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Predictors of Cognitive Failures: Media Multitasking and Fear of Missing Out

Bilişsel Hataların Yordayıcıları: Medya Çoklu Görevi ve Gelişmeleri Kaçırma Korkusu

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ABSTRACT

Objective: This study examined how cognitive failures encountered in daily life vary depending on the frequency of multitasking and the fear of missing out (FoMO).

Method: Using a correlational cross-sectional design, the study included data from 315 participants aged 18-35 (Mage = 20.69, SD = 3.05) who completed the Cognitive Failures Questionnaire, the Short Media Multitasking Measure, the Social Media Multitasking Scale, and the Fear of Missing Out Scale. The data were analyzed using Pearson correlation and hierarchical multiple regression. In the regression model, age and daily time spent on social media were included as control variables.

Results: Cognitive failure scores showed significant positive correlations with daily time spent on social media ($r = .19$, $p < .001$), media multitasking frequency ($r = .30$, $p < .001$), academic-social media multitasking frequency ($r = .30$, $p < .001$), and FoMO ($r = .30$, $p < .001$). Hierarchical regression results indicated that fear of missing out ($\beta = .206$, $p < .001$), media multitasking frequency ($\beta = .197$, $p < .001$), and academic-social media multitasking frequency ($\beta = .171$, $p = .003$) together accounted for 17% of the variance in cognitive failures (adjusted $R^2 = .170$). FoMO emerged as the strongest predictor of cognitive failures, followed by media multitasking frequency and academic-social media multitasking frequency.

Conclusion: The findings suggest that cognitive failures are more strongly associated with media use motivations such as FoMO, and with the context of media use, such as multitasking behaviours, rather than with the amount of time spent on social media.

Keywords: Cognitive failures, media multitasking, fear of missing out

ÖZ

Amaç: Bu araştırmada günlük hayatta karşılaşılan bilişsel hataların medya çoklu görev sıklığına ve gelişmeleri kaçırma korkusuna bağlı olarak değişimi incelenmiştir.

Yöntem: İlişkisel kesitsel desen kullanılarak yürütülen araştırmaya Bilişsel Hatalar Ölçeği, Medya Çoklu Görev Ölçeği, Sosyal Medya Çoklu Görev Ölçeği ve Gelişmeleri Kaçırma Korkusu Ölçeğini dolduran 18- 35 yaşları arasında (Ort.yaş = 20,69, SS = 3,05) 315 katılımcının verisi dahil edilmiştir. Veriler, Pearson korelasyon analizi ve hiyerarşik çoklu regresyon analiziyle incelenmiştir. Regresyon modelinde yaş ve günlük sosyal medya kullanım süresi kontrol edilmiştir.

Bulgular: Bilişsel hata puanları ile günlük sosyal medya kullanım süresinin ($r = ,19$, $p < ,001$), medya çoklu görev sıklığının ($r = ,30$, $p < ,001$), akademik-sosyal medya çoklu görev sıklığının ($r = ,30$, $p < ,001$) ve gelişmeleri kaçırma korkusunun ($r = ,30$, $p < 0,001$) anlamlı yönde pozitif ilişkisi olduğu gösterilmiştir. Regresyon analizi sonucunda gelişmeleri kaçırma korkusunun ($\beta = ,206$, $p < ,001$), medya çoklu görevi sıklığının ($\beta = ,197$, $p < ,001$) ve akademik-sosyal medya çoklu görev sıklığının ($\beta = ,171$, $p = ,003$) birlikte bilişsel hata puanlarındaki varyansın %17'sini açıkladığı görülmüştür (düzeltilmiş $R^2 = ,170$). Bilişsel hataların en büyük yordayıcısının gelişmeleri kaçırma korkusu olduğu saptanmış olup ardından sırasıyla medya çoklu görev sıklığı ve akademik-sosyal medya çoklu görev sıklığı gelmiştir.

Sonuç: Bulgular, bilişsel hataların sosyal medyada geçirilen süreden ziyade, gelişmeleri kaçırma korkusu gibi medya kullanım motivasyonları ve çoklu görev davranışları gibi kullanım bağlamlarıyla daha güçlü biçimde ilişkili olduğunu göstermektedir.

Anahtar sözcükler: Bilişsel hatalar, medya çoklu görevi, gelişmeleri kaçırma korkusu

Introduction

Cognition is an abstract construct that encompasses a set of mental functions such as perception, attention, memory, thinking, and problem-solving (Goldstein 2013; Solso et al. 2018). Cognitive skills are essential abilities that enable individuals to maintain functional performance in daily life. Cognitive capacity can show limitations depending both on individual differences and situational factors. For instance, working memory capacity is one of the core cognitive processes that play a critical role in intelligence and other cognitive abilities (Goldstein 2013: 255–259). However, this capacity may fluctuate due to factors such as sleep deprivation (Frenda and Fenn 2016), attentional lapses (Unsworth and Robison 2016), fatigue (Chen et al. 2021), or environmental distractors (Rodrigues and Pandeirada 2015). A significant portion of these distractors consists of social media platforms, which have increasingly become integrated into daily life with the widespread use of smartphones.

Today, living without technology is nearly impossible. One of the leading reasons for this is that technological

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developments and internet tools facilitate various aspects of our lives. The use of these tools is becoming more widespread each day, and both the frequency and duration of use are increasing at individual and societal levels. In Türkiye, internet use among individuals aged 16–74 was reported as 82.6% in 2021, and this rate increased to 88.8% by 2024 (TÜİK 2021, 2024). While such developments contribute positively to daily life, they also bring negative consequences. The emergence of concepts such as smartphone addiction, problematic internet use, and technology addiction—and the growing number of studies examining these issues—reflect this concern. The effects of internet and technological tools on cognitive performance have also become an important line of inquiry. In particular, technology-related interruptions, attentional distraction, and instant notifications create conditions conducive to cognitive failures and reduce productivity (Montag and Markett 2023). In the study by Andrews et al. (2015), participants were found to check their phones an average of 85 times per day and use them for approximately 5 hours daily. More than half of these interactions (55%) lasted less than 30 seconds, indicating that individuals check their phones frequently but in very short intervals throughout the day. One study showed that frequent phone checking, rather than screen time, increased cognitive failures (Hartanto et al. 2023); another study demonstrated that frequent checking and smartphone addiction predicted the hostility subscale of an aggression measure, whereas screen time did not predict any of the aggression subscales (Khoo and Yang 2021). Taken together, these findings suggest that the behavior of checking a phone frequently and briefly—rather than the total duration of phone use—may negatively affect not only cognitive functions but also emotional processes. In addition, findings from studies examining the relationship between sleep quality—which is directly related to cognitive processes—and the use of media devices are noteworthy. One such study found that in the relationship between smartphone addiction and cognitive failures, sleep quality was more important than sleep duration, and that higher self-regulation ability may have a protective effect (Hong et al. 2020). Another study reported that as addiction to social networking sites increased, sleep quality decreased, which in turn increased cognitive failures (Xanidis and Brignell 2016).

Several studies have shown that beyond intensive interaction with online environments, even the mere presence of technological devices that provide access to these environments can affect cognitive performance (Tanil and Yong 2020, Niu et al. 2022, Skowronek et al. 2023). Tanil and Yong (2020) found that participants who had their smartphones placed face-down on the desk during a computer-based working memory task demonstrated lower recall accuracy compared to participants without their phones present. Similarly, Niu et al. (2022) reported that individuals in the smartphone-present group performed with lower accuracy and longer reaction times on an operational span task. These authors also suggested that avoiding smartphones is the most effective way to enhance focus and productivity during highly demanding cognitive tasks such as academic work (Niu et al. 2022). Consistent with these findings, Skowronek et al. (2023) interpreted their results as evidence that the mere presence of smartphones consumes limited cognitive resources, resulting in reduced cognitive performance. The negative effects of technology and media tools on cognitive processes have also been shown to impair academic performance (Sana et al. 2013, Carrier et al. 2015, Wang et al. 2025). In one study, participants who engaged in multitasking on their laptops during a lecture not only reduced their own academic performance but also negatively affected the performance of nearby classmates within their line of sight (Sana et al. 2013). Another study demonstrated that excessive information overload experienced by university students through media tools led to mental fatigue and cognitive exhaustion, which in turn caused impairments in attentional focus and information processing, ultimately lowering academic performance (Wang et al. 2025). The same study emphasized that self-control plays a moderating role in the relationship between information overload and cognitive exhaustion, indicating its importance in managing the negative consequences associated with intensive social media use.

One of the key concepts highlighted in the literature concerning the impact of media tools on cognitive performance is multitasking behavior. Multitasking is broadly defined as carrying out two or more tasks simultaneously. In this context, consuming multiple content streams or media inputs at the same time is referred to as media multitasking (Ophir et al. 2009). Media multitasking is examined not only in terms of the frequency of this behavior but also with regard to the nature of the simultaneous tasks it includes. In studies focusing on behavioral frequency, participants are often categorized as heavy media multitaskers (HMM) or light media multitaskers (LMM) based on the intensity of their media multitasking behaviors (Ophir et al. 2009, Minear et al. 2013, Hadlington and Murphy 2018). In one study, individuals who engaged in heavy media multitasking showed weakened attentional filtering abilities, which reduced their task-switching and information-processing performance (Ophir et al. 2009). Another study found that heavy media multitasking was associated with impulsivity and lower fluid intelligence, although no significant impairments were observed in attention or task-switching performance (Minear et al. 2013). In a different study, heavy media multitaskers reported more cognitive failures than light media multitaskers (Hadlington and Murphy 2018). A related review further noted that engaging intensely in multitasking behaviors is associated with cognitive impairments such

as decreased memory performance and may also negatively affect academic performance during learning (Uncapher et al. 2017).

When examined in terms of the nature of the tasks performed simultaneously, two types of multitasking can be identified. The first involves engaging in two media-related activities at the same time. As defined by Ophir et al. (2009), this form of media multitasking includes, for example, watching television while listening to music, browsing social media, or sending messages (Baumgartner et al. 2017). In many studies investigating media multitasking, the measurement tools used focus on assessing how frequently different media are used concurrently (Ophir et al. 2009, Baumgartner et al. 2017). Ophir et al. (2009) asked participants to report their weekly frequency of using 12 different types of media and to indicate how often they used other media simultaneously while using each type. Similarly, Baumgartner et al. (2017) measured media multitasking using a short scale consisting of nine items such as listening to music, sending messages, or using social media while watching television. Rosen et al. (2013b), in their Media and Technology Usage and Attitudes Scale, assessed multitasking tendencies using four general items adapted from Poposki and Oswald's (2010) Multitasking Preference Inventory, including statements such as "When doing a number of assignments, I like to switch back and forth between them rather than do one at a time." In sum, instruments designed to measure media multitasking typically focus on identifying individuals' tendencies to engage in simultaneous use of multiple media tools or their preferences for such activities.

The second type of media multitasking involves performing a media-related activity concurrently with a non-media and typically academic task (Bowman et al. 2010, Wood et al. 2011, Junco 2012, van der Schuur et al. 2020, Mason et al. 2025). Examples of this behavior include using media for non-academic purposes during class, staying online on social media while completing assignments, or checking social media accounts while studying. Such media use that occurs during academic activities but serves non-academic purposes has been termed academic-media multitasking (van der Schuur et al. 2020). However, the literature also shows that behaviors corresponding to academic-media multitasking have been studied under various alternative labels. These include off-task multi-tasking (Wood et al. 2011), in-class multitasking (Junco 2012), non-lecture-related multitasking (Demirbilek and Talan 2018), and social media multitasking (Lau 2017). Although the terminology varies across studies depending on the context in which the behavior occurs, the core idea of academic-media multitasking is the use of media tools for purposes unrelated to the ongoing academic activity. In other words, when media multitasking occurs during an academic task, it refers not to "media-and-media" multitasking but rather to "academic-and-media" multitasking. To measure multitasking in academic settings, media multitasking scales are often adapted to academic contexts. For example, van der Schuur et al. (2020) adapted the Media Multitasking Index (Ophir et al. 2009) to academic situations and asked participants to report how frequently they engaged in non-academic activities such as using social media or listening to music during class or while doing homework. Similarly, Junco (2012) assessed students' frequencies of off-task multitasking behaviors during class, such as using social media, sending messages, making phone calls, or searching for information unrelated to the lecture. Burak (2012) examined a broader range of in-class multitasking behaviors, including social media use, messaging, phone calls, attending to other coursework, listening to music, and eating or drinking. Özer (2014) evaluated social media multitasking behavior using three items assessing students' tendencies to check social media accounts while studying or completing assignments. Deng et al. (2022) examined such behaviors based on the frequency of messaging and social networking during class. In the literature, the frequency of media or social media use during academic tasks is commonly referred to as "academic-media multitasking." However, because the Social Media Multitasking Scale used in the present study (Özer 2014) specifically assesses social media use during academic tasks, the behavior is referred to as academic-social media multitasking in this study to ensure conceptual consistency with the scale.

Although multitasking may appear to enable accomplishing more work in less time, researchers have noted that individuals actually require more time to reach the same level of performance on an academic task when multitasking (Bowman et al. 2010). In particular, during cognitively demanding academic activities, multitasking does not save time. A study conducted with university students showed that the academic use of social media did not significantly predict academic performance, whereas non-academic use of social media—such as for video games—and social media multitasking significantly and negatively predicted academic performance (Lau 2017). Studies examining academic-media multitasking have frequently focused on the relationship between this behavior and academic achievement, typically measured by overall grade point averages or grades in specific courses (Burak 2012, Junco 2012, Özer 2014, van der Schuur et al. 2020). Findings indicate that a substantial proportion of students engage in multitasking during class (Burak 2012) and that multitasking behaviors such as social media use and texting during lectures are associated with lower grade point averages (Junco 2012). Among these studies, academic-media multitasking has also been found to be associated with academic

performance as well as in-class attention levels (van der Schuur et al. 2020) and risky behaviors (Burak 2012). Multitasking during reading has been found to negatively affect comprehension of the text (Mason et al. 2025), and participating in non-academic digital activities during lectures has been shown to impair learning (Wood et al. 2011). Rosen et al. (2013a) observed middle school, high school, and university students in their home environments during a 15-minute study period. The results showed that students' attention drifted, on average, in less than six minutes after beginning their work, and they typically shifted to another activity. The most common distractors were social media, texting, and multitasking preference. The researchers also found that students who preferred multitasking were surrounded by more distracting technologies and were more prone to off-task behavior (Rosen et al. 2013a). A recent meta-analysis reported that smartphone-induced distraction during learning negatively affects lecture recall (Chen et al. 2025). Another meta-analysis showed that academic-media multitasking is weakly but significantly negatively associated with academic performance, and that inconsistencies in the literature highlight the need for further research on this topic (Cvetković et al. 2025).

As outlined above, while previous research has primarily focused on the association of academic-social media multitasking with academic outcomes—such as academic achievement, lecture comprehension, or reading comprehension—there are relatively few studies directly assessing its relationship with cognitive performance. One such study found that adolescents aged 11–18 who engaged in media multitasking while doing homework exhibited greater executive function deficits and performed more poorly in working memory, information processing, language, and mathematics (Martín-Perpiñá et al. 2019). Van der Schuur et al. (2020) examined the short- and long-term effects of academic-media multitasking among adolescents aged 11–15. Although academic-media multitasking was associated with academic performance in the short term, this relationship did not persist—either directly or indirectly—over the long term. In contrast, academic-media multitasking predicted increases in academic attention problems three to four months later. The authors noted that this finding is consistent with the hypothesis that frequent academic-media multitasking may lead adolescents to develop “scattered attention” during academic activities over time (Ophir et al. 2009, van der Schuur et al. 2015), suggesting that the scattered attention hypothesis may be generalized beyond media-media multitasking to include academic-media multitasking as well. These findings suggest that adolescents' repeated engagement in academic-media multitasking may lead to habitual patterns of attentional distraction, and the absence of an immediate impact on academic performance indicates that academic-media multitasking may negatively influence cognitive processes independently of academic outcomes (van der Schuur et al. 2020).

Another variable that has gained considerable attention in recent research on social media use is the fear of missing out (FoMO) (Przybylski et al. 2013, Elhai et al. 2025). Two key characteristics stand out in the definition of FoMO (Elhai et al. 2025). The first is a pervasive concern that others may be having rewarding experiences in one’s absence, and the second is the desire to stay continually informed about what others are doing (Przybylski et al. 2013). With the widespread use of smartphones, many studies on FoMO have assessed the construct specifically in relation to smartphone use. For instance, Balcı and Bal (2022) demonstrated a significant association between smartphone usage duration and FoMO and found that increases in FoMO predicted longer smartphone usage time. Montag and Markett (2023) found that individuals who did not use social media scored lower on both FoMO and cognitive failures. In the same study, among individuals who used social media, the tendency toward social networks use disorder was found to mediate the relationship between FoMO and cognitive failures. Li and Ye (2022) showed that FoMO increased procrastination via cognitive failures and that self-control moderated the relationship between FoMO and cognitive failures. Bakioğlu et al. (2023) reported that as FoMO increased among university students, cognitive flexibility decreased, and cognitive flexibility mediated the association between internet addiction and FoMO. FoMO has also been shown to be closely related to sensitivity to various distractors, such as the tendency to check social media, and media multitasking has been proposed as one potential coping strategy for managing FoMO (Popławska et al. 2021). Wu et al. (2025) found a positive relationship between FoMO and online social anxiety, which was partially mediated by procrastination and media multitasking behavior. Another study showed that FoMO was positively associated with academic-social media multitasking, which in turn increased cognitive distraction, and cognitive distraction was negatively associated with academic performance; these relationships were confirmed through structural equation modeling within the Stimulus–Organism–Behavior–Consequence framework (Zhao 2023). Additionally, a study found that increases in FoMO and depressive symptoms predicted higher levels of social media addiction, with FoMO emerging as the strongest predictor (Çağlayan and Arslantaş 2023). Individuals with higher FoMO have also been found to show greater impairments in cognitive performance when a smartphone is present in the environment (Niu et al. 2022).

The growing body of research on FoMO not only deepens our understanding of the construct but also raises new questions. For example, one study investigating variables associated with FoMO found that FoMO was positively

related to an interdependent self-construal, which typically emerges within collectivistic cultural contexts (Doğan 2019). In that study, participants whose interdependent self-construal was experimentally activated reported higher levels of FoMO than those in the control condition. This suggests that individual differences such as FoMO may be closely tied to sociocultural factors. Finally, in their review of the causes, symptoms, negative effects, and coping strategies related to FoMO, Tanhan et al. (2022) emphasized that FoMO negatively affects life satisfaction, psychological well-being, and academic–social functioning—particularly through social media use habits—and highlighted the need for awareness and intervention programs addressing this issue.

In the present study, the relationship between everyday cognitive failures and individuals' media multitasking, academic-social media multitasking, and FoMO was examined. Although numerous studies in the literature have focused on the associations between media or social media multitasking during academic tasks and FoMO with academic performance, only a limited number of studies have investigated how these two variables together relate to cognitive processes such as executive functioning (Martín-Perpiñá et al. 2019) and attention (van der Schuur et al. 2020). Moreover, these studies typically included adolescent samples aged 11–15 or 11–18, and academic achievement was often one of the outcome variables. Prior research indicates that the prefrontal cortex—the neural substrate of higher-order cognitive processes—continues to develop during adolescence (Arain et al. 2013, Konrad et al. 2013). Therefore, the present study aims to make a meaningful contribution to the literature by focusing on a young adult sample, by examining multitasking as two distinct dimensions (media–media multitasking and academic–social media multitasking), and by assessing all three variables (media multitasking, academic-social media multitasking, and FoMO) in relation to cognitive failures. Accordingly, the purpose of the present study is to examine the associations between daily time spent on social media, media multitasking frequency, academic-social media multitasking frequency, FoMO, and cognitive failures, and to evaluate the extent to which these variables predict cognitive failures. The hypotheses of the study are as follows: (H1) Daily time spent on social media, media multitasking frequency, academic-social media multitasking frequency, and FoMO are expected to be positively and significantly associated with cognitive failures. (H2) The regression model including media multitasking frequency, academic-social media multitasking frequency, and FoMO is expected to significantly predict cognitive failures.

Method

This study is part of a larger research project conducted to examine the cognitive, psychological, and social effects of technology and social media use. The research protocol was reviewed and approved by the Tekirdağ Namık Kemal University Scientific Research and Publication Ethics Board at its meeting dated 31 July 2019 (No: T2019-7). The ethical approval covers all measurement instruments and all procedures used in the study. Informed consent was obtained from all participants, who voluntarily agreed to take part in the research.

Sample

A total of 402 individuals participated in the study. The inclusion criteria were determined with consideration for the young adult period, during which cognitive abilities have substantially matured (Arain et al. 2013, Konrad et al. 2013) and age-related cognitive decline has not yet become evident (Hartshorne and Germine 2015), as well as the age range in which social media use is particularly intensive (Perrin 2015). Accordingly, the criteria for participation were being a university student or graduate between the ages of 18 and 35, voluntarily agreeing to participate and providing written informed consent, and completing at least 90% of the survey items. As part of the data cleaning process, participants who left more than 10% of the survey items unanswered (n = 71) and those identified as inattentive respondents by providing inconsistent responses to reverse-scored and regular items (n = 16) were excluded from the analyses. After this process, data from 315 participants were retained for analysis. The mean age of the included participants was 20.68 (SD = 3.05). One participant did not report gender; the final sample consisted of 100 males (Mage = 21.40, SD = 3.09) and 214 females (Mage = 20.34, SD = 2.98).

Procedure

The data were collected using a paper-and-pencil method prior to the full COVID-19 lockdowns. Data collection was carried out both in groups within classroom settings and individually. In group administrations, participants completed the questionnaires in a quiet environment in classrooms at Tekirdağ Namık Kemal University over a period of approximately one hour. The purpose of the study was briefly explained to the participants, and they were informed about the importance of responding to all items honestly. They were then asked to read and sign a written informed consent form and were given the opportunity to ask questions. In individual administrations, participants received the same information and were asked to complete the survey in a quiet, distraction-free

environment. Regardless of whether participation occurred individually or in groups, all participants took part in the study on a voluntary basis. Additionally, participants were eligible to enter a tablet raffle as compensation for their participation.

As the study was part of a broader research project, the questionnaire form consisted of multiple scales. To ensure that participants' initially higher motivation—and potential decreases in attention or increases in fatigue in later sections—did not systematically influence their responses or introduce confounding bias, the order of the scales was counterbalanced across five versions of the questionnaire. Once data collection was completed, all questionnaire responses were first entered into Excel, checked for accuracy, and then screened for missing, inconsistent, or inattentive responses, following the procedures described in the data cleaning section.

Measures

Demographic and Social Media Use Information Form

This form was used to collect participants' demographic information, the frequency of their social media use, and their preferred social media platforms.

Cognitive Failures Questionnaire (CFQ)

In this study, the CFQ was used to assess everyday cognitive failures, which served as the dependent variable. The scale was originally developed by Broadbent et al. 1982 and was adapted into Turkish by Şenkal et al. 2015. The scale consists of 25 items assessing perception–concentration, memory, attention, and motor functioning, and is rated on a five-point Likert scale. Total scores range from 0 to 100. The original validation study reported an internal consistency coefficient of .89 and a test–retest reliability of r = .82 (Broadbent et al. 1982). In the Turkish adaptation study, the internal consistency coefficient for the total score was .91, and the test–retest reliability was r = .54 (Şenkal et al. 2015). In the present study, the total score was used, and Cronbach's alpha was calculated as .91.

Short Media Multitasking Measure (MMM-S)

The Short Media Multitasking Measure was used to assess one of the predictor variables, media multitasking behavior. Developed by Baumgartner et al. 2017, the scale contains nine items assessing different combinations of simultaneous media use, with prompts such as "While watching television, how often do you… listen to music / send messages on a computer or phone / use social networking sites?" Each item is rated on a four-point Likert scale ranging from 1 = never to 4 = very often. Baumgartner et al. 2017 reported that the mean score of the nine items may be used as an indicator of media multitasking frequency. In their study with adolescents aged 11–18, the internal consistency coefficient was .88. In the present study, Cronbach's alpha was calculated as .73.

Social Media Multitasking Scale (SMMS)

This scale was used to assess academic-social media multitasking, one of the predictor variables in the present study. Academic-social media multitasking refers to not pausing one's social media use while engaged in academic tasks such as studying or doing homework. Developed by Özer 2014, this three-item scale includes statements such as: "I multitask with my social media account while studying; I have social media sites up while doing homework; I do not check my social media account if I am doing my work for school", rated on a five-point Likert scale. Lau (2017) reported that the scale has a unidimensional structure and a Cronbach's alpha coefficient of .719. In the present study, Cronbach's alpha was calculated as .81. The scale was preferred due to its brevity and ease of administration, as well as evidence showing that students frequently engage with technological distractors such as social media and messaging during academic activities (Rosen et al. 2013a).

Fear of Missing Out Scale (FoMOS)

This scale was used to assess fear of missing out, defined as the concern that others may be having rewarding experiences in one's absence and the desire to stay continuously informed about others' activities. Developed by Przybylski et al. (2013), the scale consists of 10 items rated on a five-point Likert scale. The Turkish adaptation by Gökler et al. (2016) reported a Cronbach's alpha coefficient of .81. In the present study, Cronbach's alpha was calculated as .80.

Control Variables

Research indicates that time spent on social media affects both mental health (Fardouly et al. 2018) and cognitive performance (Poles 2025). Although age-related cognitive decline typically becomes evident in later

adulthood (Heiskanen et al. 2024), some studies have shown that declines in specific cognitive domains may begin even in the twenties and thirties (Salthouse 2009). Additionally, age has been shown to moderate the relationship between technology use and cognitive processes (Matthews et al. 2022). Based on these findings, age and daily time spent on social media were included as control variables in the analyses.

Statistical Analysis

The data were analyzed using SPSS, and the level of statistical significance was set at .05. Before conducting the analyses, missing or inconsistent responses were identified, and data cleaning procedures were carried out as described below. Subsequently, the assumptions of the statistical analyses used to test the hypotheses were examined, and once these assumptions were met, the analyses required for hypothesis testing were performed.

After entering the data from 402 participants, data cleaning procedures were conducted to enhance data quality. First, participants who left items unanswered or who did not complete a questionnaire were excluded from the analyses. For this purpose, if the proportion of missing items in any questionnaire exceeded 10% relative to the total number of items, that participant's data were removed from the dataset (Bennett 2001). When item-level missing data were examined for each scale included in the analyses, it was noted that even a single missing item in the nine-item Short Media Multitasking Measure (MMM-S) or the three-item Social Media Multitasking Scale (SMMS) would exceed the 10% threshold; therefore, these scales were required to contain no missing items. Subsequently, participants who left two or more items blank on the ten-item FoMO Scale and those who left three or more items blank on the 25-item Cognitive Failures Questionnaire (CFQ) were also excluded (n = 71). This reduced the sample size to N = 331. Finally, participants who were deemed to have responded carelessly or inconsistently were removed from the dataset. To detect such cases, responses to the SMMS—which contains both regular (items 1 and 2) and reverse-coded items (item 3)—were inspected. Participants who responded to regular and reverse-coded items in the same direction (n = 16) were excluded from the analyses.

The dataset for the included participants (N = 315) contained at most one missing item on the FoMO Scale and at most two missing items on the Cognitive Failures Questionnaire (CFQ), and these proportions remained below 10% of each scale's total items. For this reason, a missing data analysis was conducted. Results showed that Little's MCAR test for the FoMO was nonsignificant ($\chi^2(72) = 78.17$, $p = .289$), indicating that the missing values were randomly distributed. Accordingly, mean substitution was applied without the need for further item-level inspection. In contrast, Little's MCAR test for the CFQ was significant ($\chi^2(357) = 407.659$, $p = .033$). Following this result, missing items were examined individually. Even the item with the highest level of missingness had only 1.3% missing responses—well below the commonly accepted 5% threshold—and overall missing data remained under 10% (7.1%) relative to the full scale. Considering these indicators, mean substitution was deemed an appropriate method for handling the missing values (see Tabachnick and Fidell 2007).

The dependent, predictor, and control variables included in the regression model were determined based on the study's theoretical framework and previous empirical findings. Cognitive failures were selected as the dependent variable. Media multitasking, academic–social media multitasking, and fear of missing out were included as primary predictors given prior evidence demonstrating their associations with cognitive failures. Age and daily social media use were added as control variables to account for their potential confounding effects, given their known associations with cognitive performance and media use patterns.

Prior to testing the study hypotheses, the data were first examined to determine whether the assumptions required for parametric analyses were met. The dataset met the assumptions necessary for conducting a parametric correlation analysis. For the hierarchical regression analysis, scatterplots were inspected to assess the relationship between the dependent variable and each independent variable to be included in the model, and these examinations indicated a linear relationship. The assumption of multicollinearity among the independent variables was also evaluated using VIF values, which ranged from 1.040 to 1.231, indicating that multicollinearity was not a concern. The Durbin–Watson statistic (2.044) suggested the absence of autocorrelation. Regarding normality, skewness (.391) and kurtosis (.356) values, along with visual inspection of the histogram and Q–Q plots, indicated that the distribution approximated normality.

In order to test the correlational hypothesis, Pearson's product–moment correlation coefficient was used to examine the associations between cognitive failure scores and daily time spent on social media, media multitasking frequency, academic–social media multitasking frequency, and fear of missing out. For the predictive hypothesis, a hierarchical multiple regression analysis was conducted. In this model, media multitasking frequency, academic–social media multitasking frequency, and fear of missing out were entered as

the primary predictor variables, whereas age and daily time spent on social media were included as control variables. In the first step, only the control variables were entered into the model; in the second step, the primary predictor variables were added in addition to the control variables.

After excluding participants who were removed during the data cleaning process (n = 87), a post hoc power analysis was performed using G*Power 3.1 (Faul et al. 2009) to assess the adequacy of the remaining sample (N = 315). The results of this analysis are reported following the presentation of the correlation and regression findings.

Results

The present study examined media multitasking frequency, academic–social media multitasking frequency, and fear of missing out (FoMO) as predictors of everyday cognitive failures. Participants' daily social media use was concentrated primarily in the 2–3 hour range (57%). While 18% of the participants reported spending approximately one hour per day on social media, 25% indicated that they used social media for four hours or more each day. Thus, one in every four participants spent at least four hours per day on social media. Given that this duration corresponds to nearly one-sixth of a day, it can be inferred that social media usage occupies a substantial portion of participants' daily lives. Examination of preferred social media platforms showed the following distribution: Instagram (91.1%), YouTube (87%), Twitter (now known as X) (54%), Facebook (41.6%), Snapchat (29.5%), other platforms (15.6%), and LinkedIn (7.9%). Descriptive statistics for the primary variables of the study are presented in Table 1.

Table 1. Descriptive statistics for the variables

Variables	N	M	SD	Minimum	Maximum
CFQ Total Score	315	40.75	15.16	0.00	98.00
MMM-S Mean Score	315	2.81	0.56	1.22	4.00
SMMT Mean Score	315	2.92	1.05	1.00	5.00
FoMO Total Score	315	24.79	7.44	10.00	49.00

CFQ: Cognitive Failures Questionnaire; FoMO: Fear of Missing Out Scale; MMM-S: Short Media Multitasking Measure; SMMS: Social Media Multitasking Scale

The correlation analysis conducted to test the correlational hypotheses of the study revealed significant positive associations, as expected, between cognitive failure scores and daily time spent on social media ($r = .19$, $p < .001$), media multitasking frequency ($r = .30$, $p < .001$), academic–social media multitasking frequency ($r = .30$, $p < .001$), and fear of missing out ($r = .30$, $p < .001$). These findings support the study's correlational hypothesis (H1). The full set of Pearson correlation coefficients and significance values for all variables is presented in Table 2.

Table 2. Correlation analysis results among variables

	CFQ	Age	SM Duration	MMS	SMMS	FoMO
CFQ	—					
Age	-.11	—				
SM Duration	.19***	–.20***	—			
MMM-S	.30***	–.13*	.30***	—		
SMMS	.30***	–.03	.28***	.30***	—	
FoMO	.30***	–.18**	.17**	.15**	.29***	—

*$p<.05$, **$p < .01$, ***$p < .001$; CFQ: Cognitive Failures Questionnaire; FoMO: Fear of Missing Out Scale; MMM-S: Short Media Multitasking Measure; SMMS: Social Media Multitasking Scale; SM Duration: Daily Time Spent on Social Media

Additionally, examination of the correlations among all variables included in the regression model indicated several noteworthy associations involving age. Specifically, age demonstrated significant negative correlations with daily time spent on social media, media multitasking frequency, and fear of missing out.

Based on the existing literature, the hierarchical regression analysis conducted in the present study entered the control variables (age and daily time spent on social media) in the first block and the independent variables (media multitasking, academic–social media multitasking, and fear of missing out) in the second block using the enter method, in which all variables in each block are entered simultaneously. The analysis examined the extent to which these variables explained variance in everyday cognitive failures.

In the first block, the model including the control variables age and daily time spent on social media was statistically significant ($F(2, 312) = 6.66$, $p = .001$, Adjusted $R^2 = .035$). This indicates that the control variables accounted for 3.5% of the variance in cognitive failures. Daily time spent on social media significantly predicted cognitive failures ($\beta = .173$, $p = .002$), whereas age did not exhibit a significant effect ($\beta = –.076$, $p = .180$).

In the second block, media multitasking frequency, academic–social media multitasking frequency, and fear of missing out were entered simultaneously. The addition of these predictors increased the explanatory power of the model, which was also statistically significant ($F(5, 309) = 13.85$, $p < .001$, Adjusted $R^2 = .170$). Thus, with the inclusion of the independent variables, the total explained variance in cognitive failures increased to 17%, and this increase was statistically significant. In this model, fear of missing out emerged as the strongest predictor of cognitive failures ($\beta = .206$, $p < .001$), followed by media multitasking frequency ($\beta = .197$, $p < .001$) and academic–social media multitasking frequency ($\beta = .171$, $p = .003$).

Notably, daily time spent on social media—which had shown a significant effect in the first block ($p = .002$)—lost its significance after the three primary predictors were added to the model in the second block ($p = .477$). Overall, the hierarchical multiple regression results support the study's regression hypothesis (H2). Detailed results of the analysis are presented in Table 3.

Table 3. Results of the hierarchical regression analysis predicting cognitive failures

	Block 1		**Block 2**	
Variables	β	t	β	t
Age	-0.076	-1.344	-0.035	-0.650
SM Duration	0.173**	3.064	0.040	0.712
MMM-S	-	-	0.197***	3.551
SMMS	-	-	0.171**	2.999
FoMO	-	-	0.206***	3.771
F	6.657**		13.851***	
R	0.202		0.428	
R^2	0.041		0.183	
Adjusted R2	0.035		0.170	
ΔR^2	0.041		0.142	
ΔF	6.657**		17.925***	

**$p < .01$, ***$p < .001$; FoMO: Fear of Missing Out Scale; MMM-S: Short Media Multitasking Measure; SMMS: Social Media Multitasking Scale; SM Duration: Daily Time Spent on Social Media

A post hoc power analysis was conducted using G*Power 3.1 (Faul et al. 2009) to evaluate the adequacy of the sample size. For the smallest correlation coefficient observed in the correlation analysis ($r = .19$), statistical power was calculated as $(1–\beta) = .93$. For the hierarchical multiple regression model (Adjusted $R^2 = .170$; $f^2 = .205$), statistical power exceeded $(1–\beta) > .99$. These results indicate that the analyses conducted with the present sample demonstrated high statistical power.

Discussion

In this study, the relationships of cognitive failures with daily time spent on social media, media multitasking frequency, academic–social media multitasking frequency, and fear of missing out (FoMO) were first examined (H1). The correlation analysis revealed significant positive associations between everyday cognitive failures and daily time spent on social media, media multitasking frequency, academic–social media multitasking frequency, and FoMO. Examination of Pearson correlation coefficients indicated that these associations were generally small in magnitude and, in some cases, approached the lower boundary of the medium range according to Cohen's (1988: 79–80) classification (see Table 2). These findings support the correlational hypothesis (H1), suggesting that as daily time spent on social media, media multitasking, academic–social media multitasking, and FoMO increase, cognitive failures also increase. When considered from the perspective of multitasking behavior, this finding is noteworthy because it demonstrates that both media-media multitasking and academic–social media multitasking—defined as the maintenance of social media engagement during academic tasks—are positively associated with cognitive failures.

The hierarchical regression analysis also examined the role of age as a control variable, focusing on its associations with cognitive failures and the other study variables. The results indicated that age showed significant negative correlations with daily time spent on social media, media multitasking frequency, and FoMO. These results suggest that as age increases, individuals tend to spend less time on social media, experience lower levels of FoMO, and engage less frequently in simultaneous media use. Although not among the original hypotheses, this finding is noteworthy and aligns with the results of Çağlayan and Arslantaş (2023), who reported that social media dependency decreases with age.

In the first block of the hierarchical regression analysis, the model including age and daily time spent on social media was significant, accounting for 3.5% of the variance in cognitive failures. Although age did not

significantly predict cognitive failures, daily time spent on social media did, albeit with a small effect. The correlation analysis conducted for H1 similarly showed a positive and significant association between daily time spent on social media and cognitive failures ($r = .19$, $p < .001$). In the hierarchical regression model, this variable increased the explained variance by 3.5% when age was controlled, and it emerged as a significant predictor. This association may reflect the link between excessive engagement with media technologies and "information fatigue," which can contribute to errors in cognitive processing. Kiraz (2021) likens information fatigue to chronic exhaustion, describing it as characterized by distractibility, heightened urgency and pressure, and an overloaded, fatigued nervous system. However, when the independent variables—media multitasking frequency, academic–social media multitasking frequency, and FoMO—were entered into the model in the second block, the effect of daily time spent on social media became nonsignificant. This suggests that the variance in cognitive failures is explained not by the direct effect of daily time spent on social media but by the shared variance between social media use duration and the primary predictors. This finding is consistent with Lara and Bokoch (2021), who reported no significant relationship between social media use and cognitive processes such as working memory and inhibition. Similarly, Stieger and Wunderl (2022), in their large-sample study, found that abilities such as intelligence, spatial perception, and information processing were only weakly related to social media use patterns. Drawing on both previous literature and the current findings, it appears that variables associated with cognitive failures are more closely linked to why and how individuals use social media—specifically FoMO and multitasking patterns—rather than the amount of time spent using it. The model incorporating the predictors entered in the second block of the regression analysis further supports this interpretation.

In the second block, three predictor variables—media multitasking frequency, academic–social media multitasking frequency, and FoMO—were entered to the model. It was expected that each of these variables would independently predict everyday cognitive failures and that the full model including all three predictors would be significant (H2). The results supported the regression hypothesis: in Model 2, the explained variance in cognitive failures increased to 17%. These findings indicate that all three variables are significant predictors of everyday cognitive failures, with FoMO emerging as the strongest predictor. This result suggests that individuals who worry that others are experiencing rewarding events in their absence, who feel they are constantly missing out, and who experience ongoing anxiety about falling behind tend to make more cognitive failures in daily life. It is not surprising that FoMO exerts negative effects on cognitive processes. Previous research has documented both direct and indirect detrimental impacts of FoMO on cognition. For example, Niu et al. (2022) found that even the mere presence of a smartphone in the environment impaired cognitive performance, and this effect was more pronounced among individuals with high FoMO. Another study reported that when social media use was low, FoMO negatively predicted academic performance; however, this effect disappeared as social media use increased (Abd Ellatif Elsayed 2025). Przybylski et al. (2013) found that university students with higher FoMO were more likely to use Facebook during class. Drawing on such findings, Hadlington and Murphy (2018) suggested that FoMO may be one of the underlying drivers of media multitasking behavior. Montag and Markett (2023) showed that individuals who do not use social media experience lower FoMO and report fewer cognitive failures. In the same study, mediation analyses further revealed that the association between FoMO and cognitive failures was not primarily direct; instead, it was indirectly explained through tendencies toward problematic social network use. Particularly for the component of state FoMO—defined as situational, online-behavior–specific FoMO—the direct association with cognitive failures became nonsignificant, and the effect was entirely mediated by problematic social network use (Montag and Markett 2023). This pattern does not fully align with the present study's finding that FoMO directly predicts cognitive failures. This suggests that FoMO may be related to cognitive failures not primarily through a direct link, but rather indirectly by increasing excessive social media use.

In Model 2, the other predictors—ranked by their predictive strength—were media multitasking frequency and academic–social media multitasking frequency. Both forms of multitasking significantly explained variance in cognitive failures. This finding indicates that different types of multitasking behavior may contribute to an increase in everyday cognitive failures. The results are consistent with Ophir et al.'s (2009) study, which showed that individuals who engage heavily in media multitasking are more susceptible to interference from task-irrelevant stimuli and exhibit poorer performance when switching between tasks, likely due to reduced ability to filter out irrelevant information. Similarly, individuals who report high levels of multitasking have been shown to report more cognitive failures in daily life compared to those who multitask less frequently (Hadlington and Murphy 2018). A review by Van der Schuur et al. (2015) also demonstrated that, in studies using self-report measures, high levels of media multitasking were negatively associated with sustained attention and cognitive control in everyday life. However, the same review highlighted that when performance-based measures were used, media multitasking did not show significant associations with indicators such as working memory capacity,

task switching, or response inhibition. İmren and Tekman (2019) found that self-reported heavy media multitasking was negatively associated with sustained attention but positively associated with working memory performance. The researchers suggested that neural plasticity may play a role in the positive association with working memory. Specifically, because simultaneous use of multiple media devices requires switching between tasks as well as between the features of the media being used, this process may function as an exercise that supports working memory performance (İmren and Tekman 2019). Although this explanation does not align with the results of the present study, it parallels the "trained attention hypothesis," which posits that frequent switching across multiple media platforms may improve task-switching abilities and the filtering of irrelevant information (Van der Schuur et al. 2015, Ophir et al. 2009). Nevertheless, the broader literature suggests that empirical findings tend to support the scattered attention hypothesis—highlighting the negative effects of multitasking—rather than the trained attention hypothesis (Van der Schuur et al. 2015).

Research in the literature has indicated that academic tasks such as studying, problem-solving, and learning new material may impose higher cognitive load (Paas et al. 2003, Lin 2009). From this perspective, it could be expected that academic–social media multitasking generates greater cognitive load than media-media multitasking and, consequently, would show a stronger positive association with cognitive failures. In the present study, both media multitasking (β = .197) and academic–social media multitasking (β = .171) significantly predicted cognitive failures, and their predictive strengths were highly similar. Although the contribution of media multitasking was slightly higher, the difference was not statistically significant. This finding is surprising, as it runs counter to the common expectation that academic tasks place greater strain on the cognitive system and thus result in more cognitive failures. However, the small difference between the β coefficients indicates that the relationships of media multitasking and academic–social media multitasking with cognitive failures are at very similar levels. This indicates that cognitive failures may stem not only from the academic nature of the task being performed but also from the divided attention and task-switching costs inherent in multitasking itself (Ophir et al. 2009). The present study was able to make such a comparison because both types of multitasking were examined simultaneously within the same model.

In studies investigating the relationships between media and social media use and cognitive processes, numerous researchers have examined the cognitive correlates of FoMO (Li and Ye 2022, Niu et al. 2022, Bakioğlu et al. 2023, Montag and Markett 2023) and multitasking behaviors (Ophir et al. 2009, Minear et al. 2013, Hadlington and Murphy 2018, Martín-Perpiñá et al. 2019, van der Schuur et al. 2020, Marriner et al. 2025). Among these studies, some have focused on media multitasking (Ophir et al. 2009, Minear et al. 2013, Hadlington and Murphy 2018, Marriner et al. 2025), whereas others—particularly those conducted with adolescent samples—have investigated academic–social media multitasking (Martín-Perpiñá et al. 2019, van der Schuur et al. 2020). Beyond these, many studies examining academic–media multitasking has primarily explored its associations with academic performance (Junco 2012, Lau 2017), learning (Wood et al. 2011), and reading comprehension (Bowman et al. 2010). Therefore, it is considered important that the present study examines the relationship between academic–media multitasking and cognitive failures in a young adult sample, as it reveals that this behavior is associated not only with academic achievement but also with cognitive failures, which represent the everyday outcomes of cognitive processes.

In the present study, FoMO and multitasking were examined together within the same model as predictors of cognitive failures, and both types of multitasking were analyzed simultaneously. The results showed that both media multitasking and academic–social media multitasking significantly explained variance in cognitive failures. This suggests that multitasking imposes cognitive load regardless of the type of tasks between which individuals are switching. Furthermore, the fact that daily time spent on social media was significant in the first block but lost its significance once the predictor variables were added to the model suggest that the adverse effect on cognitive processes may stem less from the duration of social media use and more from how it is used (multitasking) and motivation for its use (FoMO).

In the limitrations of the study, first, when interpreting the findings of this study, it is important to note that the data were collected shortly before the COVID-19 pandemic—specifically, prior to the implementation of lockdown restrictions. Following the onset of full lockdowns and the transition to distance education, individuals' use of social media, digital streaming platforms, and messaging services increased dramatically (Sharma et al. 2020). Therefore, when considering the current findings, it is important to acknowledge that today's patterns of media and social media use may have shifted substantially, and these shifts may also influence the relationship between such behaviors and cognitive processes.

One of the major limitations of the present study is that the data was collected using a survey method. In research that uses self-report measures, participants may provide biased or inaccurate responses. To address

this limitation, in addition to self-report scales, observations by relatives and behavior-based measurements can be used in the assessment of variables related to multitasking and cognitive failures. Although using such methods—especially for assessing academic–social media multitasking—carries the risk of reduced sample sizes, these approaches can minimize subjective bias and provide more objective and reliable findings. The ecological validity of results derived from observational or performance-based measures is also likely to be higher. Regarding this issue, Doğan (2019) stated that in order to increase the ecological validity of FoMO related to social media use, using behavioral approaches instead of self-report–based measures would provide more reliable results. Indeed, self-reports do not always correspond to actual behavior. For example, Andrews et al. (2015) examined the extent to which self-reported data reflect actual smartphone usage and found that while individuals' estimates of their daily usage time were partially valid, their estimates of phone usage frequency were inconsistent with actual usage data. The researchers also highlighted the insufficiency of their sample and emphasized that self-reported estimates of smartphone use should be interpreted with caution in research (Andrews et al. 2015).

Another limitation is that FoMO was assessed as a unidimensional construct in the present study. Montag and Markett (2023) evaluated FoMO in two dimensions—trait and state FoMO—using the scale developed by Wegmann et al. (2017). This scale distinguishes FoMO both as a personality trait independent of social media (trait FoMO) and as a situation-specific construct experienced particularly in online environments (state FoMO). In their study, the relationship between FoMO and cognitive failures was mediated by tendencies toward problematic social network use, and this mediation effect emerged particularly for state FoMO. The same study also suggested that individuals with higher cognitive failure scores may be more likely to experience FoMO because greater cognitive failures may be associated with more difficulties in self-regulation (Montag and Markett 2023). Thus, when evaluating a psychological construct such as FoMO, it may be important to consider individual differences. Variables such as emotion regulation abilities can influence the relationship between different components of FoMO and cognitive processes. Moreover, the literature indicates that FoMO may vary across cultural contexts. Regarding this issue, Doğan (2019) has suggested that individuals with an interdependent self-construal—which is more common in collectivistic cultures—may experience higher levels of FoMO compared to individuals with an independent self-construal, which is common in individualistic cultures. In this regard, future models examining the relationship among multitasking, FoMO, and cognitive failures may also consider factors such as personality traits (Sutin et al. 2020), anxiety levels (Goodhew and Edwards 2024), and negative mood (Payne and Schnapp 2014).

The present study included participants aged 18–35, and older adults were not represented. Given that digital and media technologies are now widely used by older populations as well, research involving a broader age range has become increasingly noteworthy in the literature (Rosen et al. 2013b, Montag and Markett 2023). Considering the age-related decline in cognitive abilities, future studies may include participant groups spanning a wide age range to examine how the effects of such media tools on cognitive performance vary across the life span.

Finally, the correlational and predictive nature of the research design does not allow for causal conclusions. Understanding the causes of cognitive failures requires experimental designs. Uncapher et al. (2017) published a review on the cognitive, psychological, and neural effects of media multitasking, stating that such correlational findings should be carefully evaluated until the direction of causality is understood. Researchers have suggested that it is necessary to determine whether media multitasking causes behavioral and neural differences or whether individuals with such differences tend to multitask with media more frequently (Uncapter et al. 2017). Clarifying this requires studies that employ experimental methodologies.

Conclusion

The findings of this study indicate that, in addition to media use motivations such as FoMO, both media multitasking and academic–social media multitasking account for a portion of the variance in everyday cognitive failures. Notably, FoMO emerged as a stronger predictor for cognitive failures. The results suggest that, in order to understand the effects of media and social media use on cognitive processes, focusing on the motivations underlying this use and the types of multitasking contexts in which it occurs, rather than the duration of use, provides a comprehensive framework.

In this regard, future studies incorporating broader age ranges, behavioral and performance-based cognitive assessments in addition to self-report measures, and individual difference variables such as personality, emotion regulation, cultural factors, and distinct dimensions of FoMO will meaningfully advance the existing body of knowledge in the field. Furthermore, examining the effects of both technology-related multitasking behaviors

and the various subdimensions of FoMO on academic achievement and cognitive performance through experimental designs in future research may help develop a more comprehensive and generalizable understanding of the causes of cognitive failures.

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