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Exploring the relationship Between Cognitive Distortions and Cognitive Failure in College Students

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Abstract

Objective: This study aims to investigate the relationship between cognitive distortions and cognitive failures among college students. Specifically, it examines the direct relationship between cognitive distortions and cognitive failures and explores the predictive power of various cognitive distortion sub-components in relation to different cognitive failure components. Additionally, the study aims to explore differences in cognitive distortions and cognitive failures based on sex and academic major.

Method: Data were collected from a sample of 486 college students (240 males, 246 females) across different academic majors. Structural Equation Modeling (SEM) was used to analyze the direct and indirect relationships between cognitive distortions and cognitive failures, and to identify significant predictors. Differences based on sex and academic major were examined using appropriate statistical methods.

Results: The SEM analysis revealed a significant direct effect between cognitive distortions and cognitive failures. Several cognitive distortion sub-components, such as overgeneralization and magnification, were significant predictors of specific cognitive failure components, including memory lapses and attention deficits. The study also found significant differences in cognitive failures across academic majors, with some disciplines exhibiting higher levels of cognitive failures.

Conclusion: This study highlights a strong correlation between cognitive distortions and cognitive failures among college students. Cognitive distortions were found to directly influence cognitive failures, with certain sub-components playing a critical role in predicting specific cognitive errors. The findings underscore the importance of addressing cognitive distortions in educational settings, as targeted interventions may help reduce cognitive failures and improve overall academic performance.

Keywords: Cognitive distortions, cognitive failures, college students, Structural Equation Modeling, academic performance, Mental health, Wellbeing

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Introduction

College students in higher education face a variety of challenges that can significantly affect their academic performance and overall well-being. Among these challenges are cognitive distortions and cognitive failures, which can arise due to the demanding academic environment, the pressure to adapt to new learning styles, and the increasing use of technology (Abdelrheem, 2024; Hartanto et al., 2023; Mohamed et al., 2024). These factors may lead to difficulties with focus, memory recall, and decision-making (Roca et al., 2013). Furthermore, these cognitive challenges can significantly disrupt cognitive processes and shape students' beliefs about their own abilities (Buğa & Kaya, 2022). These issues, especially under academic pressure, often result in students struggling to meet deadlines, maintaining focus, and regulating negative emotions and irrational thoughts (Phelps., 2004). Such cognitive impairments create a feedback loop that not only strengthens cognitive distortions but also impairs overall academic performance and mental well-being (Buğa & Kaya, 2022; Tyng et al., 2017).

Cognitive distortion refers to irrational or biased thinking patterns that can lead students to misinterpret situations, reinforcing negative thoughts and emotions (Alford & Beck, 1997; Tauscher et al., 2023). Research has demonstrated that these distortions significantly impact emotional responses, often resulting in increased stress, anxiety, and depression. For example, individuals who engage in cognitive distortions may experience heightened anxiety as they catastrophize situations, predicting negative outcomes without any evidence to support their fears (Dhanalakshmi, 2015). This kind of negative thinking can create a constant state of worry, making individuals feel as if they are always in danger from exaggerated or unfounded threats (Hirsch & Mathews, 2012). Additionally, cognitive distortions can result in inaccurate interpretations of reality, which can negatively impact behavior and decision-making (Alford & Beck, 1997). These distorted mental patterns misrepresent facts and foster unfavorable feelings and beliefs (Dhanalakshmi, 2015). Consequently, they can negatively influence individuals' perceptions, beliefs, and actions, leading to unnecessary stress, anxiety, and depression, which in turn can increase cognitive failures.

Beck (1979) identified several key dimensions of cognitive distortions that significantly influence how individuals interpret their experiences, including catastrophizing, arbitrary inference, and overgeneralization. Catastrophizing involves making negative predictions about future events based on limited evidence (Hirsch & Mathews, 2012). For instance, someone might believe that failing one test means they will fail their entire course, which can lead to overwhelming anxiety. In addition to catastrophizing, arbitrary inference is another dimension of cognitive distortion that affects interpretation. This refers to drawing conclusions without sufficient evidence and often ignoring other possible explanations (Beck, 1979). For example, a person may interpret a friend's lack of response to a message as a sign of rejection, despite other reasonable explanations, such as the friend being busy. Moreover, overgeneralization represents another way cognitive distortions can mislead individuals. This occurs when individuals take one negative event and assume it will always happen in the future (Abdelrheem & Bendania., 2022; Alford & Beck, 1997; Mohamed & Bendania., 2024). For instance, a student who receives a low grade may conclude that they are not suited for their field of study, overlooking their previous successes. These cognitive distortions not only affect how individuals perceive themselves and their circumstances but also impact their relationships and overall life satisfaction. The reinforcement of negative thought patterns can lead to avoidance behaviors, social withdrawal, a diminished sense of self-efficacy, and lower academic achievement (Rachman & Shafran, 1999).

The literature offers substantial evidence into the effects of cognitive distortions across different populations. For instance, Brugman et al. (2024) examined the role of moral reasoning, moral value evaluation, and self-serving cognitive distortions in peer bullying among 522 adolescents from grades 1 to 4 in three public secondary schools in Spain. The findings revealed that bullies and bully-victims exhibited the lowest levels of moral judgment and the highest levels of self-serving cognitive distortions. Conversely, defenders and bystanders showed higher levels of moral judgment and lower levels of self-serving cognitive distortions. Furthermore, self-serving cognitive distortions were found to fully mediate the relationship between moral reasoning and bullying and partially mediate the link between moral evaluation and bullying.

In another study, Benhalilem & Hartani (2024) investigated the prevalence of cognitive distortions among college students, focusing on differences based on gender and educational level. The study found a moderate prevalence of cognitive distortion overall. While no significant gender differences were identified, there were differences based on educational level, indicating that cognitive distortions may vary with academic progression. Alwawi & Alsaqqa (2024) explored the prevalence of cognitive distortions in a sample of nursing students, identifying the most common types and examining how these distortions varied by sociodemographic factors. Among the 176 respondents, 5% exhibited severe cognitive distortions, 33% moderate, 47% mild, and 15% healthy levels of cognitive distortions. Emotional reasoning, perfectionist thinking, and "What if?" questioning were the most frequently observed cognitive distortions, while polarized thinking and overgeneralization were less common. The study also found that younger, first-year, and single students were more likely to exhibit higher levels of cognitive distortions.

Despite the important role of cognitive distortions in cognitive theory, there is a lack of research examining the specific mechanisms through which cognitive distortions impact subsequent cognitive failures. Cognitive failures refer to errors, slips, and lapses in cognitive functions (Carrigan & Barkus, 2016). This can manifest as forgetfulness, absent-mindedness, difficulties in concentration, attention, and perception (Lange & Süß, 2014). There are different forms of cognitive failures such as: forgetting appointments, misplacing items, or struggling to focus during lectures or studying. It is important to note that cognitive failures are not attributed to complex problem-solving challenges, lack of knowledge, or deficits in motor skills (Krems, 2014). Instead, they involve situations where students may forget important details, become easily distracted, or make errors in tasks they would normally complete accurately (Ekici et al., 2016).

Understanding cognitive failures is essential at college level because of its impact on educational functioning, productiveness, and wellbeing. Different studies showed that cognitive failures are related to excessive level of stress and anxiety (Dalgaard et al., 2014; Matthews et al., 1990), which have critical implications for students' mental health. Smith (2023) explored the connection between cognitive failure and emotional wellbeing by examining numerous components of emotional well-being, which include happiness, life satisfaction, positive affect, stress, anxiety, depression, and negative affect. The results showed that individuals with higher levels of negative well-being experienced more difficulties with memory, attention, and action. Even when considering established predictors of well-being in the analysis, the associations between negative well-being outcomes and cognitive failures remained significant. Therefore, the author concluded that high levels of negative well-being are associated with a higher frequency of cognitive failures. The same conclusion was previously reported by Payne & Schnapp (2014), who examined the relationship between cognitive failure and both negative and positive effects in a sample of 129 college students. The findings revealed that negative affective experiences were significantly correlated with failures of memory and attention on the Cognitive Failure Questionnaire (CFQ). In contrast, positive effects were negatively correlated with distractibility. These results provide additional evidence supporting the relationship between negative affective experiences and the reported frequency of problems on the cognitive failures questionnaire among college students.

Furthermore, cognitive failures are likely to hinder effective coping attempts among college students. This is required different efforts to improve situations where thinking doesn't go smoothly, such as studying or dealing with emotions, involve regaining control. Cognitive failures are mistakes in thinking, remembering, or understanding information. These mistakes can make it hard to see things clearly and function well (Kondracki et al., 2023). Studying how college students deal with these failures is important because it affects how they perform in school and other situations that require focus, such as taking notes, studying, reading, and taking exams. Therefore, it's important to understand how these mistakes affect students' ability to perform these tasks effectively.

There are several theoretical hypotheses that explain cognitive failures. One hypothesis suggests that cognitive failure occurs as lapses in attention, where individuals struggle to maintain focus on a task or stimulus (Roca et al., 2013). Another hypothesis focuses on memory lapses, where individuals forget important information or tasks (Meiran et al., 1994). A third hypothesis suggests that cognitive failure can arise from conflicts between automatic and controlled cognitive processes (Wickens et al., 2008). Lastly, cognitive failures can also be influenced by individuals' metacognitive beliefs and strategies, such as unrealistic optimism or overconfidence in memory abilities (Mirzaee et al., 2021).

Although substantial research has explored cognitive distortions and cognitive failures independently, there remains a critical gap in examining the relationship between these constructs, particularly in college students within the Kingdom of Saudi Arabia. Given the increasing academic demands and unique sociocultural contexts, understanding this relationship is essential for enhancing academic performance and psychological well-being between college students.

Understanding the connection between cognitive distortions and cognitive failures is vital for several reasons. First, cognitive distortions may impair an individual's ability to process and comprehend essential information, which can contribute to attention lapses—a key form of cognitive failure. Second, cognitive distortions often involve exaggerated beliefs about oneself, others, or the world, leading to strong emotional reactions such as anxiety or frustration. These emotional responses may reduce cognitive resources, leaving fewer available for tasks that require attention, memory, or decision-making, thereby hindering cognitive performance. Cognitive distortions thus have the potential to create vulnerabilities that increase the likelihood of cognitive failures in areas such as thinking, memory, decision-making, and attention (Roca et al., 2013; Wickens et al., 2008).

Purpose of the current study

Building on the theoretical frameworks and addressing gaps identified in the literature, this study aims to explore several key relationships between cognitive distortions and cognitive failures in college students. First, it seeks to explore the direct link between cognitive distortions and cognitive failures, focusing on how maladaptive thought patterns may lead to frequent cognitive lapses in everyday situations. Second, the study examines the predictive power of specific cognitive distortion sub-components, such as catastrophizing and overgeneralization, in relation to distinct types of cognitive failures. Third, it investigates whether significant differences in cognitive distortions and failures exist across demographic variables such as sex and academic major. Finally, the study aims to understand the mediating role of cognitive distortions in the relationship between cognitive failures and academic performance. By addressing these objectives, this research contributes to a more nuanced understanding of how cognitive patterns influence cognitive functioning and academic outcomes.

Method

Participants

The current study has been followed the ethical standards outlined by the American Psychological Association (APA) for conducting research involving human subjects. Every participant who took part in the current study signed an informed consent form. Data were collected from 486 (240 males) participants, from public universities at KSA (Mean age =20.3 years, SD =0.9). Participant recruitment took place during the summer term (213) of 2021–2022. Participants come from different majors. Prior to data collection, participants were informed about the study's purpose and procedures through an online survey. Informed consent was obtained from all participants, who were given the option to

either agree to participate ('Yes') or decline ('No'). This ensured that participants were fully aware of their involvement and had the opportunity to make an informed decision regarding their participation in the study.

Study Tools and Measurements

Cognitive Distortions Scale (CDS): The Cognitive Distortions Scale (CDS), developed by the author, is a psychological tool designed to measure various aspects related to cognitive distortions. The CDS consists of 19 items organized into three dimensions: (1) Arbitrary interferences (6 items), which refers to the type of thinking pattern where individuals draw conclusions without sufficient evidence or logical reasoning; (2) Catastrophizing (7 items), reflecting the tendency to blow things out of proportion and assume that the worst possible outcome will occur; and (3) Overgeneralization (6 items), which involves drawing broad conclusions based on limited evidence or isolated incidents. Respondents use a Likert-type scale ranging from 1 (Not applicable at all) to 5 (fully applicable) to rate their agreement with each item. Scores on the scale range from 19 to 95. The scale has demonstrated satisfactory psychometric properties (Table 1).

Tab. 1. Reliability coefficients for CDS and their components

Dimension	α coefficient	ω coefficient
Arbitrary interference	.788	.795
Catastrophizing	.732	.742
Overgeneralization	.784	.788
CDS	.830	.832

Additionally, Confirmatory Factor Analysis (CFA) was conducted to validate the proposed three-factor structure of the CDS. The goodness-of-fit indices indicated an acceptable fit: $\chi2$ = 448.85, p <.001 CMIN/DF. = 2.053; NFI =.886; CFI =.943; IFI =.945; RMSEA =.054. These findings highlight the psychometric validity and goodness of the CDS in assessing cognitive distortions within the studied population.

Cognitive Failure Questionnaire (CFQ) is a widely used tool for assessing cognitive failure across three distinct dimensions (Rast et al., 2008; Walles et al., 2009). It was originally proposed by Broadbent et al. (1982) and validated by Walles et al. (2009). The CFQ consists of 25 items that assess forgetfulness (8 items), distractibility (8 items), and false triggering (9 items). The questionnaire has been translated into Arabic using a back translation process to ensure linguistic and cultural equivalence. Respondents rate their agreement with each item on a Likert-type scale ranging from 1 (never) to 3 (often). Dimension scores are calculated by summing the scores for the respective items. Most dimension scores range from 8 to 24. Two items were omitted from the original scale due to inconsistent results that affected reliability. The Arabic translations of the CFQ have demonstrated satisfactory psychometric properties (see table 2).

Tab. 2. Reliability coefficients for CFQ and its components

Dimension	α coefficient	ω coefficient
Forgetfulness (6 Items)	.715	.717
Distractibility (8 items)	.701	.702
False Trigg (9 items)	.732	.734
CFQ	.876	.877

Confirmatory Factor Analysis (CFA) was conducted to validate the proposed CFQ. The goodness-of-fit indices indicated an acceptable fit: $\chi2$ = 466.70, p <.001; CMIN/DF = 2.056; NFI =.876; CFI =.898; IFI =.902; RMSEA =.05. These findings support the psychometric validity of the Arabic version of the CFQ within the studied population.

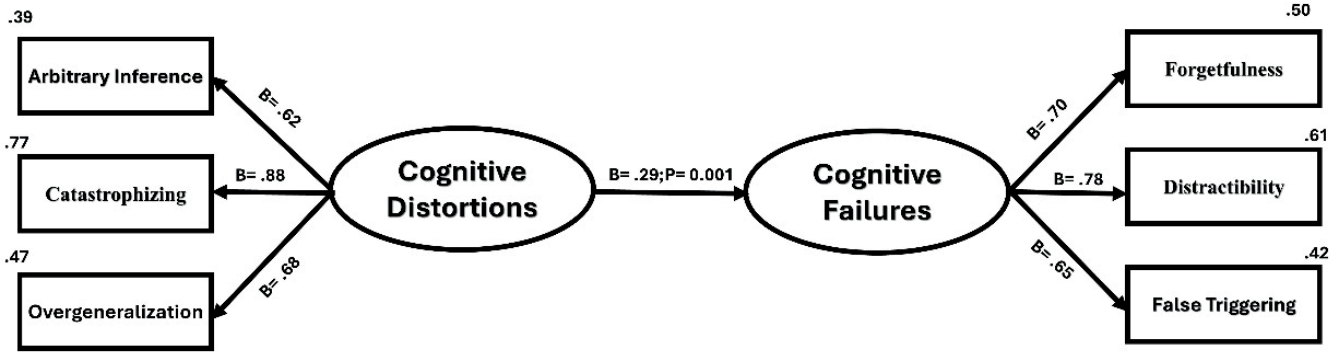
Results

To investigate the direct relationship between cognitive distortions and cognitive failure among college students, we used SEM (structural equation modeling). The results of the SEM, as shown in Figure 3, indicated a direct relationship between cognitive distortion and cognitive failure, with a coefficient of .29. These findings suggest that when cognitive distortions increase by 1 standard deviation, cognitive failure also increases by .29 standard deviations (Figure 1). Additionally, both the subcomponents of cognitive distortions and cognitive failure made significant contributions to their respective constructs. Table 3 provides various indicators for assessing the model fit.

Tab. 3. Model fit indicators.

Indicators	Values
CMIN/DF	1.413
GFI	.992
CFI	.996
TLI	.992
NFI	.986
RMSEA	.029

Fig. 1. SEM for the direct effect of cognitive distortions on failures



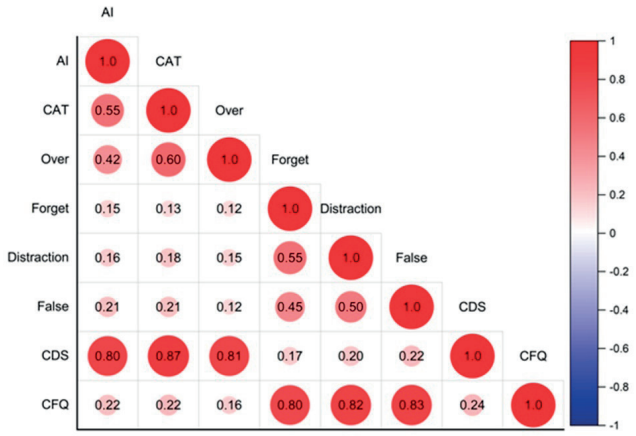
Tab. 4. Multilinear regression analysis for cognitive failure and its components.

	Forgottenness				Distractions				False triggering				CFQ			
	estimate	S.E.	p	VIF	estimate	S.E.	p	VIF	estimate	S.E.	p	VIF	estimate	S.E.	p	VIF
Constant	12.2	.68	.01		12.4	.68	.01		15.9	.83	.01		40.5	1.8	.01	
Arbitrary interference	.08	.04	.04	1.5	.06	.04	.14	1.5	.14	.05	.01	1.5	.28	.11	.01	1.5
Catastrophizing	.03	.48	.48	1.9	.09	.05	.06	1.9	.15	.05	.01	1.9	.27	.13	.03	1.9
Overthinking	.04	.47	.34	1.6	.04	.05	.41	1.6	-.03	.05	.59	1.6	.06	.12	.67	1.6
R^2	.029		.003		.041		.001		.060		.001		.063		.001	

To explore the predictive power of cognitive distortions sub-components on cognitive failure and its components, multilinear regression was used (see., Table 4).

To assess the reliability of the outcomes derived from multiple regressions, correlation analyses, and tests for multicollinearity were conducted. Significant correlations between the variables can lead to a type II error, resulting in failure to reject a false null hypothesis. Given the observed correlations among cognitive failure sub-types (Figure 2), Variance Inflation Factor (VIF) values were calculated for all independent variables in the regression to address concerns about multicollinearity (Table 4). Notably, none of the VIF values exceeded the commonly accepted threshold of 3, indicating that multicollinearity was not a significant issue.

Fig. 2. Pearsons' correlation between CDS and CFQ



To examine the differences in study variables, cognitive distortions, and cognitive failure, based on sex and major, different statistical approaches were employed. For sex differences, an independent sample t-test was utilized. The results revealed differences between males and females in false triggering (t (484) = 4.221, p =.001), with female participants (M = 20.78) scoring higher in false triggering than their male counterparts (M = 19.28). Moreover, there were mean differences in cognitive failure reported between males (M = 48.94) and females (M = 51.18), which replicated the same pattern observed for false triggering.

For major, participants were categorized into three main groups: Medical, Engineering & Science, and humanities & social sciences majors. A one-way ANOVA was conducted, and the results presented in Table 5 indicated significant differences. Table 5 provided evidence of differences in arbitrary interferences (i.e., cognitive distortions) and false triggering.

Tab. 5. One Way ANOVA Results for the factors that revealed significant differences.

Factors		SS	df	MS	F	P
Arbitrary interference	Between G.	117.08	2	58.53	3.314	.05
	Within G.	8531.29	483	17.66		
	total	8648.37	485			
False Triggering	Between G.	147.89	2	73.95	4.66	.01
	Within Grou	7605.11	483	15.75		
	total	7753.01	485			

Post-hoc analysis (Bonferroni) revealed that there were significant differences in arbitrary interferences between various study majors. Specifically, participants from the medical field scored higher in Arbitrary interference compared to those in engineering & science fields (M*diff*= 1.305; p =.04). Furthermore, there were also differences in false triggering between different study majors. Participants from humanities and social sciences scored higher in this dimension compared to those in engineering & science fields (*Mdiff*= 1.24; p =.01).

To investigate whether cognitive distortions dimensions mediate the relationship between cognitive failures and academic achievement. A mediation analysis was conducted using Hayes' (2022) PROCESS macro (Model 4) to examine whether cognitive distortions (assessed as sub-components: arbitrary inference, catastrophizing, and overgeneralization) mediate the relationship between cognitive failures and academic achievement (GPA). Cognitive failures (CFQ) were entered as the independent variable, the three sub-components of cognitive distortions (AI: Arbitrary Inference, CAT: Catastrophizing, Over: Overgeneralization) as mediators, and Academic achievement as the dependent variable.

The analysis revealed that cognitive failures significantly predicted all three sub-components of cognitive distortions. Cognitive failures were positively associated with arbitrary inference (B = .1078, SE =.022, t(484) = 4.93, p < .001, 95% CI: .0648;.1508), explaining 4.8% of its variance (R^2 =.048). Similarly, cognitive failures predicted catastrophizing (B =.1075, SE =.022, t(484) = 4.97, p < .001, 95% CI: .065;.150), accounting for 4.9% of its variance (R^2 = 0.049). Cognitive failures also predicted overgeneralization (B =.0735, SE = .0206, t(484) = 3.57, p < .001, 95% CI:.033; .114), explaining 2.6% of its variance (R^2 =.026).

However, the overall model predicting academic achievement from cognitive failures and cognitive distortions was not statistically significant (F (4, 481) = 1.61, p = .171), with only 1.32% of the variance in GPA explained (R^2 =.013). Neither cognitive failures nor the mediators were significant predictors of GPA:

Cognitive Failures (CFQ): B =.028, SE =.064, t(481) = .44, p = .66, 95% CI: -.0972; .1536.

Arbitrary Inference (AI): B = -.023, SE =.152, t(481) = -.15, p = .88, 95% CI: -.3211; .2761.

Catastrophizing (CAT): B = -.189, SE =.174, t(481) = -1.08, p = .279, 95% CI: -.5311,.1534.

Overgeneralization (Over): B = -.18, SE = .170, t(481) = -1.03, p = .304, 95% CI: -.5093; .1594.

The direct effect of cognitive failures on academic achievement was also non-significant (B =.028, SE =.064, t(481) = .44, p = .66, 95% CI: -.097; .154). In terms of mediation, the total indirect effect of cognitive failures on academic achievement through the three cognitive distortions (Figure 3) was small but statistically significant (B = -.036, SE = .022, 95% CI: -.087; -.001). However, when examined individually, none of the mediators had significant indirect effects:

Arbitrary Inference: B = -.002, SE = .018, 95% CI: -.039; .032.
Catastrophizing: B = -.020, SE = .022, 95% CI: -.069; .016.
Overgeneralization: B = -.013, SE = .014, 95% CI: -.045; .010.

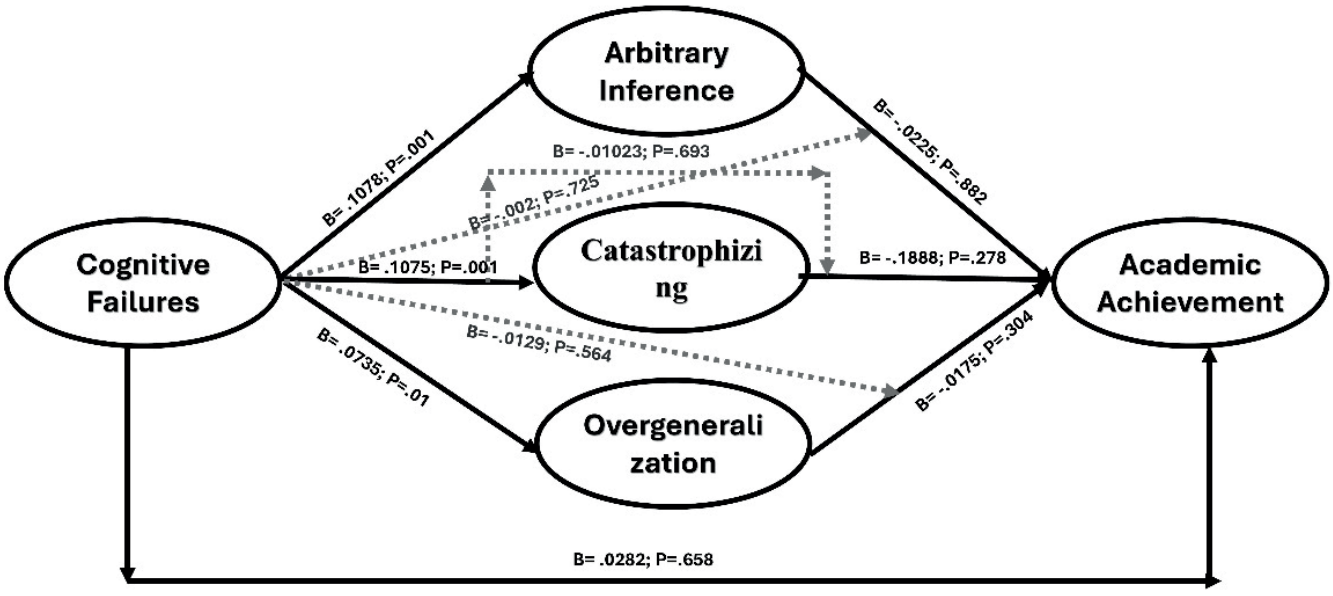
Thus, while cognitive failures significantly predicted cognitive distortions, the mediating role of these distortions on the relationship between cognitive failures and academic achievement was limited, with no significant indirect effects from any of the mediators when considered separately.

General Discussion

This study investigated the relationship between cognitive distortions and cognitive failures in college students, emphasizing both the direct and indirect influence of cognitive distortions on cognitive failures and the predictive capacity of their sub-components. Specifically, it examined how cognitive distortion patterns, including arbitrary inference, catastrophizing thinking, and overgeneralization, contribute to distinct aspects of cognitive failures, such as forgetfulness, distractibility, and false triggering. Additionally, the study investigated whether variations in cognitive distortions and cognitive failures could be attributed to demographic factors such as sex and academic major. Finally, the study also addressed whether cognitive distortions mediate the relationship between cognitive failures and academic achievement. A total of 486 participants were included in the data collection process to assess the study goals.

The findings of the first research objective highlighted a significant direct relationship between cognitive distortions and cognitive failures, as illustrated in figure 1. Specifically, individuals with more frequent cognitive distortions tend to experience a higher incidence of cognitive failures. This result supports existing cognitive theory, which suggests that cognitive distortions contribute to a cascade of dysfunctional cognitive processes (Sorden, 2013). Cognitive distortions are known to lead to psychological distress and impaired information processing, which can manifest cognitive errors in daily life, such as forgetfulness, reduced attention, and errors in judgment (Beck, 1979; Smith, 2023). These results aligned with the principles of cognitive theory, which emphasize that distorted thinking patterns, such as overgeneralization or catastrophizing, contribute to psychological suffering by distorting the individual's perception of reality. When such counterproductive thoughts presist, they can interfere with one's ability to process information effectively, leading to cognitive failures. This aligns with findings from recent studies that indicate a strong association between cognitive distortions and cognitive impairments, particularly in populations prone to stress and anxiety, such as college students (Benhalilem & Hartani, 2024). For example, research shows that negative thinking patterns can worsen attention problems and make mistakes in everyday tasks more likely, especially when college students are stressed or facing pressure in academic

Fig. 3. The mediator effects of cognitive distortion on the relationship between cognitive failures and Academic achievements



settings. Furthermore, these findings are consistent with recent psychological studies that suggest cognitive distortions may not only influence emotional regulation but also extend their impact to basic cognitive functions such as memory and attention (Booth et al., 2019; Covin et al., 2011)

The findings from the second research objective revealed that arbitrary inference, a key dimension of cognitive distortions, significantly predicts forgetfulness, one of the components of cognitive failures. This result highlights the impact of cognitive distortions on memory and attention processes. An explanation for this effect is that arbitrary inference involves making judgments or decisions based on insufficient or irrelevant evidence, which can lead to misinterpretations and distorted perceptions of reality. Such distortions can divert attention from important information or focus it on irrelevant details, resulting in lapses in memory and impairments in attentional focus. This explanation aligns with the attentional hypothesis, which posits that attentional disruptions contribute to cognitive impairments, such as those seen in forgetfulness (Roca et al., 2013). Another possible explanation for this relationship is that cognitive distortions like arbitrary inference increase cognitive load—the mental effort required to process information and complete tasks. Engaging in such distorted thinking patterns requires additional cognitive resources, leading to an overload that can impair memory performance. Individuals who engage in arbitrary inference may have increased forgetfulness because their distorted thinking places extra effort on their mental resources (Wickens et al., 2021). This aligns with the idea that a higher cognitive load limits the brain's ability to process and remember important information.

Furthermore, the results from the multiple regression analysis suggest that both arbitrary inference and catastrophizing thinking are significant predictors of false triggering, another dimension of cognitive failure, as well as the overall score of cognitive failures. It seems that false triggering occurs when irrelevant information or stimuli trigger inappropriate thoughts or actions. Arbitrary inference, where judgments are made based on unrelated or insufficient evidence, can worsen false triggering by leading individuals to misinterpret stimuli or events. As a result, these individuals may respond inappropriately to situations, triggering cognitive failures. This supports findings from Carrigan, N., & Barkus, (2016), which demonstrated that distorted interpretations of stimuli are linked to improper cognitive responses.

Similarly, catastrophizing thinking, characterized by exaggerated thoughts about negative events, can also predict false triggering. Individuals who catastrophize tend to overreact to imagined threats or minor challenges, perceiving them as significant. This exaggerated response can lead to false triggering when irrelevant stimuli are perceived as threats, triggering inappropriate cognitive or behavioral responses (Unsworth et al., 2012). The heightened anxiety and distress that associate catastrophic thinking can increase the perceived importance of irrelevant stimuli, further contributing to cognitive failures (Tauscher et al., 2023; You et al, 2021).

The finding that both arbitrary inference and catastrophizing thinking significantly predicts the overall cognitive failure score suggests a broader relationship between cognitive distortions and overall cognitive functioning. It seems that students who they vulnerable to cognitive distortions may face challenges across various cognitive domains—attention, memory, and information processing—due to their tendency to misinterpret situations or exaggerate the consequences of events. This misperception may lead to a higher prevalence of cognitive failures, supporting Lefebvre's (1981) perspective that cognitive distortions contribute to diminished cognitive performance in everyday life.

The results for the third study objective show no significant gender differences in cognitive distortions and cognitive failures among college students. However, differences are observed across academic majors. Post-hoc comparisons highlight significant differences in **arbitrary interferences**, particularly between students in medical disciplines and those in other majors. Specifically, medical students exhibited higher scores in arbitrary interference than their counterparts in engineering & science fields. These findings can be explained by the specific demands and characteristics of each academic program. Medical students undergo rigorous training that emphasizes critical thinking, problem-solving, and clinical decision-making. While this education builds essential skills, it also exposes students to complex and uncertain situations. This exposure may lead to cognitive distortions, like arbitrary interference, as students deal with the uncertainties of medical practice. Conversely, students in engineering or other practical disciplines typically receive training that emphasizes structured analytical reasoning and logical problem-solving. This focus may help diminish cognitive distortions, as these programs often require a clear, methodical approach to problem-solving, which can enhance students' ability to assess situations accurately and avoid erroneous conclusions. The data indicates that students in humanities and social sciences are more prone to false triggering compared to those in applied fields. This may be related to differences in cognitive styles and educational backgrounds. Humanities and social science students often engage in abstract thinking and critical analysis, which could make them more susceptible to lapses in attention, memory, or perception. The focus on theoretical exploration may increase vulnerability to cognitive distortions due to the less structured and more subjective nature of information processing. However, these interpretations are speculative, and further research is needed to understand the underlying factors.

The findings of the fourth study objective indicated that cognitive failures significantly predicted all three sub-components of cognitive distortions—arbitrary inference, catastrophizing thinking, and overgeneralization. This finding aligns with previous literature suggesting that cognitive failures can lead to distorted thinking patterns (Friedman., 2023), which may hinder students' cognitive functioning. Specifically, cognitive failures accounted for 4.8% of the variance in arbitrary inference, 4.9% in catastrophizing thinking, and 2.6% in overgeneralization. These results highlight the potential impact of cognitive failures on students' thought processes, highlighting a pathway through which cognitive distortions may arise. Despite the robust relationships between cognitive failures and cognitive distortions, the overall model predicting academic achievement (GPA) from these variables was not statistically significant. This indicates that, while cognitive failures may lead to cognitive distortions, these distortions do

not substantially mediate the relationship between cognitive failures and academic success. The model explained only 1.32% of the variance in GPA, suggesting that other factors may play a more critical role in determining academic achievement. The direct effects of cognitive failures and cognitive distortions on GPA were also non-significant, with each variable failing to serve as a meaningful predictor of academic performance. This finding suggests that cognitive failures, while predictive of cognitive distortions, may not directly influence academic outcomes in the absence of additional contributing factors. Interestingly, although the total indirect effect of cognitive failures on academic achievement through cognitive distortions was statistically significant, it was small in magnitude (B = -.036). When examined individually, none of the cognitive distortions demonstrated significant indirect effects. This indicates that while there is a pathway from cognitive failures to cognitive distortions, and ultimately to academic achievement, this pathway is limited in its practical significance. These results raise important questions about the nature of the relationship between cognitive failures, cognitive distortions, and academic achievement. The lack of significant indirect effects suggests that cognitive distortions may not be the primary mediators through which cognitive failures influence academic outcomes. Other factors, such as motivation, study habits, and external support systems, may have more substantial impacts on GPA.

Conclusion

This study demonstrates a strong correlation between cognitive distortions and cognitive failures, revealing that cognitive distortions have a direct effect on cognitive failures. The findings indicate that differences among academic majors suggest the presence of contextual variables that may modify this relationship. Additionally, certain aspects of cognitive distortions were found to predict cognitive failures, highlighting the complex nature of this relationship. These findings emphasize the importance of addressing cognitive distortions in academic settings, as targeted interventions may help reduce cognitive errors and improve students' cognitive performance.

The direct connection between cognitive distortions and cognitive failures highlights the need to address dysfunctional thinking patterns to reduce cognitive errors in educational settings. Interventions like cognitive-behavioral therapy (CBT) may help improve cognitive functioning and decrease cognitive failures among college students (Beck, 1979; Hofmann et al., 2012). By promoting healthier cognitive habits, educational institutions can better support students in reaching their academic goals and improving their overall well-being

Limitations and Future Research

It is essential to acknowledge the limitations of this study. The reliance on self-report measures may introduce bias, and the cross-sectional design limits causal interpretations. Future research could benefit from longitudinal designs to establish clearer causal relationships and explore additional mediators, such as emotional regulation or coping strategies. Additionally, examining different populations or academic contexts may provide further insights into how cognitive failures and distortions impact academic achievement. Recognizing these patterns can help develop interventions that enhance academic performance by improving cognitive processes and supporting students who struggle with cognitive failures.

Ethical approval

The study was committed to ethics and participant well-being. The research followed human participant ethics guidelines even though official ethics approval was not needed. The study needed informed consent from all participants, assuring their voluntary participation. During the research, strong privacy and confidentiality safeguards were taken. The study protocols were designed to minimize participant risk and discomfort. All critical or finding information was protected. I understand the importance of ethical research methods and I am committed to following them in all my work. If you have ethical questions about this work, contact the corresponding author.

Data Availability Statement

Supporting data can be made accessible to researchers through the following Mohamed, Tarik, 2025, "Exploring the relationship Between Cognitive Distortions and Cognitive Failure in College Students", Harvard Dataverse, V1, https://doi.org/10.7910/DVN/ZWQJYA.

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Author Contributions

The author solely contributed to the conception, design, data collection, analysis, and interpretation of the study. The author also wrote, revised, and approved the final manuscript.

Conflict of interest

The author declared no potential conflict of interest in connection with this article's research, authorship, and/or publication.

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