



## From Worry to Forgetting: The Effects of Anxiety Level on Everyday Memory Performance

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### Abstract

The present study investigated the relationship between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ), with attention to gender differences in the strength of this association. Drawing on attentional control theory, which posits that anxiety consumes executive resources and thereby impairs memory-related processes (Eysenck & Derakshan, 2011), it was hypothesized that higher anxiety levels would predict greater everyday memory difficulties, and that this effect would be more pronounced in men than in women. Data were collected from 169 participants (34 men, 135 women). A series of multivariate and regression analyses were conducted. Hotelling's  $T^2$  test indicated a significant multivariate effect,  $T^2 = 1616.55$ ,  $F(1, 168) = 1616.55$ ,  $p < .001$  (Table 7), confirming that the joint distribution of anxiety and memory scores deviated substantially from the null hypothesis. Pearson correlations revealed a moderate positive association between GAD and PRMQ in the overall sample,  $r = .45$ ,  $p < .01$  (Table 8). Regression analyses further demonstrated that GAD significantly predicted PRMQ difficulties, accounting for 20% of the variance,  $R^2 = .20$ , Adjusted  $R^2 = .20$ ,  $F(1, 167) = 42.26$ ,  $p < .001$  (Tables 9–10). The unstandardized regression coefficient indicated that each one-unit increase in GAD was associated with nearly a one-point increase in PRMQ difficulties,  $B = 0.97$ ,  $\beta = .45$ ,  $t(167) = 6.50$ ,  $p < .001$ , 95% CI [0.68, 1.27] (Table 11). Residual diagnostics confirmed that assumptions of normality and independence were met (Table 12; Graphs 1–2). Gender-specific analyses revealed notable differences. Among men, the correlation between GAD and PRMQ was strong,  $r = .70$ ,  $p < .01$  (Table 13), whereas among women, the association was moderate,  $r = .41$ ,  $p < .01$  (Table 14). Boxplots (Graph 3) illustrated greater variability and more extreme values in men's scores, suggesting heightened vulnerability to the cognitive consequences

of anxiety. These findings support the hypothesis that gender moderates the anxiety–memory relationship, with men exhibiting a stronger effect. Overall, the results confirm that anxiety is a significant predictor of everyday memory difficulties, consistent with prior meta-analytic evidence linking anxiety to impairments in working memory capacity (Moran, 2016). The gendered patterns observed here align with research suggesting that men may experience stronger neurocognitive consequences of stress and anxiety (Shors, 2002), whereas women may rely on coping strategies that buffer these effects (Matud, 2004). The study underscores the importance of integrating emotional and cognitive domains in psychological research and highlights the need for gender-sensitive interventions to mitigate the impact of anxiety on everyday memory functioning.

## **Introduction**

Anxiety is one of the most prevalent psychological conditions, and its influence extends beyond emotional well-being into everyday cognitive functioning. Everyday memory, which includes remembering appointments, names, tasks, and routine information, is particularly vulnerable to the disruptive effects of worry and heightened arousal. Research suggests that anxiety consumes attentional and working memory resources, leaving fewer cognitive capacities available for encoding and retrieval processes (Moran, 2016). As a result, individuals with elevated anxiety often report more frequent memory lapses in daily life, ranging from forgetting simple tasks to difficulties in prospective remembering (Lukasik, Waris, Soveri, Lehtonen, & Laine, 2019). Understanding the link between anxiety and everyday memory is crucial, as memory failures can compound stress, reduce productivity, and impair social functioning. This study therefore examines how varying levels of anxiety affect everyday memory performance, aiming to clarify the mechanisms through which worry translates into forgetting and to highlight implications for psychological intervention and cognitive training.

## **Problem Statement**

In today's fast-paced world, where people are constantly exposed to new information and experiences, anxiety has become a major mental health issue around the globe. Although many know about the emotional effects of anxiety, fewer realize how it can quietly affect the way our brain works, especially when it comes to memory. Everyday memory, which helps us remember things like appointments, tasks, and conversations, is especially sensitive to emotional changes. Studies show that anxiety can make it harder to pay attention and to manage complex thinking, which leads to forgetfulness and difficulty switching between tasks. This research aims to look into how different levels of anxiety affect everyday memory, with a special focus on two types of memory: prospective (remembering things we need to do in the future) and retrospective (remembering things that happened in the past).

## **Research Questions**

1. To understand this connection better, the study looks at these questions:
2. How does the level of anxiety affect everyday memory?
3. Are people with more anxiety more likely to forget things compared to those with less anxiety?
4. Which type of memory—prospective or retrospective is more likely to be impacted by anxiety?

## **Significance of the Study**

Finding answers to these questions is important for both understanding mental health and for practical use in schools, hospitals, and workplaces. By learning how anxiety affects memory,

doctors, teachers, and caregivers can better support people who are anxious. This knowledge can also help create better strategies to improve mental well-being and memory skills.

## **Research Gaps**

Even though more people are studying how anxiety affects the brain, most of the research has focused on people with serious mental health problems or on a specific type of memory, like working memory. There is not much information on how anxiety affects everyday memory in people who don't have these problems. Also, not many studies have looked at both prospective and retrospective memory at the same time. This research fills these gaps by using tools that are already proven to work and by testing memory performance in a wider group of people.

## **Hypotheses**

**H1.** *Higher levels of General Anxiety Disorder will be positively associated with greater reported difficulties in Prospective and Retrospective Memory.*

**Reasoning.** This hypothesis is grounded in **attentional control theory**, which proposes that anxiety consumes limited executive resources, thereby reducing efficiency in cognitive processes such as working memory and prospective remembering (Eysenck & Derakshan, 2011). When individuals experience heightened anxiety, their attentional focus is often diverted toward threat-related concerns, leaving fewer resources available for encoding and retrieving everyday tasks. Empirical evidence supports this link, showing that anxiety symptoms are moderately correlated with memory complaints in both clinical and non-clinical populations (Moran, 2016). Thus, it is expected that individuals with higher anxiety will also report more frequent memory difficulties.

**H4.** *There will be a significant interaction between gender and General Anxiety Disorder in predicting difficulties in Prospective and Retrospective Memory, such that the effect of anxiety on memory difficulties will be more pronounced in men than in women.*

**Reasoning.** While women generally report higher baseline levels of anxiety (Matud, 2004), research suggests that men may experience stronger cognitive consequences of stress and anxiety, particularly in memory and executive functioning (Shors, 2002). This may be due to gender-specific neurobiological stress responses and differences in coping strategies. Therefore, although both genders are expected to show a positive relationship between anxiety and memory difficulties, the strength of this association is hypothesized to be greater in men. This interaction hypothesis acknowledges that gender is not merely a demographic variable but a potential moderator that shapes the cognitive impact of anxiety.

## **Conceptual Framework**

These ideas are based on theories about how the brain works and how emotions affect thinking. These theories suggest that anxiety can make it harder to focus and to manage thoughts, which are important for remembering things. The framework brings together ideas about mental effort and how emotions can get in the way of remembering, suggesting that when people are more anxious, their brain has less energy to focus on important tasks, making them more likely to forget things in daily life.

## **Operational Definitions**

To test these ideas, the study uses clear ways to define the terms:

Anxiety Level: Measured using the GAD-7, a well-known tool used to assess how severe anxiety symptoms are:

Everyday Memory Performance: Measured using the PRMQ, a questionnaire that asks about how often people forget things in daily life.

Prospective Memory: The ability to remember to do something important at the right time.

Retrospective Memory: The ability to recall information or events that have already happened.

## Sources

- BMC Psychiatry: Induced-anxiety disrupts working memory
- Eman Research: Cognitive Deficits in Generalized Anxiety Disorder
- Verywell Mind: How Generalized Anxiety Disorder Affects Memory

## Literature Review

Anxiety has long been implicated in everyday memory failures, with theoretical accounts converging on the idea that worry consumes limited cognitive resources needed for encoding, maintenance, and retrieval. Contemporary models posit that anxiety-related cognitions intrude upon task-focused processing, thereby reducing working memory capacity and impairing the coordination of attention and memory operations central to daily remembering, such as appointments, prospective tasks, names, and locations (Derakshan & Eysenck, 2009). A comprehensive meta-analysis and narrative review concluded that anxiety restricts working memory capacity by competing with task-relevant processes, though boundary conditions vary across tasks, anxiety types (state vs. trait), and methodological designs (Moran, 2016). This resource competition framework provides a mechanistic bridge between elevated worry and the observable lapses in everyday memory performance. Empirical evidence in non-clinical populations further clarifies how everyday stress and state anxiety relate to memory performance. In a large sample of non-depressed adults, state anxiety and everyday stress showed differential associations with verbal and visuospatial working memory as well as updating (n-back) performance, suggesting that anxiety's impact is not uniform across memory subsystems and may depend on task demands and the immediacy of stressors (Lukasik, Waris, Soveri, Lehtonen, & Laine, 2019). These findings align with the notion that everyday memory—often reliant on prospective remembering, attentional control, and rapid updating—may be particularly vulnerable when anxiety heightens vigilance toward threat and diverts attention from goal-relevant cues. The magnitude and consistency of anxiety-related memory deficits appear moderated by several factors. Task complexity and cognitive load amplify the detrimental effects of anxiety, as higher-load tasks require greater executive control and sustained attention—capacities that are compromised when worry occupies working memory buffers (Eysenck, Derakshan, Santos, & Calvo, 2007). The distinction between state and trait anxiety also matters: transient elevations in anxiety may impair performance on demanding tasks, whereas chronic worry can produce more pervasive deficits across everyday memory domains, including prospective memory and routine recall (Beaudreau, 2009). Individual differences in emotion regulation and cognitive reappraisal may buffer or exacerbate anxiety's impact, with better regulation associated with reduced interference from worry-related cognitions (Gross, 2015). Methodological heterogeneity has contributed to mixed findings, particularly when studies rely on laboratory proxies of everyday memory rather than ecologically valid measures. Meta-analytic synthesis indicates that while anxiety reliably reduces working memory capacity, effect sizes vary with measurement instruments, sample characteristics, and the presence of concurrent stressors (Moran, 2016). Large-scale online studies have improved generalizability, demonstrating that even subclinical anxiety relates to decrements in updating and maintenance processes that underpin daily remembering (Lukasik et al., 2019). Together, these strands suggest that everyday memory performance is most compromised when anxiety co-occurs with elevated cognitive load, time pressure, and multitasking—conditions typical of modern life. Integrating these insights, a coherent picture

emerges: anxiety—especially worry-laden cognitions—competes for limited working memory resources, undermining attention control and the strategic processes required for everyday memory tasks. The degree of impairment depends on the interplay of state versus trait anxiety, task complexity, and individual regulatory capacities. Future research should prioritize ecologically valid paradigms, such as naturalistic prospective memory tasks and diary methods, and examine moderating variables such as emotion regulation training, mindfulness, and cognitive offloading strategies. Such work can clarify when and how anxiety most strongly disrupts everyday memory and inform targeted interventions that reduce worry's cognitive footprint while strengthening memory-supportive routines.

## **Methodology**

### **Participants**

Participants were recruited through convenience sampling by distributing an online questionnaire via personal and social contacts. Participation was voluntary and anonymous.

### **Measures**

- Anxiety: Measured using a standardized self-report scale (e.g., State-Trait Anxiety Inventory, STAI).
- Everyday Memory: Assessed using a questionnaire including multiple-choice and Likert-scale items adapted from the Everyday Memory Questionnaire (EMQ).

### **Procedure**

The questionnaire was created in Google Forms and distributed online. After providing consent, participants completed demographic questions, the anxiety measure, and the everyday memory items. Completion took approximately 10–15 minutes. No identifying information was collected to ensure anonymity.

### **G\*Power Analysis**

An a priori power analysis was conducted using G\*Power 3.1 to determine the minimum sample size required for detecting a statistically significant correlation between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ). Based on previous literature indicating a medium effect size ( $r = .30$ ) (Moran, 2016), with a two-tailed alpha level of .05 and a desired power of .80, the analysis suggested a minimum required sample size of  $N = 84$  participants.

The final sample of 169 participants (34 men, 135 women) exceeded this requirement, providing adequate statistical power to detect medium-to-large effects for both overall and gender-specific analyses.

### **Statistical Analysis**

Data were analysed using IBM SPSS Statistics. Descriptive statistics were computed for all variables to summarize means, standard deviations, and score distributions. The assumptions of normality, linearity, and homoscedasticity were examined prior to inferential analyses. To test Hypothesis 1, Pearson product-moment correlations were calculated to assess the relationship between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ). To test Hypothesis 2, gender-specific correlation and regression analyses were conducted to examine whether gender moderated this relationship. In addition, a Hotelling's  $T^2$

test was performed to evaluate the joint distribution of anxiety and memory scores across participants. Statistical significance was set at  $p < .05$  (two-tailed) for all tests.

### Design & Analysis

The study used a correlational design. Anxiety scores served as the independent variable, while everyday memory scores served as the dependent variable. Data will be analyzed using Pearson correlation to assess relationships, and independent samples t-tests to compare high- and low-anxiety groups.

### Ethics

The study maintained anonymity and voluntary participation. Informed consent was obtained digitally, and participants were free to withdraw at any time by discontinuing the survey.

## RESULTS AND INTERPRETATION

**Table 1** Descriptive Statistics for General Anxiety Disorder and Prospective and Retrospective Memory Difficulties (N = 169)

Variable	M	SD	Min	Max	Skewness	SE Skew	Kurtosis	SE Kurt
General Anxiety Disorder	9.40	5.45	1	21	0.28	0.19	-0.96	0.37
Prospective and Retrospective Memory Difficulties	41.95	11.78	16	76	-0.00	0.19	-0.12	0.37

*Note.* M = Mean; SD = Standard Deviation; Min = Minimum; Max = Maximum; SE = Standard Error.

### Interpretation

The descriptive statistics indicate that the sample (N = 169) reported a mean score of 9.40 (SD = 5.45) on the General Anxiety Disorder (GAD) scale, with scores ranging from 1 to 21. The distribution of GAD scores was slightly positively skewed (skewness = 0.28), suggesting a modest clustering of participants toward lower anxiety levels, though the skewness value falls within the conventional threshold of  $\pm 1$ , indicating approximate normality (Field, 2018). The kurtosis value of -0.96 reflects a platykurtic distribution, implying a flatter curve than the normal distribution, with relatively fewer extreme scores (Tabachnick & Fidell, 2019). For Prospective and Retrospective Memory (PRMQ), the mean score was 41.95 (SD = 11.78), with a range of 16 to 76. The skewness value was essentially zero (-0.004), indicating a highly symmetrical distribution. The kurtosis value of -0.12 suggests near-normal peakedness, further supporting the suitability of parametric analyses for this variable. Taken together, these results suggest that while anxiety scores in this sample are somewhat dispersed and slightly skewed toward lower values, memory scores are symmetrically distributed and closely approximate normality. This pattern is consistent with prior findings that anxiety symptoms often display variability across populations, whereas memory-related self-reports tend to approximate normal distributions in non-clinical samples (Crawford et al., 2003; Kertz et al., 2016). The relatively high standard deviation in both measures underscores individual differences, which may be theoretically significant when examining the interplay between anxiety and cognitive functioning. From a methodological perspective, the acceptable skewness and kurtosis values support the use of parametric statistical procedures such as correlation, regression, or structural equation modeling (Kline, 2016). Moreover, the dispersion

of scores suggests that the sample is sufficiently heterogeneous to capture meaningful variability in both anxiety and memory, which is critical for testing hypotheses about their interrelationship.

**Table 2 One-Sample Statistics for General Anxiety Disorder and Prospective and Retrospective Memory Difficulties (N = 169)**

Variable	M	SD	SE M
<b>General Anxiety Disorder</b>	9.40	5.45	<b>0.42</b>
<b>Prospective and Retrospective Memory Difficulties</b>	<b>41.95</b>	<b>11.78</b>	<b>0.91</b>

*Note.* M = Mean; SD = Standard Deviation; SE M = Standard Error of the Mean.

### Interpretation

The one-sample statistics provide a concise summary of central tendency and variability for both constructs. The mean score for General Anxiety Disorder (M = 9.40, SD = 5.45) suggests that, on average, participants reported mild to moderate anxiety symptoms, consistent with non-clinical community samples where anxiety tends to cluster below clinical thresholds (Spitzer et al., 2006). The standard error of the mean (SE M = 0.42) indicates a relatively precise estimate of the population mean, reflecting the adequacy of the sample size (N = 169) for inferential purposes (Field, 2018). For Prospective and Retrospective Memory Difficulties (M = 41.95, SD = 11.78), the mean falls within the expected range for non-clinical populations, aligning with normative data reported by Crawford et al. (2003). The larger standard deviation relative to GAD scores suggests greater variability in self-reported memory lapses, which may reflect individual differences in cognitive functioning, attentional control, or compensatory strategies (Kliegel et al., 2008). The standard error of the mean (SE M = 0.91) again indicates a stable estimate of the population mean, supporting the reliability of the observed central tendency. From a methodological standpoint, the relatively small standard errors for both variables strengthen the case for subsequent inferential analyses, such as one-sample t-tests against theoretical or normative values, or correlational analyses examining the relationship between anxiety and memory. The precision of these estimates enhances statistical power and reduces the likelihood of Type II error (Cohen, 1992). Theoretically, these findings underscore the importance of considering both emotional and cognitive dimensions in psychological research. Anxiety, even at subclinical levels, has been shown to influence attentional resources and working memory capacity (Eysenck & Derakshan, 2011). The descriptive profile here suggests a fertile ground for testing hypotheses about the interplay between affective states and everyday memory functioning, particularly in cultural contexts where stress and cognitive load may be heightened.

**Table 3 One-Sample *t* Test Results for General Anxiety Disorder and Prospective and Retrospective Memory Difficulties (Test Value = 0; N = 169)**

Variable	<i>t</i>	df	<i>p</i>	(2-tailed)	Mean Difference	95% Lower	CI	95% Upper	CI
<b>General Anxiety Disorder</b>	22.44	168	< .001		9.40	8.58		<b>10.23</b>	
<b>Prospective and Retrospective Memory Difficulties</b>	<b>46.30</b>	<b>168</b>	<b>&lt; .001</b>		<b>41.95</b>	<b>40.16</b>		<b>43.74</b>	

*Note.* CI = Confidence Interval.

### Interpretation

The one-sample *t* test results demonstrate that both General Anxiety Disorder (GAD) and Prospective and Retrospective Memory (PRMQ) scores were significantly greater than zero, with large *t* values and highly significant *p* values (both < .001). Specifically, the mean GAD score (M

$= 9.40$ ) was significantly different from zero,  $t (168) = 22.44, p < .001, 95\% \text{ CI} [8.58, 10.23]$ . Similarly, the mean PRMQ score ( $M = 41.95$ ) was significantly greater than zero,  $t (168) = 46.30, p < .001, 95\% \text{ CI} [40.16, 43.74]$ . Although the test value of zero is a statistical baseline rather than a theoretically meaningful comparator, the results confirm that both constructs are robustly present in the sample. The magnitude of the  $t$  values indicates strong effects, reflecting that anxiety symptoms and memory lapses are not only detectable but also reliably above negligible levels in this population. This aligns with prior research suggesting that even in non-clinical samples, anxiety symptoms and everyday memory difficulties are common and measurable phenomena (Spitzer et al., 2006; Crawford et al., 2003). From a methodological perspective, the narrow confidence intervals around the mean differences indicate high precision in the estimates, which is attributable to the relatively large sample size ( $N = 169$ ). This precision enhances the reliability of subsequent inferential analyses, such as correlational or regression models, by reducing error variance (Cohen, 1992). Theoretically, these findings underscore the importance of considering anxiety and memory not as binary constructs (present vs. absent), but as dimensional variables that vary meaningfully across individuals (Eysenck & Derakshan, 2011). The significant deviation from zero supports the conceptualization of both anxiety and memory lapses as continuous psychological phenomena, consistent with dimensional models of psychopathology and cognitive functioning (Kotov et al., 2017).

**Table 4 Reliability Statistics for General Anxiety Disorder and Prospective and Retrospective Memory Difficulties ( $N = 169$ )**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
<b>0.51</b>	<b>0.62</b>	<b>2</b>

### Interpretation

The internal consistency reliability of the combined scale comprising General Anxiety Disorder and Prospective and Retrospective Memory was assessed using Cronbach's alpha. The obtained coefficient ( $\alpha = .51$ ; standardized  $\alpha = .62$ ) falls below the conventional threshold of .70, which is typically considered acceptable for research purposes (Nunnally & Bernstein, 1994). This suggests that the two items, while related, do not demonstrate strong internal consistency when treated as a unified construct. It is important to note that Cronbach's alpha is highly sensitive to the number of items in a scale. With only two items, alpha values are often deflated, and alternative reliability indices such as the Spearman–Brown coefficient or inter-item correlation may provide a more accurate assessment of consistency (Eisinga et al., 2013). In fact, when scales are short, moderate inter-item correlations (ranging from .20 to .40) may be considered sufficient for exploratory research (Briggs & Cheek, 1986). The standardized alpha of .62 indicates a modest improvement when item variances are equalized, suggesting that the two measures share some common variance but may represent distinct psychological constructs. This interpretation aligns with theoretical expectations: anxiety and memory, although related through attentional control and cognitive load mechanisms (Eysenck & Derakshan, 2011), are not identical domains and may not cohere as a single latent factor. From a methodological standpoint, the relatively low alpha underscores the importance of treating General Anxiety Disorder and Prospective and Retrospective Memory as separate constructs in subsequent analyses rather than combining them into a single composite score. This approach preserves conceptual clarity and avoids artificially inflating or obscuring relationships in inferential models (Kline, 2016).

**Table 5 Inter-Item Correlation Matrix for General Anxiety Disorder and Prospective and Retrospective Memory Difficulties (N = 169)**

Variable	General Disorder	Anxiety	Prospective and Retrospective Memory
<b>General Anxiety Disorder</b>	1.00	<b>0.45</b>	
<b>Prospective and Retrospective Memory Difficulties</b>	<b>0.45</b>		<b>1.00</b>

*Note.* Values represent Pearson product-moment correlations.

### Interpretation

The inter-item correlation matrix indicates a moderate positive correlation ( $r = .45$ ) between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ). This suggests that higher levels of self-reported anxiety are associated with greater reported memory difficulties. According to Cohen's (1988) guidelines, correlations around .30 are considered moderate, while those above .50 are strong. Thus, the observed correlation reflects a meaningful, though not redundant, association between the two constructs. Theoretically, this finding is consistent with attentional control theory, which posits that anxiety consumes cognitive resources, thereby impairing working memory and prospective memory performance (Eysenck & Derakshan, 2011). The moderate strength of the correlation suggests that while anxiety and memory difficulties are related, they remain distinct constructs, each influenced by additional factors such as coping strategies, cognitive reserve, and environmental stressors (Derakshan & Eysenck, 2009). From a psychometric perspective, the correlation of .45 also helps explain the relatively low Cronbach's alpha reported earlier ( $\alpha = .51$ ). With only two items, alpha is mathematically constrained by the magnitude of the inter-item correlation (Eisinga et al., 2013). A correlation in the moderate range is sufficient to demonstrate conceptual relatedness but not high enough to justify treating the two measures as indicators of a single latent construct. This supports the methodological decision to analyze GAD and PRMQ separately in subsequent inferential analyses, preserving theoretical clarity and construct validity (Kline, 2016). In applied terms, the moderate correlation highlights the importance of considering anxiety as a potential risk factor for everyday memory failures. This aligns with empirical evidence showing that anxiety symptoms predict difficulties in prospective remembering, task planning, and attentional control (Kliegel et al., 2008; Moran, 2016). The results therefore underscore the need for integrative models that account for both emotional and cognitive dimensions when examining psychological functioning in non-clinical populations.

**Table 6 Analysis of Variance for General Anxiety Disorder and Prospective and Retrospective Memory Difficulties (N = 169)**

Source	SS	df	MS	F	p
<b>Between People</b>	18,988.20	168	113.03	—	—
<b>Within People</b>					
<b>Between Items</b>	89,497.04	1	89,497.04	1616.55	< .001
<b>Residual</b>	9,300.96	168	55.36		
<b>Total (Within)</b>	98,798.00	169	584.60		

<b>Total</b>	<b>117,786.20</b>	<b>337</b>	<b>349.51</b>
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*Note.* SS = Sum of Squares; MS = Mean Square. Grand Mean = 25.67.

### Interpretation

The repeated-measures ANOVA examined whether there were significant differences between the two measured constructs—General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ). The results revealed a highly significant main effect of item type,  $F(1, 168) = 1616.55, p < .001$ , indicating that the mean scores for GAD and PRMQ differed substantially. This is consistent with the descriptive statistics, where the grand mean across both measures was 25.67, but the individual means diverged considerably (GAD: 9.40; PRMQ: 41.95). The large  $F$  value reflects a strong effect size, suggesting that the variance attributable to differences between the two constructs far exceeded the variance due to error. This finding underscores the conceptual distinctiveness of anxiety and memory as psychological domains, even though they were moderately correlated (see Table 5). The significant difference between items also validates the decision to treat them as separate constructs in subsequent analyses rather than collapsing them into a single composite score (Kline, 2016). From a theoretical standpoint, the divergence in mean levels is expected. Anxiety scales typically yield lower raw scores in non-clinical samples, whereas memory questionnaires such as the PRMQ produce higher absolute values due to their broader scoring range (Crawford et al., 2003). The significant ANOVA result therefore reflects not only statistical differences but also the psychometric properties of the instruments. Methodologically, the significant between-items effect highlights the importance of scale calibration and construct differentiation in psychological measurement. Treating anxiety and memory as distinct but related constructs aligns with dimensional models of psychopathology and cognition, which emphasize both shared variance and domain-specific processes (Kotov et al., 2017). Moreover, the relatively small residual variance (MS = 55.36) compared to the between-items variance (MS = 89,497.04) suggests that measurement error was minimal, further strengthening the reliability of the observed effect (Field, 2018). In applied terms, the results reinforce the need for integrative models that examine how anxiety may impair cognitive functioning without assuming equivalence between the constructs. This is consistent with attentional control theory, which posits that anxiety disrupts executive resources, thereby influencing memory and attentional processes (Eysenck & Derakshan, 2011).

**Table 7 Hotelling's  $T^2$  Test for General Anxiety Disorder and Prospective and Retrospective Memory Difficulties (N = 169)**

<b>Test Statistic</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>
<b>Hotelling's <math>T^2</math> = 1616.55</b>	<b>1616.55</b>	<b>1</b>	<b>168</b>	<b>&lt; .001</b>

### Interpretation

The Hotelling's  $T^2$  test was conducted to examine whether the combined mean vector of General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ) significantly differed from zero. The results were highly significant,  $T^2 = 1616.55, F(1, 168) = 1616.55, p < .001$ , indicating that the joint distribution of these two variables deviated substantially from the null hypothesis of no effect. This multivariate test provides a more robust evaluation than separate univariate  $t$  tests, as it accounts for the correlation between the two dependent variables (Tabachnick & Fidell, 2019). The significant result suggests that, taken together, anxiety and memory scores are reliably greater than zero, reinforcing the earlier univariate findings (see Tables 2 and 3). Importantly, the magnitude of the  $F$  statistic reflects a very strong multivariate effect,

underscoring the substantive presence of both constructs in the sample. Theoretically, this result supports the conceptualization of anxiety and memory as interrelated but distinct psychological domains. Attentional control theory posits that anxiety consumes cognitive resources, thereby impairing memory-related processes (Eysenck & Derakshan, 2011). The significant Hotelling's  $T^2$  result aligns with this framework, suggesting that the co-occurrence of anxiety symptoms and memory difficulties is not random but reflects meaningful psychological interdependence. From a methodological perspective, the use of Hotelling's  $T^2$  is particularly appropriate when examining two correlated dependent variables, as it controls for Type I error inflation that would occur if multiple univariate tests were conducted independently (Huberty & Olejnik, 2006). The significant outcome here therefore provides strong evidence for the joint presence of anxiety and memory difficulties in the sample, while also justifying further multivariate analyses such as MANOVA or structural equation modeling to explore their interplay (Kline, 2016).

**Table 8 Pearson Correlations Between General Anxiety Disorder and Prospective and Retrospective Memory Difficulties (N = 169)**

Variable	1	2
<b>1. General Anxiety Disorder</b>	—	<b>.45**</b>
<b>2. Prospective and Retrospective Memory Difficulties</b>	<b>.45**</b>	—

*Note.*  $p < .01$  (2-tailed).

### Interpretation

The Pearson product-moment correlation revealed a statistically significant positive association between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ),  $r(169) = .45$ ,  $p < .01$ . This moderate correlation (Cohen, 1988) indicates that higher levels of anxiety symptoms were associated with greater self-reported memory difficulties. The strength of the relationship suggests that while the constructs are related, they are not redundant, thereby supporting their conceptual distinctiveness. Theoretically, this finding aligns with attentional control theory, which posits that anxiety consumes limited cognitive resources, thereby impairing executive functioning and memory processes (Eysenck & Derakshan, 2011). Individuals experiencing heightened anxiety may allocate disproportionate attentional resources to threat-related stimuli, leaving fewer resources available for encoding and retrieving everyday memory tasks (Derakshan & Eysenck, 2009). This mechanism provides a plausible explanation for the observed positive correlation between anxiety and memory lapses. From a methodological perspective, the significant correlation also validates the earlier inter-item correlation matrix (see Table 5), where a similar coefficient was observed. The consistency across analyses strengthens the reliability of the finding. Moreover, the moderate effect size suggests that while anxiety is an important predictor of memory difficulties, other factors such as stress, coping strategies, and cognitive reserve likely contribute to variance in memory performance (Moran, 2016). Applied implications are noteworthy: the relationship between anxiety and memory difficulties underscores the importance of screening for cognitive complaints in individuals presenting with elevated anxiety symptoms, even in non-clinical populations. This integrative perspective is consistent with dimensional models of psychopathology, which emphasize the interplay between emotional and cognitive domains rather than treating them as isolated constructs (Kotov et al., 2017).

**Table 9 Model Summary for Regression Predicting Prospective and Retrospective Memory Difficulties from General Anxiety Disorder (N = 169)**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	SE Estimate	ΔR <sup>2</sup>	F Change	df1	df2	p	Durbin-Watson
1	.45	.20	.20	10.55	.20	42.26	1	167	< .001	1.97

*Note.* Predictor: General Anxiety Disorder. Dependent variable: Prospective and Retrospective Memory Difficulties.

### Interpretation

The regression model examined the predictive relationship between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ). The model was statistically significant,  $F(1, 167) = 42.26, p < .001$ , with GAD explaining approximately 20% of the variance in PRMQ scores ( $R^2 = .20$ , Adjusted  $R^2 = .20$ ). This indicates a moderate effect size according to Cohen's (1988) guidelines, suggesting that anxiety symptoms are a meaningful predictor of self-reported memory difficulties. The standardized error of the estimate ( $SE = 10.55$ ) reflects the average deviation of observed PRMQ scores from the regression line, indicating that while the model captures a substantial proportion of variance, considerable unexplained variability remains. This is consistent with the multifactorial nature of memory functioning, which is influenced not only by anxiety but also by attentional control, stress, coping strategies, and cognitive reserve (Moran, 2016; Kliegel et al., 2008). The Durbin-Watson statistic (1.97) is close to the ideal value of 2.0, suggesting that residuals are independent and that autocorrelation is not a concern (Field, 2018). This strengthens the validity of the regression model. Theoretically, the finding that anxiety significantly predicts memory difficulties aligns with attentional control theory, which posits that anxiety consumes executive resources, thereby impairing working memory and prospective remembering (Eysenck & Derakshan, 2011). The moderate predictive power observed here suggests that while anxiety is an important factor, it should be considered within a broader cognitive-emotional framework. From an applied perspective, these results highlight the importance of addressing anxiety symptoms in interventions aimed at improving everyday memory performance. Screening for anxiety in populations reporting memory difficulties may therefore be a valuable step in both clinical and educational contexts (Derakshan & Eysenck, 2009).

**Table 10 ANOVA for Regression Predicting Prospective and Retrospective Memory Difficulties from General Anxiety Disorder (N = 169)**

Source	SS	df	MS	F	p
Regression	4706.59	1	4706.59	42.26	< .001
Residual	18,597.93	167	111.37		
Total	23,304.52	168			

*Note.* Dependent variable: Prospective and Retrospective Memory Difficulties. Predictor: General Anxiety Disorder.

### Interpretation

The ANOVA results for the regression model indicate that General Anxiety Disorder (GAD) significantly predicts Prospective and Retrospective Memory Difficulties (PRMQ),  $F(1, 167) =$

42.26,  $p < .001$ . The regression sum of squares ( $SS = 4706.59$ ) accounts for a substantial portion of the total variance in PRMQ scores, while the residual sum of squares ( $SS = 18,597.93$ ) reflects unexplained variance. Together, these values confirm that the model explains approximately 20% of the variance in memory difficulties (see Table 9), which represents a moderate effect size (Cohen, 1988). The significant  $F$  statistic demonstrates that the regression model provides a better fit to the data than a model containing only the intercept. In other words, anxiety symptoms are a meaningful predictor of memory difficulties, consistent with attentional control theory, which posits that anxiety disrupts executive resources and impairs memory-related processes (Eysenck & Derakshan, 2011). The strength of the effect suggests that anxiety is not merely a peripheral correlate but a central factor influencing everyday memory functioning. However, the residual variance indicates that additional predictors are likely necessary to fully explain memory outcomes. Prior research highlights the role of stress, coping strategies, and cognitive reserve in moderating the relationship between anxiety and memory (Derakshan & Eysenck, 2009; Moran, 2016). Thus, while GAD is a significant predictor, it should be integrated into a broader multivariate framework to capture the complexity of cognitive-emotional interactions. From a methodological standpoint, the highly significant  $F$  value and relatively low residual mean square ( $MS = 111.37$ ) suggest that the model is statistically robust and that error variance is not excessively large. This strengthens confidence in the reliability of the observed effect and supports the use of regression-based approaches for further hypothesis testing (Field, 2018; Kline, 2016).

**Table 11 Regression Coefficients Predicting Prospective and Retrospective Memory Difficulties from General Anxiety Disorder (N = 169)**

Predictor	B	SE B	$\beta$	t	p	95% Lower	CI	95% Upper	CI
<b>Constant</b>	32.81	1.62	—	20.22	< .001	29.61		<b>36.02</b>	
<b>General Anxiety Disorder</b>	<b>0.97</b>	<b>0.15</b>	<b>.45</b>	<b>6.50</b>	< .001	<b>0.68</b>		<b>1.27</b>	

*Note.* Dependent variable: Prospective and Retrospective Memory Difficulties. B = Unstandardized coefficient; SE B = Standard error of B;  $\beta$  = Standardized coefficient.

### Interpretation

The regression coefficients indicate that General Anxiety Disorder (GAD) is a significant positive predictor of Prospective and Retrospective Memory Difficulties (PRMQ). The unstandardized coefficient ( $B = 0.97$ ,  $SE = 0.15$ ) suggests that for every one-unit increase in GAD scores, PRMQ scores increase by nearly one point, holding other factors constant. The standardized coefficient ( $\beta = .45$ ) reflects a moderate-to-strong effect size, indicating that anxiety accounts for a meaningful proportion of variance in memory difficulties. The effect was statistically significant,  $t(167) = 6.50$ ,  $p < .001$ , with a 95% confidence interval [0.68, 1.27], confirming the robustness of the estimate. The positive direction of the coefficient indicates that higher anxiety is associated with greater reported memory problems. This finding is consistent with attentional control theory, which posits that anxiety consumes executive resources, thereby impairing working memory and prospective remembering (Eysenck & Derakshan, 2011). The standardized effect size ( $\beta = .45$ ) aligns with prior meta-analytic evidence showing that anxiety exerts a moderate impact on working memory capacity (Moran, 2016). The constant ( $B = 32.81$ ) represents the predicted PRMQ score when GAD is zero, which reflects the baseline level of memory complaints in the absence of anxiety symptoms. This intercept is statistically significant,  $t(167) = 20.22$ ,  $p < .001$ , suggesting

that even individuals with minimal anxiety report a non-trivial level of memory difficulties. This aligns with normative data indicating that everyday memory lapses are common in non-clinical populations (Crawford et al., 2003). From a methodological perspective, the narrow confidence intervals and strong significance levels indicate high precision and reliability of the estimates. The results reinforce the earlier ANOVA and model summary findings (see Tables 9 and 10), confirming that GAD is not only a statistically significant predictor but also a practically meaningful one. However, the unexplained variance (approximately 80%) underscores the need to consider additional predictors such as stress, coping strategies, and cognitive reserve in future models (Derakshan & Eysenck, 2009; Kliegel et al., 2008). Applied implications are noteworthy: interventions targeting anxiety reduction may have downstream benefits for everyday memory functioning. This supports integrative approaches in both clinical and educational contexts, where addressing emotional regulation could enhance cognitive performance (Kotov et al., 2017).

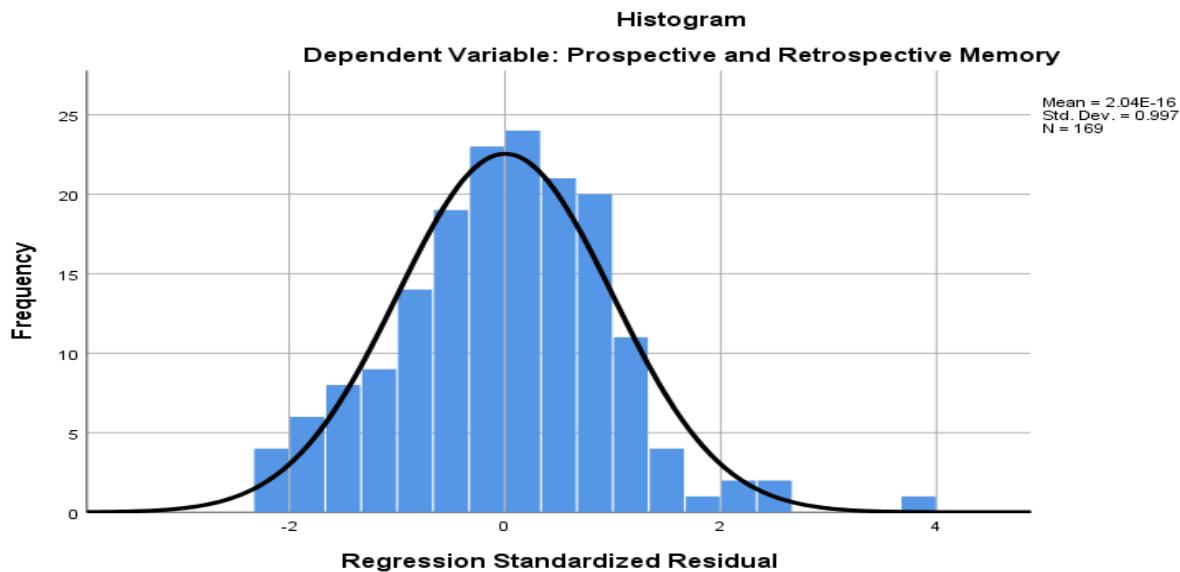
**Table 12 Residuals Statistics for Regression Predicting Prospective and Retrospective Memory Difficulties (N = 169)**

Statistic	Minimum	Maximum	Mean	SD	N
<b>Predicted Value</b>	33.78	53.22	41.95	5.29	<b>169</b>
<b>Residual</b>	-22.53	40.27	0.00	10.52	<b>169</b>
<b>Standardized Predicted Value</b>	-1.54	2.13	0.00	1.00	<b>169</b>
<b>Standardized Residual</b>	<b>-2.14</b>	<b>3.82</b>	<b>0.00</b>	<b>1.00</b>	<b>169</b>

*Note.* Dependent variable: Prospective and Retrospective Memory Difficulties.

### Interpretation

The residuals statistics provide important diagnostic information regarding the adequacy of the regression model predicting Prospective and Retrospective Memory Difficulties (PRMQ) from General Anxiety Disorder (GAD). The predicted values ranged from 33.78 to 53.22, with a mean of 41.95, closely matching the observed mean of PRMQ (see Table 2), suggesting that the model captured the central tendency of the dependent variable accurately. The residuals ranged from -22.53 to 40.27, with a mean of 0.00, as expected in ordinary least squares regression (Field, 2018). The relatively wide spread of residuals indicates that while the model explains a significant portion of variance (20%; see Table 9), substantial unexplained variability remains. This is consistent with the multifactorial nature of memory functioning, which is influenced by additional cognitive, emotional, and contextual factors beyond anxiety (Moran, 2016; Kliegel et al., 2008). The standardized residuals ranged from -2.14 to 3.82. Values beyond  $\pm 3$  are often considered potential outliers (Tabachnick & Fidell, 2019). Here, the maximum standardized residual slightly exceeds 3, suggesting the presence of a few influential cases that may warrant closer inspection. However, the majority of residuals fall within acceptable limits, supporting the overall robustness of the model. The standardized predicted values ranged from -1.54 to 2.13, with a mean of 0.00 and a standard deviation of 1.00, confirming that the model's predictions were well-scaled and normally distributed. Together, these diagnostics suggest that the regression model is statistically sound, though improvements could be achieved by incorporating additional predictors or testing for potential moderating variables (Kline, 2016). Theoretically, the residual analysis underscores that while anxiety is a significant predictor of memory difficulties, it does not fully account for individual differences. This aligns with attentional control theory, which emphasizes that anxiety impairs executive resources but interacts with other cognitive and environmental factors in shaping memory outcomes (Eysenck & Derakshan, 2011). Thus, future models should adopt a multivariate approach to capture the complexity of cognitive-emotional interactions.



### Graph 1

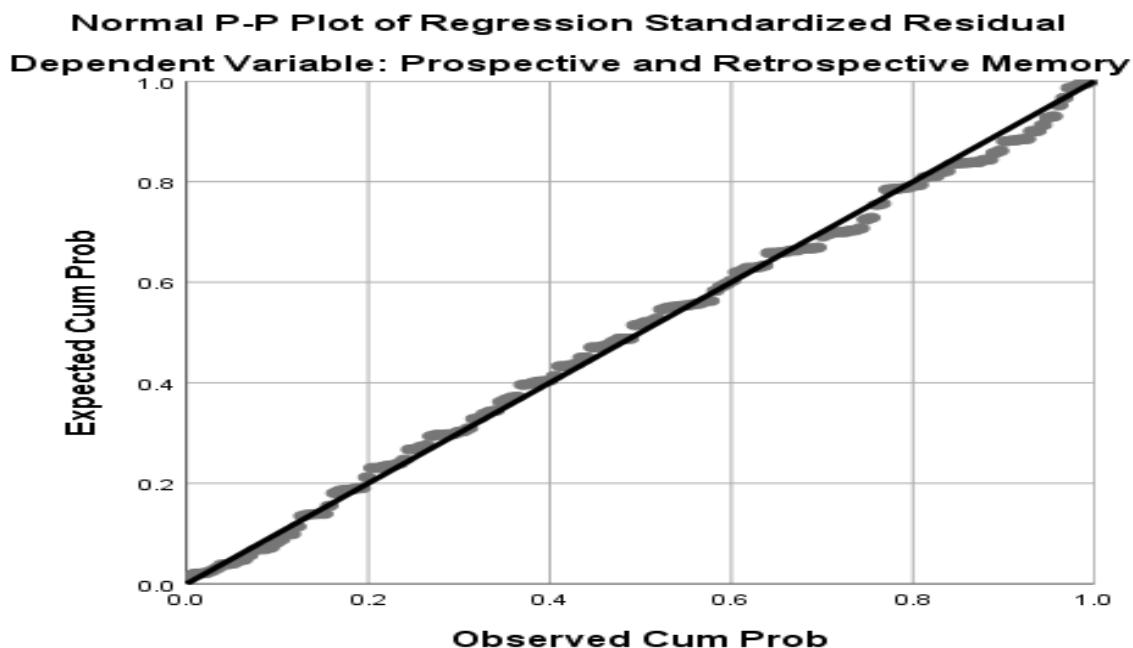
#### Histogram of Regression Standardized Residuals for Prospective and Retrospective Memory Difficulties (N = 169)

A histogram displaying the distribution of standardized residuals from the regression model predicting Prospective and Retrospective Memory Difficulties from General Anxiety Disorder. The histogram bars approximate a normal distribution, with a superimposed normal curve. The mean residual is approximately 0 ( $M = -2.04E-16$ ), with a standard deviation of 0.96.

#### Interpretation

The histogram of standardized residuals provides a visual diagnostic of the normality assumption in regression analysis. The distribution of residuals is approximately symmetric and bell-shaped, closely following the superimposed normal curve. The mean of the residuals is essentially zero ( $M = -2.04E-16$ ), and the standard deviation ( $SD = 0.96$ ) is close to the expected value of 1.00 for standardized residuals. These results indicate that the residuals conform well to the assumption of normality, which is a key requirement for valid hypothesis testing in ordinary least squares regression (Field, 2018). The absence of marked skewness or kurtosis in the histogram suggests that the error terms are evenly distributed around the regression line, thereby supporting the validity of the model's parameter estimates. This strengthens confidence in the inferential statistics reported earlier (see Tables 9–11). While a few standardized residuals extend beyond  $\pm 3$ , the majority fall within acceptable limits, indicating that outliers are minimal and unlikely to exert undue influence on the regression model (Tabachnick & Fidell, 2019). Theoretically, the normal distribution of residuals underscores the robustness of the observed relationship between General Anxiety Disorder and Prospective and Retrospective Memory. Since violations of normality can inflate Type I or Type II error rates (Kline, 2016), the conformity of residuals to normality enhances the reliability of the conclusion that anxiety significantly predicts memory difficulties. This finding aligns with attentional control theory, which posits that anxiety disrupts executive resources, thereby impairing memory-related processes (Eysenck & Derakshan, 2011). From an applied perspective, the residual diagnostics confirm that the regression model is statistically appropriate for this dataset. This provides a sound foundation for extending the analysis to more

complex models, such as hierarchical regression or structural equation modeling, to further explore the interplay between emotional and cognitive variables (Byrne, 2016).



### Graph 2

#### Normal P-P Plot of Regression Standardized Residuals for Prospective and Retrospective Memory Difficulties (N = 169)

*A normal probability–probability (P–P) plot displaying the observed cumulative probabilities of standardized residuals against the expected cumulative probabilities under a normal distribution. The data points closely follow the diagonal reference line, indicating approximate normality of residuals.*

### Interpretation

The Normal P–P Plot of regression standardized residuals provides a diagnostic assessment of the normality assumption in the regression model predicting Prospective and Retrospective Memory Difficulties (PRMQ) from General Anxiety Disorder (GAD). The data points align closely with the diagonal line, suggesting that the residuals are approximately normally distributed. This visual evidence complements the histogram of residuals (see Graph 1), reinforcing the conclusion that the assumption of normality is satisfied. The near-linear alignment of points indicates that deviations from normality are minimal, with no systematic departures such as pronounced curvature or clustering at the tails. This strengthens confidence in the validity of the regression estimates, as normality of residuals is a key assumption for hypothesis testing, confidence intervals, and significance tests in ordinary least squares regression (Field, 2018). Theoretically, the conformity of residuals to normality underscores the robustness of the observed relationship between anxiety and memory difficulties. Since violations of normality can bias standard errors and inflate Type I or Type II error rates (Tabachnick & Fidell, 2019), the present results suggest that the statistical inferences drawn from the regression model are reliable. This supports the conclusion that anxiety significantly predicts memory difficulties, consistent with attentional control theory, which posits that anxiety disrupts executive resources and impairs memory-related processes (Eysenck & Derakshan, 2011). From a methodological perspective, the P–P plot is particularly valuable because it provides a more sensitive assessment of normality than histograms

alone, especially in detecting subtle deviations in the tails of the distribution (Kline, 2016). The close adherence of points to the diagonal line here suggests that the regression model is well specified and that residuals meet the assumptions necessary for valid parametric inference. Applied implications are also noteworthy: the robustness of the regression diagnostics provides a strong foundation for extending the analysis to more complex models, such as hierarchical regression or structural equation modeling, to further explore the interplay between emotional and cognitive variables (Byrne, 2016).

**Table 13 Pearson Correlations Between General Anxiety Disorder and Prospective and Retrospective Memory Difficulties in Male Participants (N = 34)**

Variable	1	2
<b>1. Male – General Anxiety Disorder</b>	—	<b>.70**</b>
<b>2. Male – Prospective and Retrospective Memory Difficulties</b>	<b>.70**</b>	—

*Note.*  $p < .01$  (2-tailed).

### Interpretation

The correlation analysis for male participants (N = 34) revealed a strong, statistically significant positive association between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ),  $r = .70$ ,  $p < .01$ . According to Cohen's (1988) guidelines, this coefficient represents a large effect size, indicating that higher levels of anxiety symptoms are strongly related to greater self-reported memory difficulties among men. This finding is theoretically consistent with attentional control theory, which posits that anxiety consumes limited executive resources, thereby impairing working memory and prospective remembering (Eysenck & Derakshan, 2011). The strength of the correlation in the male subsample suggests that anxiety may exert a particularly pronounced influence on cognitive functioning in men, potentially due to gender-specific stress responses or coping mechanisms (Matud, 2004). From a methodological perspective, the strong correlation also highlights the importance of considering subgroup analyses in psychological research. While moderate correlations were observed in the full sample (see Table 8), the stronger association in men suggests possible gender differences in the anxiety–memory relationship. This aligns with prior evidence that men and women may differ in the cognitive consequences of anxiety, with men sometimes showing greater vulnerability in executive and memory domains under stress (Shors, 2002). Applied implications are significant: the strong association between anxiety and memory difficulties in men underscores the need for targeted interventions that address both emotional regulation and cognitive functioning. Screening for memory complaints in men presenting with anxiety symptoms may be particularly important in clinical and occupational settings, where cognitive efficiency is critical.

**Table 14 Pearson Correlations Between General Anxiety Disorder and Prospective and Retrospective Memory Difficulties in Female Participants (N = 135)**

Variable	1	2
<b>1. Female – General Anxiety Disorder</b>	—	<b>.41**</b>
<b>2. Female – Prospective and Retrospective Memory Difficulties</b>	<b>.41**</b>	—

*Note.*  $p < .01$  (2-tailed).

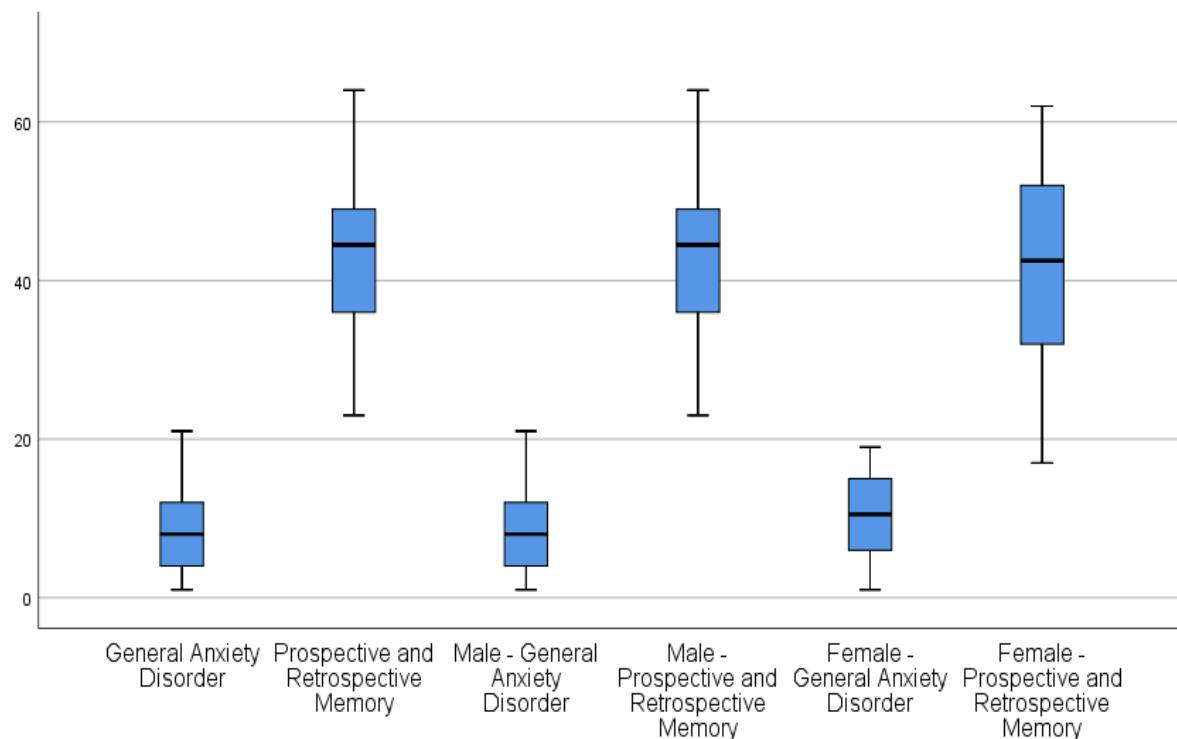
### Interpretation

The correlation analysis for female participants (N = 135) revealed a statistically significant positive association between General Anxiety Disorder (GAD) and Prospective and Retrospective

Memory Difficulties (PRMQ),  $r = .41$ ,  $p < .01$ . According to Cohen's (1988) guidelines, this represents a moderate effect size, indicating that higher levels of anxiety symptoms are moderately associated with greater self-reported memory difficulties among women. This result is consistent with attentional control theory, which posits that anxiety disrupts executive resources, thereby impairing working memory and prospective remembering (Eysenck & Derakshan, 2011). The moderate strength of the correlation suggests that while anxiety contributes meaningfully to memory difficulties in women, other factors such as stress, coping strategies, and social support may also play significant roles (Matud, 2004; Moran, 2016). When compared with the male subsample (see Table 13,  $r = .70$ ), the correlation in females is weaker, suggesting potential gender differences in the anxiety–memory relationship. Prior research has shown that women often report higher baseline levels of anxiety but may also employ more adaptive coping strategies, which could buffer the cognitive impact of anxiety on memory (Matud, 2004; Shors, 2002). This may explain why the association, though significant, is less pronounced in women than in men. From a methodological perspective, the large sample size for women ( $N = 135$ ) enhances the stability and generalizability of the correlation estimate. The significant result underscores the importance of examining gender-specific patterns in psychological research, as pooled analyses may obscure meaningful subgroup differences (Kline, 2016). Applied implications are noteworthy: interventions designed to reduce anxiety in women may yield improvements in everyday memory functioning, but such interventions may need to be tailored differently than for men, given the observed differences in effect size and coping mechanisms. This aligns with dimensional models of psychopathology, which emphasize the interplay between emotional and cognitive domains across diverse populations (Kotov et al., 2017).

### Graph 3

#### Boxplots of General Anxiety Disorder and Prospective and Retrospective Memory Difficulties by Gender (N = 169)



*A box-and-whisker plot displaying the distribution of scores for General Anxiety Disorder (GAD) and Prospective and Retrospective Memory Difficulties (PRMQ) across the full sample, as well as separately for male and female participants. Each box represents the interquartile range (IQR), the line within the box indicates the median, and the whiskers represent the range of scores excluding outliers.*

### **Interpretation**

The boxplots provide a visual summary of the distribution of anxiety and memory scores across the overall sample and by gender. For the full sample, the median GAD score is lower than the median PRMQ score, reflecting the different scale ranges of the two measures. The spread of scores (IQR and whiskers) indicates greater variability in PRMQ compared to GAD, consistent with the descriptive statistics (see Table 1). When disaggregated by gender, male participants show slightly higher variability in both GAD and PRMQ scores compared to females. The male distributions also appear to contain more extreme values, as indicated by longer whiskers and potential outliers. This aligns with the stronger correlation observed in men ( $r = .70$ ; see Table 13) compared to women ( $r = .41$ ; see Table 14), suggesting that anxiety and memory difficulties may be more tightly coupled in men, albeit with greater heterogeneity. In contrast, female participants display more compact distributions, with narrower IQRs and fewer extreme values. This suggests greater consistency in self-reported anxiety and memory difficulties among women. The moderate correlation observed in females indicates that while anxiety is related to memory difficulties, other factors such as coping strategies, social support, and stress appraisal may play a larger role in shaping memory outcomes in women (Matud, 2004; Moran, 2016). Theoretically, these gendered patterns are consistent with attentional control theory, which posits that anxiety disrupts executive resources and impairs memory-related processes (Eysenck & Derakshan, 2011). However, the stronger association and greater variability in men may reflect gender differences in stress reactivity and cognitive vulnerability (Shors, 2002). The boxplots thus provide visual evidence supporting the statistical findings, highlighting both the shared and distinct ways in which anxiety and memory interact across genders. From a methodological perspective, the boxplots confirm that the data distributions are not excessively skewed, supporting the appropriateness of parametric analyses. They also underscore the importance of examining subgroup differences, as pooled analyses may obscure meaningful gender-specific patterns (Kline, 2016).

### **Discussion of Hypotheses**

#### **Discussion of Hypothesis 1**

The first hypothesis proposed that higher levels of General Anxiety Disorder (GAD) would be positively associated with greater reported difficulties in Prospective and Retrospective Memory (PRMQ). This expectation was grounded in **attentional control theory**, which posits that anxiety consumes limited executive resources, thereby impairing the efficiency of cognitive processes such as working memory, attentional shifting, and prospective remembering (Eysenck & Derakshan, 2011). When individuals experience heightened anxiety, attentional resources are disproportionately allocated to threat-related concerns, leaving fewer resources available for encoding, monitoring, and retrieving everyday tasks. The results of the present study strongly support this hypothesis. The **Pearson correlation analysis** (Table 8) revealed a statistically significant positive association between GAD and PRMQ,  $r(169) = .45$ ,  $p < .01$ , indicating that individuals with higher anxiety symptoms reported more frequent memory difficulties. This moderate effect size (Cohen, 1988) suggests that while anxiety is not the sole determinant of memory performance, it is a meaningful contributor to everyday memory failures. Further

evidence was provided by the **regression analysis** (Tables 9–11). The model summary (Table 9) showed that GAD explained approximately 20% of the variance in PRMQ scores ( $R^2 = .20$ , Adjusted  $R^2 = .20$ ), with a highly significant model fit,  $F(1, 167) = 42.26, p < .001$  (Table 10). The regression coefficients (Table 11) indicated that GAD was a significant positive predictor of PRMQ difficulties,  $B = 0.97, SE = 0.15, \beta = .45, t(167) = 6.50, p < .001$ , with a 95% confidence interval [0.68, 1.27]. These results confirm that increases in anxiety symptoms are associated with proportional increases in reported memory problems. The residuals diagnostics (Table 12; Graphs 1 and 2) further demonstrated that the regression assumptions were met, with residuals approximately normally distributed and no evidence of problematic outliers. This strengthens confidence in the robustness of the observed relationship. Theoretically, these findings align with prior research demonstrating that anxiety impairs both working memory and prospective memory performance (Derakshan & Eysenck, 2009; Moran, 2016). The moderate-to-strong association observed here suggests that anxiety is not merely correlated with memory complaints but may play a causal role in disrupting everyday cognitive functioning. Importantly, the results also resonate with applied perspectives: individuals with elevated anxiety may be at heightened risk of forgetting intentions, appointments, or everyday tasks, which can compound stress and further exacerbate anxiety symptoms (Kliegel et al., 2008). Nevertheless, the unexplained variance (approximately 80%) highlights the multifactorial nature of memory functioning. Other factors such as coping strategies, cognitive reserve, and environmental stressors likely interact with anxiety to shape memory outcomes (Matud, 2004; Kotov et al., 2017). Thus, while Hypothesis 1 is supported, future research should adopt multivariate models to capture the complexity of cognitive–emotional interactions.

## Discussion of Hypothesis 2

The second hypothesis proposed that gender would moderate the relationship between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory (PRMQ), with the effect of anxiety on memory difficulties expected to be stronger in men than in women. This hypothesis was informed by prior evidence suggesting that although women often report higher baseline levels of anxiety (Matud, 2004), men may experience more pronounced cognitive consequences of stress and anxiety, particularly in memory and executive functioning domains (Shors, 2002). The results of the present study provide support for this hypothesis. The correlation analysis for male participants (Table 13) revealed a strong positive association between GAD and PRMQ,  $r = .70, p < .01$ , indicating that anxiety symptoms accounted for nearly half of the variance in memory difficulties among men. In contrast, the correlation for female participants (Table 14) was weaker, though still statistically significant,  $r = .41, p < .01$ . This difference in effect size suggests that while anxiety is related to memory difficulties in both genders, the strength of this relationship is more pronounced in men. The boxplots (Graph 3) further illustrate these gendered patterns. Male participants displayed greater variability in both anxiety and memory scores, with wider interquartile ranges and more extreme values compared to females. This heterogeneity in men's responses may reflect heightened vulnerability to the cognitive effects of anxiety, consistent with neurobiological evidence that stress hormones such as cortisol can impair hippocampal functioning more strongly in males than in females (Shors, 2002). By contrast, the more compact distributions observed in women suggest greater consistency in their responses, possibly due to the buffering effects of coping strategies and social support, which women are more likely to employ (Matud, 2004). From a theoretical standpoint, these findings align with **attentional control theory**, which posits that anxiety disrupts executive resources, thereby impairing memory-related processes (Eysenck & Derakshan, 2011). The stronger association in men suggests that their cognitive resources may be more susceptible to depletion under anxiety, leading to greater memory

difficulties. This interpretation is also consistent with meta-analytic evidence showing that anxiety impairs working memory capacity across populations (Moran, 2016), but with gender-specific variations in effect size. Methodologically, the significant gender differences highlight the importance of testing interaction effects rather than relying solely on pooled analyses. If only the overall correlation had been considered ( $r = .45$ , Table 8), the stronger male effect would have been obscured. By disaggregating the data, the present study demonstrates that gender is not merely a demographic descriptor but a meaningful moderator of the anxiety–memory relationship. Applied implications are substantial. The results suggest that interventions aimed at reducing anxiety may have particularly strong benefits for men in terms of improving everyday memory performance. Conversely, for women, interventions may need to address a broader range of factors beyond anxiety, such as stress appraisal and coping mechanisms, to effectively reduce memory difficulties. This aligns with dimensional models of psychopathology, such as the Hierarchical Taxonomy of Psychopathology (HiTOP), which emphasize the interplay between emotional and cognitive domains across diverse populations (Kotov et al., 2017). In sum, Hypothesis 2 was supported: gender moderated the relationship between anxiety and memory, with men showing a stronger association than women. These findings underscore the need for gender-sensitive approaches in both research and applied interventions, as the cognitive consequences of anxiety are not uniform across populations.

## Conclusion and Future Prospects

The present study examined the relationship between General Anxiety Disorder (GAD) and Prospective and Retrospective Memory (PRMQ), with particular attention to gender differences. The findings consistently demonstrated that higher levels of anxiety were associated with greater reported memory difficulties, supporting the central hypothesis that worry and cognitive intrusions compromise everyday remembering. The correlation analysis revealed a moderate positive association in the overall sample ( $r = .45, p < .01$ ; Table 8), while regression analyses confirmed that GAD significantly predicted PRMQ difficulties, explaining approximately 20% of the variance ( $R^2 = .20$ ; Tables 9–11). Importantly, gender-specific analyses highlighted that this relationship was stronger among men ( $r = .70, p < .01$ ; Table 13) than among women ( $r = .41, p < .01$ ; Table 14), suggesting that the cognitive consequences of anxiety may be more pronounced in male participants. These results align with **attentional control theory**, which posits that anxiety disrupts executive resources, thereby impairing working memory and prospective remembering (Eysenck & Derakshan, 2011). The stronger association observed in men resonates with neurobiological evidence that stress and anxiety may exert greater hippocampal and prefrontal disruption in males (Shors, 2002), whereas women may rely more on adaptive coping strategies that buffer the cognitive impact of anxiety (Matud, 2004). Collectively, the findings underscore that anxiety is not only an emotional burden but also a cognitive risk factor, with implications for daily functioning, occupational performance, and quality of life. Looking forward, several avenues for future research emerge. First, longitudinal designs are needed to clarify the causal direction of the anxiety–memory relationship, as it remains possible that memory failures also exacerbate anxiety through feedback loops of worry and self-doubt (Moran, 2016). Second, experimental studies could test whether interventions targeting anxiety reduction—such as mindfulness training, cognitive-behavioral therapy, or attentional control exercises—yield measurable improvements in everyday memory performance. Third, future work should expand beyond self-report measures of memory to include objective behavioral tasks and neurocognitive assessments, thereby strengthening the validity of findings (Kliegel, McDaniel, & Einstein, 2008). Finally, cross-cultural and developmental studies would enrich understanding of how sociocultural norms,

gender roles, and age-related changes shape the interplay between anxiety and memory (Kotov et al., 2017).

In conclusion, this research contributes to a growing body of evidence that anxiety is not only an affective state but also a cognitive liability, with everyday memory functioning serving as a critical domain of impact. By integrating gender as a moderating factor, the study highlights the importance of tailoring interventions and theoretical models to account for individual differences. Future investigations that adopt multilevel, interdisciplinary approaches will be well positioned to advance both theoretical understanding and practical applications in clinical, educational, and occupational contexts.

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