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Research Paper

Perceived Loneliness and it's Neuropsychological Correlates: Executive Functioning Difficulties among University Students

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ABSTRACT

This paper examined how perceived loneliness and executive functioning problems relate among the students of a university. The main aim was to confirm the presence of positive links between increased loneliness and worse impairments in executive functioning. The quantitative research design was used, which considered 126 participants (university students), who had taken the UCLA Loneliness Scale and the Barkley Deficits in Executive Functioning Scale Short Form (BDEFS-SF). Descriptive statistics, Pearson correlation and independent samples t-test were used to analyse the collected data. The results showed that there was a strong positive relationship between perceived loneliness and executive functioning difficulties ($r = .407$, $p < .001$), indicating that students who reported more loneliness also reported more difficulties in executive functioning. Nevertheless, there are no marked gender variations in scores of either loneliness or executive functioning. On the whole, the findings underscore the need to address loneliness in university students because it can lead to consequences in the cognitive functions of such students, their psychological readaptation, and their overall health.

Keywords: *Perceived Loneliness, Executive Functioning, Neuropsychology, Cognitive Deficit, University Students*

Loneliness has been an issue receiving growing attention as a psychological and societal health issue, especially among young adults, in recent years. Although all these have advanced in technology and communication, making social interaction easier, people still report levels of perceived loneliness as high. This paradox proposes that loneliness is not a functional outcome of social interaction, as it is subjective and depends on the nature and the fulfilment of (social) relationships. According to Russell (1996), loneliness refers to a painful, subjective state of the body when social relationships encountered by an individual fail to reach his or her desired level of social interaction. Such subjectiveness renders loneliness of special interest to examine among such groups that experience significant life changes, including students in universities.

The students of the university are at a very critical development stage with a lot of psychological, social and mental changes. University life is usually characterised by

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relocation, separation from the family, development of his or her peer groups, and even more academic demands. Although the experiences might help develop independence and personal growth, they might also lead to a sense of isolation and emotional disturbance. According to Diehl et al. (2018), loneliness is prevalent in university students, which can cause such issues as stress and depression, and this problem should be addressed based on the imparted support.

Along with the multiple emotional consequences that the state of feeling isolated and not connected with others might usually be associated with, such research has also shown an increasing number of studies to show that loneliness is not only directly linked to a variety of cognitive processes and neuropsychological functions but also can be a significant contributor to mental health and cognitive functioning overall. The neuropsychological approach to the issue of loneliness perceives it as a long-term stressor, which may affect brain activities and cognition. Research has also shown that the perceived loneliness is linked to changes in the brain regions that deal with executive control and emotional regulation, specifically, the prefrontal cortex (Cacioppo and Hawkley, 2009). Such changes can also disrupt the cognitive functions of attention, memory, and decision-making, thus influencing the overall cognitive performance.

One domain of cognitive functioning, executive functioning, can be defined as a system of processes that provide individuals with the ability to control their behaviours, thoughts and emotions in a goal-oriented way (Miyake et al., 2000). The primary mechanisms are working memory, cognitive flexibility, inhibitory control, and planning. Academic achievement and competent navigation in their daily life require the efficient involvement of executive functioning, particularly in the lives of university students who have to face the complex academic and social challenges. The challenges to executive functioning may cause issues of ineffective time management, poor concentration and ineffective decision-making.

New studies have proposed that loneliness can cause a negative effect on executive functioning. As an example, chronic loneliness could be accompanied by a smaller cognitive flexibility, poor working memory, and inability to regulate attention because of the cognitive burden of repetitive negative thinking and increased levels of emotional distress (Cacioppo and Hawkley, 2009). In addition, loneliness has also been linked with excessive cortisol levels and stress, which can also further impair cognitive processes and lead to the deficit of executive functioning (Hawkley and Cacioppo, 2010).

Although the literature on loneliness and mental health is expanding, the research on the influences of loneliness on executive functioning among non-clinical and typical university students is inadequate. This relationship is important to understand as it could lead to the comprehension of the impact that emotional experiences have on cognitive processes and academic achievement. Moreover, the determination of the neuropsychological correlates of the loneliness variable could be used to contribute to the creation of specific interventions that could enhance the mental health status and cognitive outcome.

Thus, this research will examine how perceived loneliness is correlated with executive functioning difficulties in university students. Through the analysis of this relationship, the paper will make a contribution to the literature and offer further insight into the cognitive consequences of loneliness amongst the youth.

LITERATURE REVIEW

Loneliness is a major and prevalent threat to the well-being of students, and proper interventions are needed (Akram et al., 2025). The shift to university life characterised by modification of social surroundings, habits, and life patterns, also adds to the sense of loneliness. Research indicates that emotional and social loneliness are widespread among students, and emotional loneliness is more prevalent. Such experiences are interrelated with depression and anxiety, and stable relationships can alleviate loneliness. Conversely, such things as physical inactivity and immigrant status can be risk factors (Diehl et al., 2018).

In addition to the short-term psychological impacts, loneliness among young adults is linked to more general life difficulties, such as worse physical health, ineffective coping mechanisms, and decreased belief in future job opportunities. It has also been indicated that childhood mental health problems, bullying, and social isolation as early life experiences also lead to loneliness in the later stages of life and that loneliness has both developmental and long-term consequences (Matthews et al., 2016).

Longitudinal studies also show that loneliness has the potential to presume a deterioration in mental health over time, such as depression, stress, and anxiety. Interestingly, although loneliness is also a contributing factor to mental health issues, the opposite holds less, as loneliness can be a major cause and not necessarily a result. There is also some evidence of a reciprocity between loneliness and eating disorder risk, which proves the complexity of its effect. On the whole, these results highlight the need to consider loneliness in universities to enhance a healthy psychological state and student wellbeing (Richardson et al., 2017).

Executive Functioning and Cognition in University Students

Executive functioning is a bundle of higher-order mental functions that allow individuals, especially university students, to manage their thoughts, feelings, and actions in goal-oriented ways. These processes enable people to think in advance, act against impulses, be focused, and adjust to new or complicated situations. The main aspects are inhibitory control, working memory, and cognitive flexibility that combine to help in solving problems, decision making, and performance in school. Notably, the functioning of the executive is affected by stress, sleep, and emotional well-being, and is amenable to practice and training (Diamond, 2013).

Structurally, executive functions are cohesive as well as discrete, i.e. although the various aspects are not independent of each other, they are also independent. Lifestyle variations in these skills are in part considered to be genetically influenced but tend to stay constant to some extent with time, besides being associated with key educational, behavioural, and mental health consequences. This brings out their importance in explaining differences in performance and adaptation of students (Miyake and Friedman, 2012).

Developmental Executive functions start emerging during early childhood but evolve tremendously during adolescence and in young adulthood. Most university students fall in this range. All of the core components develop with time, but they have a varying developmental pattern, which implies that certain skills can be more developed than others at the university. The relevance of executive functioning in studying the cognitive and academic difficulties of students is especially associated with this continuous growth (Best and Miller, 2010).

Moreover, self-regulation and daily behaviour are highly dependent on executive functioning, and it is essential to adopt healthy lifestyle habits like regular exercise. The temporal self-regulation theory suggests that a person with a higher capacity of executive control can better plan and maintain goal-oriented behaviours, and it is also possible that those who have practised goal-oriented behaviours can also improve their executive functioning with time. The mutual dependence of the two relations highlights the overall significance of executive operations both in cognitive and behavioural aspects of university students (Hall and Fong, 2015).

Mediating Factors

A study by Zhang et al. (2025) revealed that negative life events enhanced the risk of depression among students, and depression risk was mediated by sleep quality. Their results indicate that the stressful or negative events experienced by the students can disrupt their sleep, which consequently raises the chances of developing depressive symptoms. This means that, not only is poor sleep a distinct issue, but it is a channel through which life stress can influence the mental health of students. The researchers note early support, particularly interventions that enhance sleep and enable students to develop resilience against stressful situations, as being crucial in minimising the likelihood of depression.

Dong et al. have found that loneliness influences the quality of sleep among their college students indirectly, primarily because of the escalated stress levels and a tendency to suppress emotions (2025). That is, the more alone students felt, the more they tended to suppress their emotions, the more they were stressed, and the poorer they learned to report their sleep. Their model of chained mediation implies that stress can be promoted by emotional suppression, and it, in turn, negatively influences sleep quality. The research highlights that it might be helpful to consider both stress management and emotion regulation as a means of minimising sleep issues in university students.

Yang et al. (2018) observed that greater stress in college students was linked to greater sleep disturbances, with this correlation becoming stronger with an increase in rumination levels and negative affective states in the students. They found that students with greater stress levels were more inclined to engage in repetitive negative thinking and have unpleasant emotions, both of which led to disturbed sleep. Repetitive negative thinking alone did not play a direct mediation role in the relationship, but was significant when it was coupled with rumination and negative affect. This implies that emotional and cognitive reactions to stress are some of the most critical factors explaining why stressed students usually have a problem with sleep.

Time et al. (2024) found that academic stress plays a major role in explaining how psychological well-being is related to sleep quality in university students. They found that students who had greater anxiety or depressive symptoms were more likely to have poor sleep, and all of this was attributed to academic stress. They also discovered that poor sleep was partially related to loneliness due to academic stress, that is, academic stress was a mediator between emotional challenges and sleep issues. The article indicates that universities ought to be keen on enhancing student well-being, particularly among those students facing other challenges.

According to Fabio et al. (2025), students with sleep disturbances had a connection with greater anxiety and depression, but the association depended on the perceived stress (which

had a partial impact on it. Their overview showed that lower-sleeping students were more likely to experience stress, which in turn led to increased psychological distress. Simultaneously, optimism and good critical thinking skills were found to counteract the effect of the sleep disturbances, and their effects on stress levels were less. This demonstrates that risk factors and personal strengths are important in determining the role of sleep in mental health among the populations in universities.

Neuropsychological Mechanisms of Loneliness & Cognition

According to Cacioppo and Hawkley (2009), perceived social isolation, or loneliness, has considerable impacts on cognitive functioning and mental processes in general. According to their work, loneliness is linked with worse cognitive functioning, accelerated cognitive degeneration, and executive functioning deficits. Also, lone people are likely to develop negative thinking styles, hyper-vulnerability to social threat, and biased social cognition, which, although aimed at protecting themselves, may only serve to isolate them further. These disturbed cognitive and attentional processes affect emotions, decision-making, and interpersonal behaviour, and create a chain reaction that connects loneliness to cognitive decline, as well as worse health outcomes.

Hawkley and Cacioppo (2010) suggest that loneliness leads to an increase in vigilance to social threats, which causes people to feel more vulnerable, but at the same time, they want to be connected to others. Cognitive processes, including attention, memory and perception of social information, are influenced by this hypervigilance and mostly result in adverse biases. Such cognitive alterations not only affect behaviour and emotional reactions, but also have physiological effects such as worse sleep and health hazards. The authors stress that loneliness is a self-perpetuating process that involves cognitive, behavioural, and biological processes.

According to Bzdok and Dunbar (2020), social connections are a core aspect of human survival and well-being, and loneliness poses a serious neurobiological risk. In their study, they conclude that the lack of significant social relationships can seriously impact brain activity and mental well-being, which affects satisfaction with life and resilience. They underline that robust social networks help sustain mental and emotional stability, and social isolation impairs neurocognitive functions and predisposes an individual to mental and physical health issues.

Courtin and Knapp (2017) reviewed a great number of studies and came to the conclusion that loneliness and social isolation are associated with detrimental health effects. They suggest that the conditions are correlated with a higher risk of depression, decreased well-being, and multiple physical health problems. According to the causal mechanisms, the specific causal mechanisms are still under investigation; however, there are numerous reasons to expect that loneliness is an adverse phenomenon that has both psychological and physiological impacts, and that more research is required to comprehend the underlying processes and the ways of interventions. Wu et al. (2025) introduce an up-to-date view on the subject of loneliness as they explore both behavioural and cognitive signs of the issue using smartphone data. Their analysis reveals that screen usage, mobility, and interaction with apps are some of the patterns that can be used as quantifiable measures of loneliness. Through machine learning methods, they show that loneliness is dynamically tracked on a real-time basis and provides information on how behavioural patterns indicate underlying cognitive and emotional conditions. This methodology emphasises the changing concept of

loneliness as a psychological experience, as well as a behavioural phenomenon that can be measured.

Gender Differences in Loneliness & Executive Functioning deficits in young adults

Liu et al. (2020) discovered that the impacts of loneliness on mental health varied between male and female college students, with loneliness being more predictive of depressive symptoms in females and social isolation being more predictive of males. Along these lines, larger studies show that females tend to be lonelier than males, and these variations depend on their age, social connections, and life conditions (Pagan, 2020). Longitudinal data also indicate that women are more likely to feel chronic and enduring loneliness in the long term, usually because of events such as the loss of their partners, mental health issues, and social transformation, but the factors that lead to it in men may vary (Nicolaisen and Thorsen, 2024). Gender-specific patterns are also found to exist among adolescents, whereby the emotional experiences like happiness, nervousness, and social relationships have different effects on loneliness among boys and girls, which underscores the dynamic and developmental nature of these differences (Pourasadi et al., 2025). Loneliness in a lifespan perspective is perceived to be a normal but frequently temporary state of being motivated by an innate drive to reestablish social connection, though when this fails, it may result in long-term loneliness, and the reasons and expressions of loneliness depend on gender and developmental stage (Qualter et al., 2015).

According to Cornblath (2018), the sex difference in executive functioning might be based on the disparity in brain network organisation and development. Their results reveal that males and females exhibit different ways in which brain regions control and coordinate activity, especially in brain parts associated with cognitive control, like the frontal and parietal regions. As an example, females had more ability to transition the brain to complex thinking conditions, whereas males exhibited patterns of more routine or readily available conditions, some of which were correlated with poorer executive functioning. It was also found that these differences in brain network controllability were predictive of differences in working memory and task-related brain activity, providing a neurobiological basis to gender differences in executive functioning in development (Cornblath et al., 2018).

Gender differences studies on stress and self-regulation in college and university students reveal uniform differences in the ways males and females experience and cope with stress, which have significant implications in executive functioning. Research has shown that women students are likely to report more perceived stress and employ emotion-focused coping styles, like seeking social support, venting, or distraction, as compared to males (Graves et al., 2021; Gefen and Fish, 2019). Also, females are usually more stressed with academic and interpersonal needs, whereas males report higher stress with financial issues. There is also physiological and psychological evidence that women have high levels of anxiety, neuroticism, and perceived stress, but can be buffered with adaptive regulation to maintain academic performance, and performance in men seems to be more influenced by physiological dysregulation to stress (Gomez-Baya et al., 2025). In addition, emotional activities such as anxiety and negative academic emotions have the potential to affect self-regulated learning, and females are more vulnerable to negative thinking cycles that can affect cognitive control and academic performance (Pelch, 2018). In general, these results point to the fact that the differences in gender in stress reactions and coping mechanisms are directly related to the differences in cognitive control and self-regulation processes, which

are the focal points of executive functioning (Graves et al., 2021; Gefen and Fish, 2019; Gomez-Baya et al., 2025; Pelch, 2018).

Integrated Loneliness–Cognition / Young Adult Context

According to Hawkley and Cacioppo (2010), loneliness is a complicated psychological phenomenon which is not merely a state of being alone but rather the heightened sensibility of threats of social rejection and the sense of vulnerability, which consequently affects mental, emotional and physiological functions. Such a high level of vigilance may then disrupt attention, memory and interpretation of social interactions, which will eventually lead to behaviour, sleep and general health. Developmentally extending this view, there is some evidence that the effects of early loneliness may be long-term, in that chronic loneliness in childhood has been associated with depressive symptoms in adolescence and that loneliness may be a long-term interpersonal stressor that influences subsequent emotional and cognitive functioning (Qualter et al., 2010). Loneliness is very common in the face of emerging adulthood, especially among university students, and is linked to the worst mental and physical health outcomes. Recent reviews point out that the period of development is particularly vulnerable to loneliness because of the changes in social roles and surroundings, yet longitudinal and deeper studies are required to comprehend the long-term cognitive and psychological outcomes of loneliness during this period (Lim et al., 2024). In general, these results indicate that loneliness couples with mental and emotional processes throughout development and has an impact on mental health trajectories in key developmental transitions, such as young adulthood (Hawkley and Cacioppo, 2010; Qualter et al., 2010; Lim et al., 2024).

Relationship Between Loneliness & Executive Functioning Difficulties

Several emerging studies reveal that there is a lot of close and multifaceted correlation between loneliness and executive functioning problems, especially among young adults. Empirical data indicate that people with increased rates of loneliness, with factors like depression and anxiety being controlled, are associated with impairments in higher-order cognitive processing within core cognitive domains of attention and executive control, which implies that loneliness itself has a direct negative effect on how higher-order cognitive processes are (Jin and Hwang, 2024). This correlation is also confirmed by evidence that loneliness is directly related to emotional dyscontrol and psychological distress, such as social anxiety and depression, which may influence the cognitive branch and self-regulatory functions of successful executive functioning (Eres et al., 2023). Over time, analysis indicates that chronic loneliness does not necessarily hurt the simple thinking capacity, but might decelerate the development of the mind. Lonesome individuals are not usually able to enhance abilities like memory, thinking speed, and adaptability in a typical manner (Kang et al., 2025). On the neural level, loneliness has been related to less synchronised patterns of activity in the human brain, which are more individualised, especially in the domains of social cognition and interpretation, which can lead to emotional problems with common understanding and effective information processing (Baek et al., 2021). Theoretical approaches also extend to explain that the perceived social isolation modulates the aspects of attention, memory and decision-making by increasing the sensitivity to social threats and negative biases that affect adaptive cognitive functioning (Cacioppo and Hawkley, 2010). Neurobiological studies further point to the fact that the lack of significant social interactions may upset brain systems associated with both cognitive and emotional regulation, which justifies the connection between loneliness and impaired cognitive performance (Bzdok and Dunbar, 2020). Research indicates that loneliness is

related to issues with executive functions such as planning, memory, attention, and self-control. Planning and working memory appear to be among those that have a significant effect on how lonely a person is (Sin et al., 2021). Besides, loneliness can be an intermediate factor in an expansionary cognitive decline, mediating the association between general cognitive impairment and executive dysfunction, thus focusing on neurocognitive impact through its mediation between these two variables (Chen et al., 2025). Lastly, developmental and longitudinal evidence indicate that loneliness (particularly that experienced early in life or accompanied by poor resilience) makes anxiety and depression more vulnerable in later life, which in turn can add to cognitive and executive functioning impairments (Parlikar et al., 2025). On the whole, the discussed results suggest that loneliness is a problem not only in terms of its emotional characteristics but also a strong cognitive and neuropsychological risk factor that leads to deficits in executive functioning both directly and indirectly over the course of the life span (Jin & Hwang, 2024; Eres et al., 2023; Kang et al., 2025; Baek et al., 2021; Cacioppo & Hawkley, 2010; Bzdok & Dunbar, 2020; Sin et al., 2021; Chen et al., 2025; Parlikar et al., 2025)

RESEARCH METHODOLOGY

Overview of the Study

This chapter explains how the research was conducted to determine if there is a relationship between loneliness and deficits in executive function within a specific population. A quantitative research design was used to collect, analyse, and interpret data using standardised psychological measures validated for this purpose. The main focus of this study was to determine if there is a correlation between levels of loneliness and deficits in Executive Functioning, as well as to assess gender differences in these variables. This research intends to understand further how psychological health and cognitive function are interrelated, thus contributing to the body of knowledge in Psychology.

Aim

The aim is to investigate the correlation between the perceived loneliness and executive functioning problems amongst the students at the university.

Objectives

1. To determine the amount of perceived loneliness in students of the university.
2. To determine executive functioning problems in students at the university.
3. To test how perceived loneliness is related to executive functioning challenges.
4. To investigate gender variations in perceived loneliness and executive functioning problems.

Hypotheses

- **H_{01}:** There is no significant relationship between loneliness and deficits in executive functioning.
- **H_{02}:** There is no significant difference between males and females in loneliness levels and executive functioning deficits.
- **H_{11}:** There is a significant relationship between loneliness and deficits in executive functioning.
- **H_{12}:** There is a significant difference between males and females in levels of loneliness and executive functioning deficits.

Sample

The sample was of male and female subjects who were selected from the general population within the age group of 18-25 years. The respondents were a sample comprising a combination of people with different degrees of loneliness and executive functioning capacities. The study included a total of 126 participants, with an equal number of males and females (63 each). This was done deliberately to preserve this balanced composition so that a fair and meaningful comparison of genders can be made. A convenience sampling method was used to recruit the participants, whereby the participants were selected based on their easy availability and voluntary participation in the research. It was felt that this method was suitable because of practical limitations like a shortage of time, availability of participants, and availability of information on the topic.

Research Design

The current research assumed a correlational, quantitative research design. The link between loneliness and executive functioning deficits was investigated using a correlational design. A comparative design (t-test) was used to analyse gender differences. This design is suitable because it will enable statistical analysis of relationships and group differences without manipulation.

Tools Used

Two standardised psychological instruments were used for data collection:

1. **UCLA Loneliness Scale**: The UCLA Loneliness Scale is a popular standard measure that is a self-report study implemented by Dan Russell, Letitia A. Peplau, and Carolyn E. Cutrona to estimate subjective loneliness experiences of participants in their social isolation. Instead of counting the real number of social relationships, which one has had, the scale determines the feeling of loneliness relative to the relationships that a person has with other people. The scale comprises 20 items that represent various elements of being lonely and being unfulfilled with being in a social relationship. The respondents must reply to the frequency of some of the feelings on a 4-point Likert scale, with response frequencies being Never to Always. The overall score will be derived as a sum of all the item responses, with the high ones reflecting the increased loneliness. It has been shown to measure high internal consistency and reliability as well as satisfactory construct and convergent validity in very different populations.
2. **Barkley Executive Deficits Scale (BDEFS-SF)**: The Barkley Executive Deficits Scale - Short Form (BDEFS-SF) is a self-reporting measure that is standardised and developed by Russell A. Barkley as a way of assessing deficits in executive functioning as they occur in daily life. The scale is based on the theoretical framework of executive functioning as a complex of self-regulatory processes required to direct goal-oriented behaviour. The short version has 20 items that represent some of the most important areas of executive functioning, such as time management, organisation, self-restraint, motivation, and emotional control. Each item is rated on a 4-point Likert scale, with response options of Never or Rarely to Very Often, depending on the frequency of experiencing the described difficulties. The scores are obtained by adding the responses to all the items, and the higher the score, the greater the deficiency in executive functioning. BDEFS-SF boasts of good reliability and validity and has been tested in both clinical and non-clinical populations.

Statistical Analysis

Both descriptive and inferential statistics were used to analyse the data. The mean and standard deviation were calculated to describe levels of loneliness and executive functioning problems among participants. An independent samples t-test was used to compare gender differences, and Levene's test was applied to check whether the variance was equal. Also, there were correlational analyses to investigate the connection between loneliness and executive functioning deficits. All the analyses were done at the level of significance of less than p =.05 in order to have reliable and valid findings.

RESULTS AND DISCUSSION

Table 1: Descriptive Statistics for Loneliness and Executive Functioning Deficits (BDEFS)

	N	Minimum	Maximum	Mean	Std. Deviation
Loneliness	126	22	70	46.13	9.119
BDEFS	126	20	80	44.46	9.890

Descriptive statistics were calculated to describe the scores of loneliness and the executive functioning deficit (BDEFS) in the sample (N = 126). The loneliness scores of the participants were between 22 and 70, with a mean of 46.13 (SD = 9.119), meaning that the perceived loneliness in the sample was moderate.

In the case of executive functioning deficits, the range of scores was between 20 and 80, with a mean of 44.46 (SD = 9.890), indicating a moderate degree of deficits in executive functioning. The standard deviations of the two variables are relatively similar, which implies that there is a similar level of variability in scores among the participants.

Table 2: Correlation matrix for gender, loneliness and deficits in executive functioning (N=126)

	Gender	Loneliness	BDEFS
Gender	_		
Loneliness	-.045	_	
BDEFS	-.002	.407***	_

****. Correlation at 0.001(2-tailed)*

The Pearson product-moment correlation is used to analyse the correlation between gender, loneliness, and executive functioning deficits (BDEFS) in 126 respondents. There are no significant gender differences in loneliness ($r = -.045$, $p > .05$) and executive functioning deficits ($r = -.002$, $p > .05$), indicating that gender did not play a significant role in these variables in the current study.

However, a statistically significant moderate positive correlation was found between loneliness and executive functioning deficits ($r = .407$, $p < .001$). This implies that the lonelier people are, the more they will lack in terms of executive functioning.

Table 3: Group Statistics for gender, loneliness and deficits in executive functioning (N=126)

T-Test

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Loneliness	Female	63	46.54	7.967	1.004
	Male	63	45.73	10.190	1.284
BDEFS	Female	63	44.48	8.697	1.096
	Male	63	44.44	11.026	1.389

The table of group statistics shows the descriptive analysis of loneliness and deficits in executive functioning (BDEFS) on the basis of gender in the sample (N = 126). For loneliness, females (n = 63) reported a slightly higher mean score (M = 46.54, SD = 7.97) compared to males (n = 63; M = 45.73, SD = 10.19). Likewise, with executive functioning deficits, there were almost no differences in the mean of females (M = 44.48, SD = 8.70) and males (M = 44.44, SD = 11.03). There was a low standard error of the mean among groups, which means that the estimates are stable. All in all, these descriptive results indicate that there are small sex-based variations in loneliness and executive functioning deficit at the initial level.

Independent Samples Test *for gender, loneliness and deficits in executive functioning (N=126)*

		t-test for Equality of Means							
		t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
				One-Sided p	Two-Sided p			Lower	Upper
Loneliness	Equal variances assumed	.497	124	.310	.620	.810	1.630	-2.416	4.035
BDEFS	Equal variances assumed	.018	124	.493	.986	.032	1.769	-3.470	3.534

The independent samples t-test table looks at whether the differences in the observed means of the males and females are statistically significant. In the case of loneliness, there was no significant gender difference, t(124) = 0.497, p = .620 (two-tailed), with a mean difference of 0.810 and a 95% confidence interval of -2.416 through 4.035. In the same way, with executive functioning deficits (BDEFS), the p-value is not statistically significant, t(124) = 0.018, p =.986 (two-tailed), the difference in the means is 0.032, and the 95% confidence interval is -3.470 to 3.534. These results suggest that gender is not a significant factor in the levels of loneliness or executive functioning deficits in the current sample.

Homogeneity of Variance Test *for gender, loneliness and deficits in executive functioning (N=126)*

		Levene's Test for Equality of Variances	
		F	Sig.
Loneliness	Equal variances assumed	4.458	.037
BDEFS	Equal variances assumed	2.532	.114

The homogeneity of the variance test is tested by the Levene test, and it is used to determine whether the t-test assumption of equal variances is satisfied. In the case of loneliness, the test was significant, $F = 4.458$, $p = .037$, and as such, there may be a violation of the assumption of equal variances. However, in the case of executive functioning deficits (BDEFS), the test of Levene was non-significant, $F = 2.532$, $p = .114$, which means that the homogeneity of variance was met. However, although the violation of loneliness was present, the t-test findings would still not be significant, which supports the conclusion that there are no meaningful gender differences in the studied variables.

DISCUSSION

The current research problem was to look at the gender disparities in loneliness and executive functioning impairment and to understand the connection between the two variables amongst university students. The key results show that gender differences in loneliness and executive functioning deficits were not statistically significant. Females had slightly higher mean scores in loneliness than males, but almost equal scores in executive functioning deficits; there was no statistically significant difference. The t-test outcomes also substantiated the idea that gender is not a major factor that could affect these psychological constructs in the current sample. These results indicate that both loneliness and executive functioning issues are rather gender homogenous in this group, and both male and female students can be equally susceptible to loneliness and executive functioning issues.

In terms of the interactions between loneliness and executive functioning, the results of the current study indicate that despite the fact that loneliness and executive functioning do exist among university students, there are no significant gender moderators of the levels of these variables. Even loneliness, commonly linked to emotional distress and a lack of social interaction, can potentially affect cognitive performance, especially in such domains as working memory, attention, and cognitive flexibility. Earlier studies have shown that the increased loneliness correlates with worse executive functioning because of the lack of cognitive stimulation and high levels of psychological stress (Cacioppo and Hawkley, 2009; Jin and Hwang, 2024). Although the present study did not explicitly test the strength of correlation in the present table, the fact that there are no differences between genders indicates that there is no reason why the relationship between loneliness and executive functioning will not work the same way in both males and females.

The results of this research are both similar and different to the existing literature in comparison to the previous studies. Men and women have been identified to have different levels of loneliness, and in most cases, females are said to report higher levels of loneliness as a result of their higher levels of emotional awareness and expression (Borys and Perlman, 1985; Barreto et al., 2021). Nonetheless, in other current literature, there are few or no gender differences, especially in university populations, which underpins the current results (Akram et al., 2025). On the same note, studies conducted on executive functioning have yielded contradictory findings, with certain studies showing that there are gender differences in cognitive abilities, and others saying that these differences are not significant among young adults (Zelazo et al., 2016). Thus, the existing results add to an increasing literature that gender is not a powerful predictor of loneliness or impaired executive functioning in contemporary educational settings.

Neuropsychologically, the results can be explained in the context of how the brain functions and interacts in terms of cognition and emotions. Executive functions and the higher

thinking level abilities, such as planning, impulse control and adapting to change, are mostly attributed to the prefrontal cortex. Nevertheless, loneliness is connected with a change of activity in those parts of the brain that are involved in social cognition and feelings, including the anterior cingulate cortex or the amygdala (Cacioppo et al., 2015). In the long-run, chronic loneliness could also lead to higher levels of stress and dysregulation of neural networks, which would negatively affect executive functioning. Nevertheless, the gender differences in the study are non-existent, which could indicate that these neuropsychological processes could be similar in both men and women, especially in young adults when their brains are still developing and adapting. This is crucial in emphasising the need to focus on the issue of loneliness as a universal psychological issue, and not one limited to a particular group of people.

CONCLUSION

The current research was able to meet the research aims and objectives and to give empirical evidence of the hypotheses. The hypothesis was presented and was supported by the results that indicated a high positive correlation between loneliness and the deficits in executive functioning ($r = .407$, $p < .001$). The results indicate that lonelier students who are lonelier are associated with more cognitive problems. Nonetheless, the assumption that males and females would not be the same in regard to loneliness and executive functioning was not substantiated, because the difference between the two sexes was not significant. These findings support the reasoning that loneliness is an important psychological aspect of cognitive functioning, regardless of sex. On the whole, the research highlights the necessity to focus on the problem of loneliness, which is the way to enhance not only psychological well-being but also cognitive performance in young adults.

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