzerinde ek bir yük oluşturmuş ve yılmazlık algılarını zayıflatmış olabilir (White, 2020). Buna karşılık yılmazlık, zaman içinde görece sabit bir yapı sergilemiş; sonraki dönemde öz-düzenlemeyi olumlu, çalışma bağlılığını ise olumsuz yönde yordadığı bulunmuştur. Yılmazlığın çalışma bağlılığını olumsuz yönde etkilemesi, özellikle dönem sonuna yaklaşıldıkça öğrencilerin akademik içeriklere yönelik olumlu duygularında ve içsel motivasyonlarında yaşanan düşüşlerle ilişkili olabilir; bu durumda öğrenciler, bağlılığı sürdürmek yerine öncelikle duygusal dengeyi ve başa çıkma süreçlerini korumaya odaklanıyor olabilirler.

Elde edilen bulgular, üniversite öğrencilerinin akademik süreçlerinde karşılaştıkları zorluklarla nasıl başa çıktıklarını ve bu süreçlerin zaman içinde birbirini nasıl etkilediğini anlamak açısından önemli katkılar sunmaktadır. Çalışma bağlılığının desteklenmesi, okul tükenmişliğinin azaltılması ve öz-düzenleme becerilerinin güçlendirilmesi, öğrencilerin akademik başarı ve psikolojik iyi oluşlarını artırabilecek temel müdahale alanları olarak öne çıkmaktadır. Aynı zamanda yılmazlık ve öz-düzenleme gibi bireysel kaynakların kısa zaman aralıklarındaki değişimini anlamak, yükseköğretim kurumlarının, öğrencilerin dönem başı ve dönem sonu yaşantılarını dikkate alan, gelişimsel açıdan duyarlı destek programları tasarlamasına katkı sağlayabilir. Sonuç olarak bu çalışma, çalışma bağlılığı, okul tükenmişliği, öz-düzenleme ve yılmazlık arasındaki dinamik ilişkileri boylamsal bir bakış açısıyla ortaya koyarak, genç yetişkinlik dönemindeki akademik deneyimlerin daha bütüncül bir biçimde anlaşılmasına önemli bir katkı sunmaktadır.