

CAPITAL UNIVERSITY OF SCIENCE AND
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Association of Dysfunctional Metacognitive Beliefs, Worry, Rumination and Mindfulness with Anxiety among Young Adults

by

Mouj e Sehar

A thesis submitted in partial fulfillment for the
degree of Master of Science

in the

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Department of Psychology

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Abstract

Anxiety is a most prevalent disorder worldwide, affecting both individual wellbeing and public health systems. Research indicates that the underlying metacognitive processes play an important role in explanation and maintenance of anxiety. Therefore, this study aimed to examine the relationship of dysfunctional metacognitive beliefs, worry, rumination and mindfulness with anxiety among young adults. A cross-sectional design was used. Data were collected from 390 undergraduate and graduate students of age 18 to 25 years through convenience sampling from Rawalpindi and Islamabad universities. Google Form links were shared online in cafeterias and in classroom settings to collect data. Metacognitions Questionnaire (MCQ), Penn State Worry Questionnaire (PSWQ), Ruminative Response Scale (RRS-10), Five Facet Mindfulness Questionnaire (FFMQ-15) and Generalized Anxiety Disorder Scale (GAD-7) were used. Statistical analyses were conducted in SPSS 26. Multiple regression analysis was also conducted. Results showed that dysfunctional metacognitive beliefs, worry, and rumination significantly positively related to anxiety, whereas mindfulness is negatively related to anxiety. Multiple regression analysis model of dysfunctional metacognitive beliefs, worry, rumination and mindfulness significantly predicted anxiety, explaining 46% of the variance. The results provide evidence to support the application of metacognitive therapy and mindfulness-based interventions for anxiety. This study also provides a context-specific evidence that may inform future research, clinical practice, and mental health policy regarding anxiety among Pakistani young adults.

Keywords: Dysfunctional Metacognitive Beliefs, Worry, Rumination, Mindfulness, Anxiety, Multiple Linear Regression, Young Adults.

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Abbreviations

CAS	Cognitive Attentional Syndrome
DALYs	Disability Adjusted Life Years
FFMQ	Five Facet Mindfulness Questionnaire
GAD	Generalized Anxiety Disorder Scale
LMICs	Low- and Middle- Income Countries
LTM	Long-term Memory
MCQ	Metacognitions Questionnaire
MCT	Metacognitive Therapy
PSWQ	Penn State Worry Questionnaire
RRS	Ruminative Response Scale
S-REF	Self-Regulatory Executive Function Model

Chapter 1

Introduction

1.1 Background of the Study

Anxiety is one of prevalent mental health conditions and a leading cause of global disability, exerting a profound burden on public health systems, individual well-being and societal productivity ([Santomauro et al., 2026](#)). Anxiety disorders are considered one of the most prevailing mental health condition across globe often differentiated by fear, behavioral concerns and worry affecting individuals across all demographic starta ([Santomauro et al., 2026](#); [World Health Organization, 2025](#)). Recent epidemiological data underlines the magnitude of this crisis, with anxiety disorders consistently ranking as a leading cause of DALYs globally ([Santomauro et al., 2026](#); [Peng et al., 2025](#)). The prevalence of these disorders is not static; rather it exhibits dynamic temporal trends influenced by sociodemographic factors cultural contexts, and developmental stages, creating a need to understand their distribution and determinants ([Wang et al., 2026](#)).

Global epidemiological analyses reveal significant variations in the burden of anxiety disorders across different regions and populations. Recent studies utilizing Global Burden of Disease (GBD) data have highlighted distinct temporal trends in anxiety prevalence among older adults, indicating that the disease burden in this demographic is markedly greater than in younger cohorts on certain contexts ([Wang et al., 2026](#)). Specifically, the prevalence of anxiety disorders among individuals

aged 18 to 25 has demonstrated complex patterns of change from 1990 to 2021, reflecting the interplay between aging populations, healthcare access, and changing societal structures (Bie et al., 2024).

The prevalence of anxiety is further modulated by cultural and social aspects, which shape how symptoms are experienced, expressed and addressed. Cultural narratives and social norms play a critical role in determining the stigma associated with mental health conditions, thereby influencing help seeking behaviors and treatment outcomes (Holly, 2024). In many traditional societies, cultural codes of conduct, such as the Pashtunwali in Pakistan significantly impact attitudes toward mental health, often creating barriers to accessing psychiatric care due to heightened stigma and misconceptions about the nature of anxiety (Daraz et al., 2025). Cross-cultural validation of assessment tools, such as Brief Symptom Inventory (BSI), across 42 countries demonstrated that while the core symptoms of anxiety and depression are universal, their measurement and interpretation require careful consideration of cultural invariance (Quintana et al., 2024). Furthermore, help seeking behaviors for anxiety disorders are influenced by ethnicity, mental health literacy, and perceived stigma, with only a fraction of those suffering from anxiety receiving adequate professional support (Hohn and Maricutoiu, 2024; Knettel et al., 2024; Thomas et al., 2024).

Moreover, young adulthood represents a critical period for the onset of anxiety, with psychosocial and biological risk factors converging to increase vulnerability during this developmental stage (Guimarães et al., 2023). Globally the prevalence of social anxiety disorder, a specific subtype is particularly high among children, adolescents, and youth, significantly impairing academic performance and social functioning (Salari et al., 2024). However, older adults face distinct challenges, with anxiety often co-occurring with other chronic conditions and contributing to a compounded disease burden (Cheng et al., 2024). Gender differences are also evident as female gender have higher prevalence as compared to males, a pattern observed across various age groups and cultural contexts (Peng et al., 2025). However, men are not immune, as recent research started to explore the perinatal

mental health has begun to explore the association between adolescent anxiety and later paternal mental health outcomes, suggesting that the impact of anxiety extends across the lifespan and family systems (Lowrie et al., 2022).

While epidemiological and demographic factors provide a macro-level conceptualization of anxiety, the basic psychological processes which maintain and exacerbate these disorders are rooted in cognitive and metacognitive processes. Central to S-REF model, dysfunctional metacognitive beliefs, are an individual's beliefs about one's own thinking processes. According to the model, anxiety is not primarily driven by the content of thoughts however, how individual appraise these thoughts and their perceived ability to control them (Anyan et al., 2023). Maladaptive metacognitive beliefs can be positive or negative. A maladaptive positive metacognitive belief such as problem solving is facilitated by worrying (e.g., "worrying helps me find solutions") may encourage continued engagement in worry and can promote its use; whereas maladaptive negative metacognitive beliefs related to the danger and uncontrollability of thoughts (e.g., "my thoughts are dangerous and I can't control them") may intensify repetitive negative thinking leading to feelings of distress (Jackson and Jones, 2025; Cherry et al., 2023). Dysfunctional metacognitive beliefs, such as beliefs about worry that it is dangerous and uncontrollable, and it serves as significant predictors of severity of anxiety and are involved in the maintenance of anxiety disorders (Nordahl et al., 2023). Longitudinal studies have reported that these beliefs prospectively predict anxiety symptoms, and are mediated by the use of patterns of negative thinking including rumination and worry (Nordahl et al., 2023).

The two major forms of negative thinking patterns are worry and rumination, which are also central components of the CAS described in S-REF model (Wells, 2002a). Worry, typically future-oriented and rumination, often past oriented and focused on causes and consequences, are both driven by positive and negative dysfunctional metacognitive beliefs, both can lead to chronic anxiety (Anyan et al., 2020; Sherwood et al., 2020). The network structure of dysfunctional metacognitive beliefs showed that beliefs about uncontrollability and perceived danger of worry were more significantly associated with worry, whereas the cognitive self-consciousness

was associated with rumination ([Anyan et al., 2023](#)). Research evidence outlined that the significant association of repetitive negative thinking patterns and anxiety symptoms in both clinical and non-clinical populations, including adolescents and individuals with chronic medical conditions, such as neurobiological diseases and cancer ([Mahmodi and Ghaderi, 2024](#); [Lenzo et al., 2020](#)).

On the other hand, mindfulness represents a protective factor that may reduce anxiety by disrupting the cycle of repetitive negative thinking ([Alvarado-García et al., 2025](#)). Mindfulness defined as to be aware of the present moment without judgement, is negatively associated with dysfunctional metacognitive beliefs and anxiety symptoms ([Aldahadha, 2020](#)). Existing research suggested that there are two major facets of mindfulness that act as buffer against the impact of negative beliefs about worry on anxiety. These include non-reactivity and acting with awareness, can buffer ([Sherwood et al., 2020](#)). Research studies have reported that patients diagnosed with anxiety experience more dysfunctional metacognitive beliefs and lower levels of mindfulness than healthy participants, suggesting that these variables are critical targets for intervention ([Aydm et al., 2022](#)). Thus, mindfulness allows decentering and allows individuals to observe their thoughts without becoming entangled in them, thereby reducing the frequency and intensity of worry and rumination ([Jackson and Jones, 2025](#)). This interplay between dysfunctional metacognitive beliefs, worry, rumination and mindfulness provides a comprehensive framework for understanding the etiology of anxiety and informs the development of targeted therapeutic approaches, such as MCT and mindfulness-based interventions, which aim to modify these underlying cognitive processes ([Aydm et al., 2022](#); [Wolenski et al., 2021](#)).

1.2 Gap Analysis

Literature demonstrates that dysfunctional metacognitive beliefs play a central role in the development and maintenance of anxiety by promoting maladaptive cognitive processes, particularly worry and rumination, as proposed in S-REF model and metacognitive theory ([Wells and Matthews, 1994, 1996](#)). Worry and rumination are

recognized as core components of the CAS, which perpetuates emotional distress through threat monitoring, repetitive negative thinking, and maladaptive coping strategies (Wells, 2009, 2011). In contrast, mindfulness has been identified as a protective psychological resource that facilitates adaptive attentional regulation, decreases cognitive reactivity, and reduces emotional distress (Brown and Ryan, 2003; Gu et al., 2015). Although existing literature evidence supports the independent roles or dyadic relationships of these variables and anxiety (Gerdan, 2025). Literature also demonstrated them into a one factor construct of repetitive negative thinking and their specific contributions in maintenance of anxiety (Anyan et al., 2023). There is a critical lack of integrated multiple linear regression models that separate their unique contributions in specific cultural contexts such as Islamabad and Rawalpindi, Pakistan.

Previous research has primarily examined dysfunctional metacognitive beliefs, worry, rumination, mindfulness, and anxiety independently or through simple bivariate associations. Existing literature has predominantly investigated dysfunctional metacognitive beliefs as predictors of anxiety Normann and Morina (2018); Spada et al. (2008), examined the contribution of worry and rumination to anxiety symptomatology (Ehring and Watkins, 2008; Watkins, 2008), and evaluated the anxiety-reducing benefits of mindfulness (Khoury et al., 2013; Gu et al., 2015). Comparatively few research studies have reported these constructs simultaneously within a comprehensive conceptual framework. Consequently, the relative contributions and interrelationships among dysfunctional metacognitive beliefs, worry, rumination, mindfulness, and anxiety remain insufficiently understood. Furthermore, although metacognitive theory proposes that dysfunctional metacognitive beliefs contribute to anxiety through persistent worry and rumination (Wells, 2009, 2011), relatively few empirical studies have integrated these cognitive processes within a single explanatory model. Most investigations have relied on direct associations without examining the broader cognitive mechanisms through which maladaptive metacognitive beliefs influence anxiety. This limits the understanding of how dysfunctional metacognitive beliefs contribute to anxiety through interconnected cognitive processes rather than functioning as isolated predictors. Another

critical gap lies in the generalizability of findings from clinical samples to non-clinical young adult populations. Previous research conducted in clinical settings, mainly with individuals diagnosed with anxiety disorders ([Daraz et al., 2025](#)). However, young adulthood is a developmental period characterized by unique stressors, including academic pressure, social transition and identity formation, which may influence the expression and maintenance of anxiety differently than in older adults or clinical populations ([Anyan et al., 2023](#); [Narmandakh et al., 2021](#)). Preventive interventions that are tailored to the specific cognitive vulnerabilities of young adults are based on the understanding of these developmental changes.

Additionally, existing evidence has been derived predominantly from Western populations. Cognitive and metacognitive processes are shaped by cultural beliefs, emotional regulation strategies, and social norms ([Markus and Kitayama, 1991](#); [Ryder et al., 2008](#)). Empirical evidence from LMICs, particularly Pakistan, remains limited despite the significant increase in the prevalence of anxiety in young adults and the growing recognition of mental health as a public health priority ([World Health Organization, 2022](#)). The scarcity of culturally relevant evidence limits the applicability of existing theoretical models and intervention strategies within the Pakistani context and highlights the need for research examining these mechanisms within diverse cultural settings.

Therefore, the study addresses the gaps in the previous research by examining the predictive contributions of dysfunctional metacognitive beliefs, worry, rumination, and mindfulness on anxiety in non-clinical, culturally specific population of young adults in Pakistan.

1.3 Problem Statement

Anxiety is a most prevalent disorder worldwide, affecting both individual wellbeing and public health systems ([Santomauro et al., 2026](#)). Recent literature highlights the temporal trends influenced by sociodemographic indices, cultural contexts, and

developmental stages in the understanding and development of anxiety (Holly, 2024). Furthermore, persistent anxiety is frequently driven by underlying cognitive and metacognitive mechanisms including dysfunctional metacognitive beliefs, worry, rumination and mindfulness (Anyan et al., 2023). The main objective of the present study is to resolve these uncertainties by a constructing a comprehensive model that integrates dysfunctional metacognitive beliefs, worry, rumination and mindfulness as predictors of anxiety.

By examining these variables simultaneously, this study seeks to determine the unique and shared variance of these variables to anxiety. This approach moves beyond simple correlational analysis to provide an integrated understanding of dysfunctional metacognitive beliefs, worry, rumination and mindfulness in the maintenance of anxiety. This research provides information about specific intervention strategies that addresses cognition. The study helped identify that if dysfunctional metacognitive beliefs are found to be the key feature, Metacognitive Therapy (MCT) may be prioritized over traditional Cognitive Behavioral Therapy (CBT) (Anyan et al., 2023).

On the other hand, if mindfulness emerges as a stronger predictor, preventive programs focusing on mindfulness training may be recommended for young adults (Malik and Perveen, 2023).

1.4 Theoretical Framework

SREF model Wells and Matthews (1996) and further developed by Wells (2002b) serves as a basis for this research. This model provides a comprehensive understanding of underlying cognitive and metacognitive processes of anxiety. The model states that psychological difficulties occur as a result of maladaptive cognitive processing rather than as a direct consequence of external events or intrusive thoughts. According to the model, these difficulties are associated with CAS, of persistent attention focused on self, worry, rumination, monitoring of threat,

and maladaptive strategies to cope which interact with adaptive regulation of self and on-line processing of negative self-beliefs. The model also emphasizes that psychological disturbance is maintained by the interaction between metacognitive knowledge, appraisal processes, and coping strategies that repeatedly activate and strengthen maladaptive patterns of thinking.

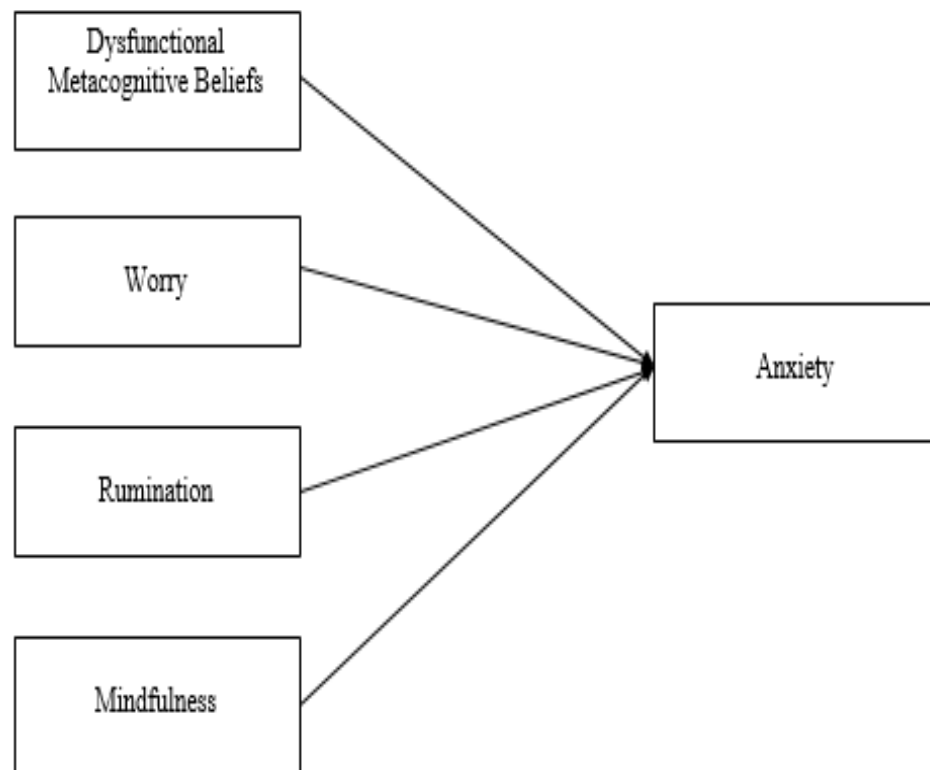


FIGURE 1.1: Conceptual Framework of Study Variables

The model proposes that cognitive functioning has 3 levels; automatic processing system acting at lower level, an on-line executive processing system responsible for the conscious regulation of thoughts and behavior, and storing knowledge about self in LTM. This self-knowledge includes metacognitive beliefs that function as plans for processing and guide attention allocation, appraisal, memory retrieval, and coping responses. In these ways, anxiety can be influenced by the metacognitive beliefs that determine response of an individual.

Within the given model, metacognitive beliefs are considered as a vulnerability and maintenance of anxiety. These beliefs consist of both explicit and implicit knowledge concerning the meaning, controllability, and consequences of thinking. The beliefs involves thoughts to be uncontrollable and harmful and worrying to cope with threat. These dysfunctional metacognitive beliefs reinforce dysfunctional processing operations that maintain and exacerbates anxiety ([Nordahl et al., 2023](#); [Aldahadha, 2020](#)).

S-REF conceptualizes worry as an active coping strategy that constitutes a core element of the cognitive attentional syndrome. This is voluntarily initiated in response to perceived threat. Although individuals may believe that worrying prepares them for future events or enhances coping, worry functions as a perseverative thinking strategy. It maintains activation of threat-related beliefs rather than resolving them. Persistent worry consumes attentional resources, prolongs self-focused processing, and interferes with the restructuring of maladaptive self-knowledge. Thus, greater worry is expected to predict increased anxiety ([Anyan et al., 2023](#); [Mahmodi and Ghaderi, 2024](#)).

Similarly, the S-REF identifies rumination as another maladaptive mental strategy that contributes to the maintenance of anxiety. Rumination involves repetitive processing of negative thoughts, emotions, and self-referent knowledge, which strengthens negative beliefs about self. It maintains the activity of cognitive attentional syndrome. Rather than facilitating problem solving or belief modification, rumination consumes valuable processing resources that could otherwise be directed toward adaptive coping and cognitive restructuring. Therefore, individuals who engage in greater rumination are expected to report increased levels of anxiety ([Anyan et al., 2020](#)).

In comparison to perseverative self-focused processing, in contrast, metacognitive mode is capable of driving shifts in dysfunctional belief. The metacognitive mode of processing in which individuals are able to record their thoughts as representing reality rather than mental activity. Mindfulness reflects many characteristics of

this metacognitive mode by promoting present-moment awareness, non-judgmental observation, and psychological distance from internal experiences. Through this metacognitive mode, individuals are less often to engage in worry, rumination, and monitoring potential threats, allowing attentional resources to be redirected toward more adaptive forms of self-regulation. As a result, mindfulness is expected to interrupt the cognitive-attentional syndrome and reduce anxiety (Sieder et al., 2024; Xu et al., 2022; Ford et al., 2023).

Based on the assumptions of model, the present study proposes that dysfunctional metacognitive beliefs, worry, rumination, and mindfulness are important cognitive and metacognitive determinants of anxiety. Specifically, higher dysfunctional metacognitive beliefs, greater worry, and greater rumination are expected to increase anxiety, whereas higher mindfulness is expected to reduce anxiety by facilitating adaptive metacognitive processing and disengagement from perseverative thinking.

1.5 Rationale

Young adulthood, usually defined as the developmental period between the ages of 18 and 25, represents a critical transitional phase characterized by identity exploration, instability and self-focus (Forster et al., 2019; Arnett, 2000). This demographic faces unique psychosocial stressors, including academic pressures, careers uncertainty, and financial strain, which significantly increase the risk for the onset and maintenance of anxiety (World Health Organization, 2025; Bosquet and Egeland, 2006). Pakistani young adults represent a different population due to unique interplay of developmental stressors and sociocultural norms (Asif et al., 2024). Unlike Western contexts, Pakistani society is characterized by collectivist norms and religious coping mechanisms, which may influence the form and expression of metacognitive beliefs (Khan and Ahmed, 2023). Cultural narratives may stigmatize mental health help-seeking (Daraz et al., 2025), which can lead young adults to internalize distress through rumination rather than seeking external support (Kelly and Tonge, 2025). Furthermore, parental expectations and familial obligations in young adults may intensify the perceived uncontrollability of worry

(Samar et al., 2024), as academic and social failures are often viewed as familial disappointments rather than individual setbacks (Talha et al., 2020). These factors may state the onset, maintenance and expression of anxiety and may affects the relationship between dysfunctional metacognitive beliefs, worry, rumination and anxiety (Cucchi and Qoronfleh, 2025; Forouhari et al., 2019). Local epidemiological trends also indicate a rising burden of anxiety among youth in South Asia (Bie et al., 2024). A study conducted on undergraduate students in Pakistan reported anxiety symptoms in 41.1% of participants (Ijaz et al., 2023).

Anxiety symptoms are prevalent in this population, yet the underlying cognitive mechanisms that maintain these states remain complex and multifaceted. The traditional cognitive-behavioral models have extensively examined the role of negative automatic thoughts and distorted cognitive schemas (Clark and Beck, 2011). This creates a need for cognitive restructuring and behavioral to facilitate more adaptive thinking (Curtiss et al., 2021) whereas, the theoretical model of this study, the S-REF model proposes by Wells and Matthews (1996) states that it is not only the content of the thoughts that can cause anxiety, but the individual's belief about their own cognitive processes can determine the duration and intensity of anxiety (White et al., 2024). Literature suggests that this includes dysfunctional metacognitive beliefs leading to CAS (Anyan et al., 2023).

The CAS is characterized by sustained threat monitoring, maladaptive coping behaviors, and repetitive negating thinking, which maintain anxiety symptoms (Nordahl et al., 2023). While theoretical evidence supports the S-REF model, empirical investigation is still required within specific cultural and developmental contexts, specifically among young adults in non-Western cultures (Villagomez-Pacheco, 2025). Moreover, the lack of literature presents for examining S-REF model creates a significant gap in understanding whether existing theoretical frameworks apply universally or require cultural adaptation. By investigating the relationship between dysfunctional metacognitive beliefs and anxiety, present study aims to further establish the transdiagnostic significance of these beliefs across

psychological disorders ([Anyan et al., 2020](#)).

The transdiagnostic significance of these metacognitive processes lies in their ability to explain the comorbidity and maintenance of various emotional disorders ([Jackson and Jones, 2025](#); [Cano-López et al., 2021](#)). Worry usually future-oriented, and mainly focuses on anticipated threats whereas rumination often past-oriented, mainly focusing on meaning, self-worth and themes of failure and loss ([Anyan et al., 2020](#)). Worry and rumination, although different in their temporal orientation ([Stade and Ruscio, 2023](#); [Anyan et al., 2020](#)), also serve a shared function of contrast avoidance, where the individuals maintain a negative emotional state to avoid the shock of sudden emotional shifts ([Baik and Newman, 2023](#)). This mechanism is transdiagnostic because it applies to panic disorder, depression, and anxiety ([Jackson and Jones, 2025](#)), and suggests that dysfunctional metacognitive beliefs are a core underlying vulnerability across psychopathologies ([Sun et al., 2017](#)). By targeting these higher-order beliefs, interventions can address the root cause of anxiety symptoms ([Anyan et al., 2023](#)). This provides a more effective pathway to stop relapse, as it prevents the re-engagement of CAS strategies ([Normann and Morina, 2018](#); [Normann et al., 2014](#)).

Furthermore, the study addresses the distinct yet overlapping roles of worry and rumination, the two core components of repeated negative thoughts. Both worry and rumination have shared underlying mechanisms ([Baik and Newman, 2023](#)), including metacognitive beliefs related to uncontrollable thoughts, and both significantly contributes to anxiety symptoms ([Anyan et al., 2020](#)). The current research also aims to clarify the unique variance each contributes to anxiety symptom when controlled for the other. The high prevalence of both worries and rumination in young adults creates a need of comprehensive analysis of their impacts on anxiety ([Anyan et al., 2020](#)).

Moreover, the study investigates the protective role of mindfulness ([Solem et al., 2015](#)). Mindfulness theory proposes mindfulness as a buffering acting against psychological distress by enhancing attentional control and emotional regulation,

thereby disrupting the CAS (Prakash, 2021). Existing studies have demonstrated that mindfulness-based interventions effectively reduced anxiety symptoms, yet the specific mechanism by which mindfulness interacts with dysfunctional metacognitive beliefs, worry and rumination requires further investigation (Jackson and Jones, 2025). The negative association of mindfulness with anxiety can highlight the potential of mindfulness as a preventive factor that can reduce the effect of stressors on anxiety (Polak and Grossman, 2025). Prevention and intervention strategies should focus not only on reducing symptoms but also on addressing the underlying metacognitive processes (Nordahl et al., 2023; Curtiss et al., 2021). The unique predictive contributions of worry, rumination, and mindfulness can guide clinicians to develop specific interventions that can enhance mindful awareness and disrupt the CAS before it develops into clinical anxiety. Furthermore, the integration of all the four constructs into a single multiple regression model provides a comprehensive understanding of shared and independent variance with anxiety (Anyan et al., 2020). Thus, this study has potential to further explain theoretical understanding and predicting of variance by examining the association between dysfunctional metacognitive beliefs, worry, rumination and mindfulness with anxiety among young adults (Anyan et al., 2023).

1.6 Research Objectives for this Study

The research objectives are:

- i. To examine the association of dysfunctional metacognitive beliefs, worry, rumination and mindfulness with anxiety among young adults.
- ii. To examine the gender related differences dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety among young adults.

1.7 Research Hypotheses for this Study

The hypotheses of this study are as follows:

-
- i. Dysfunctional metacognitive beliefs positively predicts anxiety among young adults.
 - ii. Worry positively predicts anxiety among young adults.
 - iii. Rumination positively predicts anxiety among young adults.
 - iv. Mindfulness negatively predicts anxiety among young adults.
 - v. There is a significant gender differences in dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety among young adults.

Chapter 2

Literature Review

This chapter of the study provides a comprehensive review of the literature related to a dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety. This chapter examines each construct individually and discusses the existing evidence regarding the relationships among these variables.

2.1 Dysfunctional Metacognitive Beliefs and Anxiety

Dysfunctional metacognitive beliefs emerged as one of the most influential psychological constructs in explaining the development and maintenance of anxiety ([Capobianco et al., 2020](#)). Recent studies states that metacognitive beliefs are considered as important transdiagnostic factor underlying a wide range of emotional disorders including anxiety and depression ([Normann and Morina, 2018](#); [Normann et al., 2014](#)). This includes both positive and negative metacognitive beliefs that creates a self-perpetuating cycle in which repetitive thinking is initiated yet simultaneously experienced as threatening, thereby maintaining anxiety over time ([Wells, 2009](#)). The findings also suggest that anxiety persists because individuals remain engaged in maladaptive cognitive regulation strategies rather than to experience negative thoughts alone ([Alawadhi et al., 2022](#)). Research further suggests both positive and negative dysfunctional metacognitive beliefs do not contribute equally

to anxiety ([White et al., 2024](#)). Studies have consistently demonstrated that negative dysfunctional metacognitive beliefs related to the uncontrollability and danger of thoughts shows the strongest associations with anxiety symptoms, whereas positive metacognitive beliefs about the usefulness of worry appear to play a greater role in initiating repetitive negative thinking ([Aydm et al., 2022](#)).

Across clinical and community populations, individuals who report stronger beliefs regarding the uncontrollability and danger of thoughts consistently exhibit higher levels of anxiety, suggesting that maladaptive metacognitive beliefs represent a cognitive vulnerability rather than a disorder-specific characteristic ([Capobianco et al., 2020](#)). Moreover, individuals endorsing stronger dysfunctional metacognitive beliefs are more likely to engage simultaneously in multiple forms of repetitive negative thinking, thereby increasing the severity and persistence of anxiety symptoms ([Anyan et al., 2020](#)).

Supporting this evidence, ([Spada et al., 2021](#)) examined the differential contribution of metacognitive beliefs to worry and rumination and reported that negative beliefs regarding the uncontrollability and danger of thoughts independently predicted both cognitive processes. [Kannis-Dymand et al. \(2020\)](#) also reported significant associations between dysfunctional metacognitive beliefs and symptoms of anxiety across both clinical and non-clinical populations. Their findings suggested that individuals with stronger beliefs related to the uncontrollability and danger of thoughts consistently reported higher levels of anxiety. Similarly, [Cherry et al. \(2023\)](#) demonstrated that dysfunctional metacognitive beliefs predicted greater engagement in worry, rumination, and threat monitoring, all of which contributed to higher anxiety symptoms. [Palmieri et al. \(2024\)](#) found that dysfunctional metacognitive beliefs remained significant predictors of anxiety even after controlling for depressive symptoms and general psychological distress.

Empirical studies have shown that higher levels of dysfunctional metacognitive beliefs are significantly associated with greater engagement in repetitive negative thinking during adolescence and early adulthood ([Thinkbak et al., 2024](#)). The

literature suggested that maladaptive metacognitive beliefs develop relatively early and remain stable across developmental stages, thereby increasing vulnerability to anxiety throughout young adulthood. These findings are particularly important because repetitive negative thinking occurring at subclinical levels has been identified as an early cognitive vulnerability preceding the development of emotional disorders (Sloan et al., 2021).

Research conducted in Pakistan has mainly focused on the prevalence of anxiety and psychological distress, while comparatively fewer studies have investigated the metacognitive mechanisms responsible for these emotional difficulties (Mukhtar et al., 2024; Malik and Perveen, 2023). Furthermore, the meta-analytic findings suggest that interventions targeting dysfunctional metacognitive beliefs produce significant reductions in anxiety symptoms across different anxiety disorders, providing evidence that these beliefs are not merely correlated of anxiety but important maintaining mechanisms (Normann and Morina, 2018; Normann et al., 2014).

2.2 Worry and Anxiety

Worry, recognized as defining cognitive feature of anxiety and has been extensively studied. Evidence suggesting that worry represents primary cognitive process underlying anxiety. Anxiety is a multidimensional construct including emotional physiological, cognitive and behavioral responses to perceived threat, worry specifically refers to repetitive, future-oriented thinking about uncertain and potentially negative events (Borkovec et al., 1983). However, studies conceptualize worry as cognitive manifestation through which anxiety is initiated, maintained and intensified (Hirsch and Mathews, 2012). The relationship between these two constructs was first articulated by Borkovec et al. (1983), who defined worry as relatively uncontrollable chain of negative thoughts aimed at anticipating and preventing future threats.

Worry is particularly evident in generalized anxiety disorder, where excessive and overwhelming worry represents primary diagnostic criterion. According to Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), individuals with

GAD experience excessive anxiety and worry across multiple life domains that are difficult to control and are accompanied by symptoms such as fatigue, muscle tension, restlessness, irritability, sleep disturbance and impaired concentration ([American Psychiatric Association, 2022](#)).

Although worry is frequently viewed as maladaptive, studies suggest that it may initially serve as an adaptive function. Studies proposed that worrying enables individuals to anticipate future difficulties, prepare for potential threats and engage in problem solving before adverse events occur ([Davey, 1994](#)). Similarly, research examining adaptive anxiety has suggested that heightened sensitivity to threat may promote effective coping when stressful situations are manageable, although this adaptive nature diminished when uncertainty cannot resolve ([Notebaert et al., 2017](#)).

Excessive worry has been identified as a transdiagnostic cognitive process that contributes to the development and maintenance of anxiety across clinical and non-clinical populations ([Ehring and Watkins, 2008](#); [Spada et al., 2021](#)). [Cano-López et al. \(2021\)](#) described worry as one of the principal forms of repetitive negative thinking associated with emotional disorders. This review suggested that worry primarily focuses on future-oriented threats and uncertainty, whereas rumination is predominantly concerned with past experiences and emotional losses. Literature also emphasizes that worry is not only a symptom of anxiety but a primary cognitive mechanism that maintains and exacerbates anxious states through specific neurobiological and psychological pathways ([Ohi et al., 2025](#)).

Research suggests that although worry may facilitate planning and preparation for future events, persistent and excessive worry interferes with effective problem-solving, maintains threat-focused attention, and contributes to psychological distress ([Cano-López et al., 2021](#)). A systematic review suggested that repetitive negative thinking, particularly worry, interferes with adaptive emotion regulation and increases the likelihood of developing anxiety disorders over time ([Sloan et al., 2021](#)). Previous studies have demonstrated that students reporting higher levels of

worry also experience significantly greater anxiety and emotional distress (Sloan et al., 2021). These findings are consistent with the theoretical suggestion that adaptive regulation of cognitive processes may be more important than modifying the content of thoughts themselves (Wells, 2009).

Spada et al. (2021) investigated the contribution of different dimensions of dysfunctional metacognitive beliefs to worry and rumination. Köcher et al. (2022) reported that adolescents and young adults experiencing elevated anxiety symptoms also demonstrated stronger dysfunctional metacognitive beliefs and higher levels of worry. Likewise, Thinkbak et al. (2024) observed significant associations between dysfunctional metacognitive beliefs, repetitive negative thinking, and anxiety during adolescence and early adulthood. Gentes and Bonchonsky (2026) argued that worry rarely occurs in isolation and frequently coexists with rumination, suggesting that both processes share common metacognitive mechanisms.

A comprehensive meta-analysis by Stade and Ruscio (2023) demonstrated a robust positive association between worry and rumination, indicating that repetitive negative thinking represents a common cognitive vulnerability underlying emotional distress. Contemporary research studies further showed that greater levels of worry are consistently associated with higher anxiety, whereas adaptive cognitive processes such as mindfulness may reduce this relationship by facilitating disengagement from repetitive thinking (Jackson and Jones, 2025; Aydin et al., 2022).

Wilson et al. (2023) reported that interventions reducing intolerance of uncertainty also result in reduction in worry and anxiety symptoms. Similarly, Akbari et al. (2026) demonstrated that worry is associated with anxiety and intolerance of uncertainty. Research conducted in Pakistan similarly indicates that anxiety is highly prevalent among university students and young adults. Naqvi et al. (2025) reported higher levels of anxiety and psychological distress among Pakistani university students.

2.3 Rumination and Anxiety

Cognitive and metacognitive theories identify rumination as a form of repetitive negative thinking that prolongs emotional distress, interferes with adaptive emotion regulation, and increases vulnerability to anxiety ([Jackson and Jones, 2025](#); [Cano-López et al., 2021](#)). Individuals who frequently ruminate experience difficulties disengaging from negative thoughts because repetitive thinking consumes attentional resources and limits cognitive flexibility ([Klonsky et al., 2021](#)). Previous studies suggest that individuals who ruminate do not process their emotional experiences adaptively, instead they are engaged in repetitive self-focused thinking that maintains attention on perceived failures, losses, and unresolved concerns, thereby increasing emotional distress ([Wells, 2009](#)).

Researchers suggest that rumination contributes to anxiety by impairing attentional control and increasing sensitivity to perceived threats. Persistent self-focused thinking consumes cognitive resources available for adaptive problem-solving and emotional regulation, thereby increasing vulnerability to stress and uncertainty ([Stade and Ruscio, 2023](#)). Studies also suggest that rumination is associated with increase emotional reactivity, impaired attentional control, and prolonged physiological arousal contribute to maintenance of anxiety symptoms ([Stade and Ruscio, 2023](#)).

Rumination derives its persistent nature from dysfunctional metacognitive beliefs rather than from the emotional events ([Anyan et al., 2020](#)). These findings support [Wells \(2009\)](#) proposition that repetitive thinking becomes maladaptive when individuals remain in the process of negative thinking. These dysfunctional metacognitive beliefs significantly predict repetitive negative thinking, including rumination, which subsequently contributed to increased anxiety symptoms. Similarly, [Schneider et al. \(2023\)](#) reported that both positive and negative metacognitive beliefs were strongly associated with increases levels of rumination. Thus, the individuals with greater dysfunctional metacognitive beliefs reported greater engagement in repetitive thinking, which was accompanied by elevated anxiety and

depressive and anxiety symptoms ([Schneider et al., 2023](#)).

[Jackson and Jones \(2025\)](#) further extended this evidence by investigating brooding and reflective rumination within the metacognitive framework. They reported that brooding rumination demonstrated particularly strong positive associations with dysfunctional metacognitive beliefs, anxiety and depression. Although reflective rumination was also associated with dysfunctional metacognitive beliefs, anxiety and depression, brooding appeared to represent the more maladaptive component. [Jackson and Jones \(2025\)](#) also found that brooding rumination was positively associated with dysfunctional metacognitive beliefs and anxiety, whereas dispositional mindfulness demonstrated significant negative associations with the variables. Similarly, [Palmieri et al. \(2024\)](#) found that dysfunctional metacognitive beliefs remained significant predictors of anxiety and depression, indicating that rumination contributes uniquely to anxiety rather than only reflecting depressive symptomology.

In terms of age, studies reported that repetitive negative thinking, particularly rumination, was significantly associated with dysfunctional metacognitive beliefs during adolescence and adulthood ([Thinkbak et al., 2024](#)).

2.4 Mindfulness and Anxiety

The relationship between mindfulness and anxiety in non-clinical young adult population is characterized by negative association whereas higher levels of dispositional mindfulness serves as a significant protective factor against the development and maintenance of anxiety symptoms. Recent studies states that mindfulness mitigates anxiety by disrupting maladaptive cognitive processes, particularly those involving anticipatory threat responses and negatively biased cognition ([Ford et al., 2023](#); [Xu et al., 2022](#)). Studies also suggests that individuals with lower levels of mindfulness exhibit heightened reactivity to unpredictable threats, engaging in persistent worry and catastrophic forecasting ([Xu et al., 2022](#)). Other studies also

suggest that mindfulness is negatively associated with negative cognitive biases (Ford et al., 2023). Individuals with low mindfulness are more susceptible to automatic, judgmental interpretations of their thoughts and feelings and view their negative emotions as personal failure, whereas individuals with higher mindfulness observe their negative thoughts without identification and judgement. This decentering prevents the minor stressors to escalate into anxiety episodes (Ford et al., 2023).

Research also demonstrates that adaptive cognitive and emotion regulation strategies, such as reappraisal and acceptance, are positively correlated with mindfulness and negatively correlated with anxiety (Bahrami and Yousefi, 2011). Furthermore, meta-analytic evidence indicates that higher baseline mindfulness is consistently associated with lower anxiety and better mental health outcomes, even in the absence of formal mindfulness interventions. Individuals with higher dispositional mindfulness demonstrates lower anxiety vulnerability, whereas lower trait mindfulness is associated with greater emotional reactivity and increased anxiety symptoms (Sieder et al., 2024).

Research on specific populations also reinforce these general findings. Research on nursing students reveals that higher mindfulness is associated with lower levels of stress and anxiety (Heinrich and O'Connell, 2024). Similarly, systematic reviews of Chinese college students highlight that baseline mindfulness levels are critical predictors of anxiety, with lower mindfulness correlating with higher symptom severity (Li et al., 2023).

These findings are consistent across cultural contexts, as findings by meta-analyses of young students in India, also identify a strong negative relationship between mindfulness and anxiety in adolescents and young adults (Bhattacharya and Yadav, 2025). Also, in competitive sports, baseline mindfulness traits predict lower competitive anxiety, particularly cognitive anxiety (Chen and Xing, 2026). In treatment purposes, interventions are focused on enhancing mindfulness in non-clinical populations, aimed at increasing present moment focus and non-judgmental acceptance (Cork et al., 2024).

2.5 Gender Differences in Dysfunctional Metacognitive Beliefs, Worry, Rumination, Mindfulness and Anxiety in Pakistan

Gender difference in metacognitive beliefs and related cognitive emotional processes have received increasing research attention due to their implications for anxiety and psychological wellbeing. In Pakistan, [Muneer and Malik \(2018\)](#) examined gender as a moderator and found that gender significantly influenced the relationship between meta worry, emotion-oriented coping, and wellbeing, with several indirect effects being stronger among men than women, suggesting that gender shapes metacognitive processes. Consistent with these findings, [Bahrami and Yousefi \(2011\)](#) reported that females exhibited significantly higher anxiety than males and endorsed stronger dysfunctional metacognitive beliefs, particularly negative beliefs related to the uncontrollability and danger of worry, indicating greater vulnerability to anxiety disorders. Similarly, [Lenzo et al. \(2016\)](#) found that although overall levels of dysfunctional metacognitive beliefs did not differ significantly between men and women, the associations between these beliefs and psychological symptoms varied by gender, with the need to control thoughts showing a stronger relationship with depressive symptoms among women.

[Robichaud et al. \(2003\)](#) found that women reported significantly higher levels of pathological worry, negative problem orientation, and cognitive avoidance than men, suggesting greater susceptibility to maladaptive cognitive processes underlying anxiety. Similarly, [Sweeny et al. \(2019\)](#) examined gender differences in worry during stressful waiting periods and reported that women experienced significantly greater worry and engaged in more coping strategies than men. However, after controlling for worry, most gender differences in coping became non-significant, indicating that worry, rather than gender itself, was the primary predictor of coping responses under uncertainty. More recently, [Kingery et al. \(2023\)](#) reported that males demonstrated higher dispositional mindfulness, whereas females experienced

greater rumination and anxiety symptoms. Moreover, the indirect effect of mindfulness on depression through rumination was stronger among females, suggesting that rumination plays a more prominent role in women's psychological adjustment.

Umegaki et al. (2024) found that women reported significantly higher levels of rumination than men, and rumination was more strongly associated with depressive symptoms among women. Also, Mak et al. (2024) observed that women entered treatment with higher baseline levels of rumination and anxiety than men, although both genders benefited similarly from mindfulness and rumination-focused cognitive behavioral interventions. Therefore, these findings suggest that women generally exhibit greater vulnerability to maladaptive cognitive processes, including dysfunctional metacognitive beliefs, worry, rumination, and anxiety, whereas men tend to report higher levels of mindfulness. These gender specific patterns highlight the importance of examining cognitive and emotional processes separately across males and females, particularly within underrepresented populations such as Pakistan.

Chapter 3

Research Methodology

This chapter of the study outlines information on the methodology used to accomplish the objectives of the present study. Research design and procedure, type of study, ethical considerations, study setting, sample and sampling procedure, sampling size, study procedure, research instruments, and data analysis are described in the study.

3.1 Research Design

The section presents research design and data collection procedures used in this study. Standardized self-report measures that were age appropriate and are relevant to cultural context were used to assess dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety. Data were gathered through online questionnaires.

The chapter also provides description of instruments, their psychometric properties and the statistical analyses performed using SPSS version 26. A quantitative cross-sectional design was used to examine the relationship between dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety among young adults.

The data was collected using Google Forms which includes information sheet, informed consent form, demographic sheet and questionnaires related to the study variables.

3.2 Type of the Study

A quantitative, cross-sectional research design was used to assess the associations between dysfunctional metacognitive beliefs, worry, rumination, mindfulness, and anxiety. The target population comprised young adults enrolled in universities, as this group was considered appropriate for addressing the study objectives and generating meaningful findings.

An online survey between 20 April 2026 and 2 June 2026 was conducted to collect data. The survey was designed to assess the associations between study variables.

3.3 Ethical Considerations

Ethics approval was obtained from the Ethics Review Committee of the Faculty of Management and Social Sciences at Capital University of Science and Technology. Prior to data collection, verbal permissions were obtained from authorities of relevant universities from where the data collection took place. Detailed information regarding aim and process of research along with participants' rights, data handling procedure and confidentiality, was shared with participants. Moreover, contact information was shared in case of any discomfort or distress and further information. Participants were provided with research protocol which included informed consent, a demographic sheet and a series of questionnaires of study variables (attached as Appendix A).

3.4 Time Horizon and Study Settings

A total of seven higher education institutes located in Islamabad and Rawalpindi served as data collection sites. These twin cities were selected because their vast institutional density accommodates students from diverse socio-demographic backgrounds. The contributing institutions consisted of two public, two semi-government, and three private sector universities.

The universities included Ibadat university, QAU, Foundation University, BU H-11 Campus, Shifa International, CUST, and IIUI University Islamabad. The survey was designed to assess study variables among young adults.

3.5 Sample and Procedures

The sample consisted of 388 young adults. The study sample comprised male and female students aged 18 to 25 years who were pursuing undergraduate or postgraduate degrees at public and private universities located in Rawalpindi and Islamabad. For participant recruitment, convenience sampling was used. The data was collected from both males and female participants. The data was collected using Google Forms which includes information sheet, informed consent form, demographic sheet and questionnaires related to the study variables. A QR code and a link was generated for the form. The online link and QR code was shared with the students through onsite visits of universities and through personal connections. The forms were filled by the students on their personal devices. Online data collection was considered suitable as it provided convenient access to study participants.

3.5.1 Inclusion Criteria

Those participants who met the following criteria were included in the study:

- i. Participants currently enrolled in university within Rawalpindi and Islamabad.
- ii. Participants with ages between 18 and 25 years of age.
- iii. Participants who were able to understand and complete the questionnaire independently.

3.5.2 Exclusion Criteria

Those participants who met the following criteria were excluded in study:

- i. Individuals who reported a diagnosed physical and psychological conditions which can impede their ability to participate in the study were excluded.

3.6 Sample Size

Multiple regression analysis requires an adequate sample size to ensure sufficient statistical power, stable parameter estimates, and accurate hypothesis testing. [Maxwell \(2000\)](#) argued that sample size determination should be based on statistical power and expected effect size rather than arbitrary rules of thumb, as insufficient sample sizes often produce unstable regression coefficients and inconsistent findings across studies. Similarly, statistical power of at least .80 at a significance level of .05 is generally recommended to minimize Type II errors and enhance the reliability and replicability of research findings.

Several recommendations have been proposed for determining sample size in multiple regression. [Cohen \(1988\)](#) suggested that effect size in regression be expressed using Cohen's f^2 , small, medium and large effects size were represented with the values of 0.2, .15 and .35 respectively. For a multiple regression model with four predictor variables, to detect medium effect size ($f^2 = 0.15$) with 80% statistical power and standard 5% margin of error ($\alpha = 0.5$), sample size with a total of 85 participants is needed ([Green, 1991](#)).

However, substantially larger samples are required to detect small effects, often exceeding 300 to 400 participants ([Cohen, 1988](#)). [Maxwell \(2000\)](#) further emphasized that commonly used participant-to-predictor ratio guidelines, such as 10 participants per predictor, frequently underestimate the sample size required to achieve adequate statistical power.

Although several heuristic recommendations for regression sample size have been proposed, these guidelines have been criticized for oversimplifying sample size estimation because they do not adequately consider effect size, statistical power,

or model characteristics. Contemporary methodological literature recommends anticipated effect size, desired statistical power, and significance level to conduct estimation of sample size rather than relying on conventional rules of thumb. This approach provides greater precision and improves the validity and generalizability of regression findings. In the present study, a total of 388 participants were taken, considerably exceeding minimum requirement of sample size with medium effect size to conduct multiple regression analyses. This also provides adequate statistical power for examining the predictive effects of dysfunctional metacognitive beliefs, worry, rumination, and mindfulness on anxiety. Therefore, the sample size is considered sufficient to produce stable parameter estimates and reliable regression results.

3.6.1 Study Procedure

The data collection started with google form generation. Following this a shareable link and QR code was created to facilitate ease of access for participants. Participant were approached online and in person. Study related details with clear instructions were shared. Those participants who agreed to participate were provided with link or QR code based on feasibility and ease of access. Participants were clearly informed about objectives of study; rights of participants and potential benefit or risk related to study in informed consent form. They were encouraged to seek clarification regarding any aspect of study or research protocol and all queries were promptly addressed to ensure complete understanding. Moreover, participants were instructed to complete form truthfully and reassured that there are no correct or incorrect responses to the shared questions.

The online survey had multiple sections. Initially, participants completed informed consent checklist and moved to demographic section including information related to personal characteristics, educational status and family background. Following this, they were required to complete a series of measures including, Penn State Worry Questionnaire (PSWQ), Metacognitions Questionnaire (MCQ), Ruminative

Response Scale (RRS), Five Facet Mindfulness Questionnaire (FFMQ) and Generalized Anxiety Disorder (GAD) scale. The estimated completion time for entire form was ranged between 15 to 20 minutes approximately. To maintain uniformity in responses and to minimize potential variability, participants were required to complete all sections of form in single sitting without interruption. They were also informed that once response had been submitted, it could not be altered or revised, thereby ensuring the authenticity and spontaneity of responses. Upon completion of all sections, participants were sincerely acknowledged for their cooperation, time, and participation in research.

3.7 Research Instruments

The standardized scales were used to measure variables in current study, including dysfunctional metacognitive belief, worry, rumination, mindfulness and anxiety. The selection of these measures was based on their theoretical basis and their psychometric properties. In addition to their psychometric properties, practical considerations including questionnaire length, accessibility, availability, and permission from the respective authors were taken into account when selecting the study instruments.

3.8 Measures

The standardized self-report questionnaires were used in study, including the Demographic Sheet, Metacognitions Questionnaire-30 (MCQ-30), Penn State Worry Questionnaire (PSWQ), Ruminative Response Scale (RRS-10), Five Facet Mindfulness Questionnaire (FFMQ-15), and Generalized Anxiety Disorder Scale (GAD-7).

3.8.1 Demographics

Demographic form was created which collected the information from the participants included gender, age, education level, education system (public, private or semi-government). Additionally, participants were asked about their marital status,

employment status, financial strain, family system and religion. The information regarding any diagnosed mental or physical disability was also obtained to account for the exclusion criteria of the study.

3.8.2 Metacognitions Questionnaire

To measure metacognitive beliefs, a scale developed by [Wells and Cartwright-Hatton \(2004\)](#) the Metacognitions Questionnaire-30 (MCQ-30) was used. The instrument is a short form of the original Metacognitions Questionnaire. It is a 30-item self-report questionnaire and a four point Likert scale with range from (1 = do not agree) to (4 = agree very much). It comprises of 5 subscales: (a) worry-related positive beliefs, (b) worry-related uncontrollable negative beliefs, (c) cognitive confidence, (d) need to control thoughts, and (e) cognitive self-consciousness.

Empirical studies have demonstrated good internal consistency ($\alpha = .77-.93$) and test-retest reliability across both clinical and nonclinical samples ([Spada et al., 2008](#); [Wells and Cartwright-Hatton, 2004](#)). Subscale scores are calculated by summing item responses, and a total score can also be derived, with higher scores reflecting more maladaptive metacognitive beliefs ([Wells and Cartwright-Hatton, 2004](#)).

3.8.3 Penn State Worry Questionnaire

Worry will be measured through Penn State Worry Questionnaire (PSWQ) developed by [Meyer et al. \(1990\)](#) to measure the trait of worry. It is a 16-item self-report questionnaire on a 5-point Likert type scale ranges from 1 (not at all typical of me) to 5 (very typical of me), assessing trait-like tendencies to engage in worry across situations.

In scoring of PSWQ, a value of 1, 2, 3, 4, and 5 is assigned to a response depends upon if the item is worded positively or negatively. The total score ranges from 16 to 80. The PSWQ demonstrates strong internal consistency ($\alpha > .85$) and

test–retest reliability over time (Meyer et al., 1990). High scores indicate greater tendency toward excessive and uncontrollable worry (Meyer et al., 1990).

3.8.4 Ruminative Response Scale

Rumination will be measured using the Ruminative Response Scale–Short Form (RRS-10), developed by Treynor et al. (2003) as a refined version of the original 22-item scale (Nolen-Hoeksema and Morrow, 1991). The short form was created by removing items overlapping with depressive symptomatology, resulting in a more accurate assessment of rumination as a cognitive process rather than an affective state.

The RRS-10 contains of 10 items self-report questionnaire on a 4-point Likert scale which ranges from 1 (almost never) to 4 (almost always). It comprises two subscales: (a) brooding, representing a maladaptive and passive comparison-based focus, and (b) reflection, representing a more purposeful and problem-solving-oriented inward focus. This scale shows good internal consistency, with Cronbach’s alpha values ranging from .72 to .85 across clinical and nonclinical samples (Treynor et al., 2003). Higher total scores reflect a greater tendency toward repetitive and passive ruminative thinking.

3.8.5 Five Facet Mindfulness Questionnaire

Mindfulness will be measured through Five Facet Mindfulness Questionnaire (FFMQ) was originally developed by Baer et al. (2006) to operationalize mindfulness as a multifaceted construct comprising describing, observing, non-reactivity to inner experience, non-judging of inner experience and acting with awareness. The 15-item short form (FFMQ-15) was derived from the 39-item original to allow for more efficient administration while maintaining representation of all five facets Baer et al. (2006). Each item is marked on a 5-point Likert type scale ranges from 1 (never or very rarely true) to 5 (very often or always true). The internal consistency (α) ranged from .75 to .91 for the total mindfulness score. Higher scores indicate of greater dispositional mindfulness.

3.8.6 Generalized Anxiety Disorder Scale

[Spitzer et al. \(2006\)](#) developed GAD-7, a seven-item self-report measure to assess frequency of anxiety symptoms during past two weeks. A sample item includes, “feeling nervous, anxious or on edge”. Each item is scored on 4-point Likert scale from 0 = not at all to 3 = nearly every day. Total score is computed by summing responses across all items with possible range of 0 to 21.; higher scores indicate severe anxiety. The severity is categorized on established cut off scores as minimal (0 to 4), mild (5 to 9), moderate (10 to 14), and severe (15 to 21). The scale demonstrated excellent internal reliability of .92 Cronbach’s alpha and strong criterion validity. The GAD-7 scale has been used in both clinical and research settings (Kaur, 2026) and also with non-clinical young adults to screen and measure anxiety symptoms (Gilbert et al., 2026). It takes approximately 5 to 7 minutes to complete and is widely used due to its brevity.

3.9 Data Analyses

The data collected was entered, coded, screen and analyzed using IBM SPSS version 26. Initially, data was cleaned and missing data was discarded. Responses that showed typographical errors were removed. A total of 390 questionnaires were collected. After screening, 388 responses were included for the final analyses. Two questionnaires were excluded due to typographical and data entry errors. Descriptive statistics were computed to examine the characteristics of the sample and study variables.

Frequencies and percentages were calculated for demographic variables including gender, age, education system, education level, marital status, employment status, financial situation, family system, and religion. Measures of central tendency and dispersion, including mean, median, mode, standard deviation, skewness, and kurtosis, were computed for all continuous variables to describe the overall distribution of the data. The internal consistency all study measures were assessed using Cronbach’s alpha reliability coefficient.

Before conducting inferential analyses, the assumptions of normality were evaluated using the Kolmogorov-Smirnov (K-S) test, along with the values of skewness, kurtosis, histograms and distribution curves. Pearson's product-moment correlation analyses were computed to examine the direction and strength of the relationships between study variables. Correlation coefficients (r) were interpreted according to Cohen's (1988) guidelines, where values around .10 represent small, .30 represent moderate, and .50 or above represent strong associations.

To determine the extent to which dysfunctional metacognitive beliefs, worry, rumination, and mindfulness in predicting anxiety, multiple linear regression analysis using the Enter method was conducted. Anxiety (GAD-7) was entered as the dependent variable, whereas dysfunctional metacognitive beliefs (MCQ), worry (PSWQ), rumination (RRS), and mindfulness (FFMQ) were entered as independent variables. The overall model fit was evaluated using the F-statistic, R , R^2 , and Adjusted R^2 , while the contribution of each predictor was assessed through unstandardized coefficients (B), standardized beta coefficients (β), t -values, 95% confidence intervals, and associated p -values.

Prior to conducting the multiple linear regression analysis, the underlying statistical assumptions were evaluated. Multicollinearity among the predictor variables was assessed using Tolerance and Variance Inflation Factor (VIF) values, with tolerance values above 0.10 and VIF values below 5.00 considered indicative of acceptable levels of multicollinearity. The independence of residuals was examined using the Durbin-Watson statistic, where values between 1.5 and 2.5 suggested that the residuals were independent. The normality of residuals was evaluated through histograms and normal probability-probability (P-P) plots, while the assumption of linearity was assessed by inspecting scatterplots of standardized residuals against standardized predicted values. In addition, Cook's Distance was used to identify potentially influential cases, with values below 1.00 indicating that no influential outliers were present.

Chapter 4

Results

The present study was conducted to examine the relationship between Dysfunctional Metacognitive Beliefs, Worry, Rumination and Mindfulness with Anxiety among young adults. After the data screening process, 388 valid responses were included in the final analyses, while two were removed because of typographical error in the dataset. Moreover, chapter presents the findings of the study, including the frequencies and percentages of the participants' demographic characteristics, Cronbach's Alpha Reliabilities, Descriptive Statistics of Scales, Correlation Analysis, and Multiple Linear Regression Analysis. The internal consistency of the scales was determined with the help of Cronbach's alpha reliability coefficient. Kolmogorov-Smirnov test was conducted to identify the normal distribution of data among sample of the study. Socio-demographic characteristics were analyzed through frequencies. Descriptive statistics were computed for all the measures in the study to examine the overall trend of the data. Pearson's Correlation was used to determine the relationship between variables of the study. Regression Analysis was computed to check for the variances between study variables.

4.1 Demographic Characteristics of Study Participants

Different demographic variables such as age, gender, marital status, employment status, education system and family system were calculated through frequencies in

order to find the frequent amount of demographics spread across the data.

TABLE 4.1: Demographic Characteristics of the Study Participants (N = 388)

Demographic	<i>f</i>	%
Gender		
Female	231	59.5
Male	157	40.5
Age		
18	27	7.0
19	52	13.4
20	77	19.8
21	68	17.5
22	40	10.3
23	43	11.1
24	35	9.0
25	46	11.9
Education System		
Private	255	65.7
Public/Government	73	18.8
Semi-government	60	15.5
Education Level		
Intermediate	56	14.4
Bachelors	280	72.2
Masters	51	13.1
PhD	1	0.3
Marital Status		
Single	321	82.7
Married	19	4.9
Engaged	31	8.0
In a relationship	16	4.1
Divorced	1	0.3
Widowed	0	0.0
Employment Status		
Full-time	29	7.5
Part-time	29	7.5
Self-employed	14	3.6
Unemployed	290	74.7
Student	26	6.7
Financial Situation		
Adequate	177	45.6
Comfortable	98	25.3
Some financial strain	92	23.7
Significant financial strain	21	5.4
Family System		
Joint	120	30.9
Nuclear	218	56.2
Single Parent	50	12.9

Note. *f* = frequency, % = percentage.

The sample comprised of 231 female participants (59.5%) and 157 were male (40.5%). This demonstrates a higher female representation in the study than males.

Participants age range was between 18 to 25 years where the majority of the participants were 20-year-old ($n = 77$, 19.8%), 21-year-old with a frequency of 68 (17.5%) and 19-year-old with a frequency of 52 (13.4%).

The smallest age group was of 18-year-old individuals ($n = 27$, 7.05%). The participants were from different educational system including public, private and semi government. The majority of participants were from private educational institutions ($n = 255$, 65.7%) whereas participants studying in public or government institutions comprised of 18.8% ($n = 73$) of the total sample.

Participants enrolled in semi-government institutions consisted 15.5% ($n = 60$). This indicated that nearly two-thirds of the participants were recruited from private educational settings. Students from different education level were participated in study. The highest proportions were from Bachelors (72.2%), then Intermediate (14.4%) and Masters (13.1%) respectively.

Nearly, 321 participants (82.7%) marked their marital status as Single and more than half (290 out of 388) of the participants marked themselves as Unemployed.

Around 177 out of 388 (45.6%) participants reported their financial situation as adequate, 98 (25.3%) reported their financial situation as comfortable, 92 (23.7%) reported that they are facing some financial strain and 21 (5.4%) marked their financial situation as significant financial strain.

Furthermore, nearly half of the participants of study belong to Nuclear Family system (56.2%).

4.2 Cronbach's Alpha Reliability of Scales

TABLE 4.2: Mean, Standard Deviation, Ranges, Skewness, Kurtosis and Cronbach's Alpha Reliability Coefficients (α) of Scales (N = 388)

Scales	<i>N</i>	<i>M</i>	<i>SD</i>	α	Potential Range	Actual Range	Skewness	Kurtosis
MCQ	30	66.90	14.69	.90	30 – 120	30 – 116	.13	.24
PSWQ	16	48.59	10.27	.82	16 – 80	23 – 80	.54	.49
RRS	10	23.72	5.91	.82	10 – 40	10 – 39	.25	-.07
FFMQ	15	45.60	5.82	.82	15 – 75	26 – 65	.10	.71
GAD	07	8.49	5.64	.89	0 – 21	0 – 21	.37	-.56

Note. N = Number of Items; *M* = Mean; *SD* = Standard Deviation; α = Cronbach's alpha reliability; MCQ = Metacognitions Questionnaire; PSWQ = Penn State Worry Questionnaire; RRS = Ruminative Response Scale; FFMQ = Five Facet Mindfulness Questionnaire; GAD = Generalized Anxiety Disorder Scale.

The internal consistency of all study measures was evaluated using Cronbach's alpha (α). The results indicated that each instrument demonstrated satisfactory to excellent reliability. The Metacognitions Questionnaire (MCQ) exhibited excellent internal consistency ($\alpha = .90$). The Penn State Worry Questionnaire (PSWQ) showed good reliability ($\alpha = .82$), while the Ruminative Responses Scale (RRS) also demonstrated good internal consistency ($\alpha = .82$). Similarly, the Five Facet Mindfulness Questionnaire (FFMQ) yielded a Cronbach's alpha coefficient of .82, indicating good reliability. The Generalized Anxiety Disorder-7 (GAD-7) demonstrated excellent internal consistency, with a Cronbach's alpha coefficient of .89. Therefore, these findings suggest that all instruments used in the present study possessed adequate levels of internal consistency for subsequent analyses.

4.3 Descriptive Statistics

The following section presents the descriptive statistics for all study variables. Data distribution was assessed by examining measures of central tendency (mean,

median, and mode), variability (standard deviation), skewness, kurtosis, the Kolmogorov–Smirnov (K–S) test, and visual inspection of the distribution curves. Collectively, these indicators suggested that the study variables were approximately normally distributed, supporting the use of parametric analyses, including Pearson’s correlation. For the Metacognitions Questionnaire (MCQ), the mean score was 66.90 ($SD = 14.69$), with a median of 68.00 and a mode of 71. The skewness (.13) and kurtosis (.24) values indicated a near-normal distribution, which was further supported by a Kolmogorov–Smirnov statistic of .04.

TABLE 4.3: Descriptive Statistics for Scales of MCQ, PSWQ, RRS, FFMQ and GAD (N = 388)

Scales	<i>M</i>	<i>Mdn</i>	Mode	<i>SD</i>	Skewness	Kurtosis	K-S	<i>p</i>
MCQ	66.90	68.00	71	14.69	.13	.24	.04	.12
PSWQ	48.59	47.50	45	10.27	.54	.49	.09	.00
RRS	23.72	23.00	20	5.91	.25	-.07	.09	.00
FFMQ	45.60	45.00	45	5.82	.10	.71	.08	.00
GAD	8.49	8.00	7	5.64	.37	-.56	.07	.00

Note. MCQ = Metacognitions Questionnaire; PSWQ = Penn State Worry Questionnaire; RRS = Ruminative Response Scale; FFMQ = Five Facet Mindfulness Questionnaire; GAD = Generalized Anxiety Disorder Scale; *M* = Mean; *Mdn* = Median; *SD* = Standard Deviation; K-S = Kolmogorov–Smirnov Test Statistic. All *p*-values are < .001.

The Penn State Worry Questionnaire (PSWQ) yielded a mean score of 48.59 ($SD = 10.27$), a median of 47.50, and a mode of 45. The data exhibited an approximately normal distribution, as reflected by skewness and kurtosis values of .54 and .59, respectively, along with a Kolmogorov–Smirnov statistic of .09. For the Ruminative Responses Scale (RRS), the average score was 23.72 ($SD = 5.91$), while the median and mode were 23.00 and 20, respectively. The skewness (.25) and kurtosis (.07) values suggested minimal deviation from normality. The Kolmogorov–Smirnov statistic for the scale was .09. The Five Facet Mindfulness Questionnaire (FFMQ) had a mean score of 45.60 ($SD = 5.82$), with both the median and mode equal to 45. The skewness (.10) and kurtosis (.71) values indicated an approximately

normal distribution, which was also reflected by a Kolmogorov–Smirnov statistic of .08.

The following figure shows the distribution of MCQ:

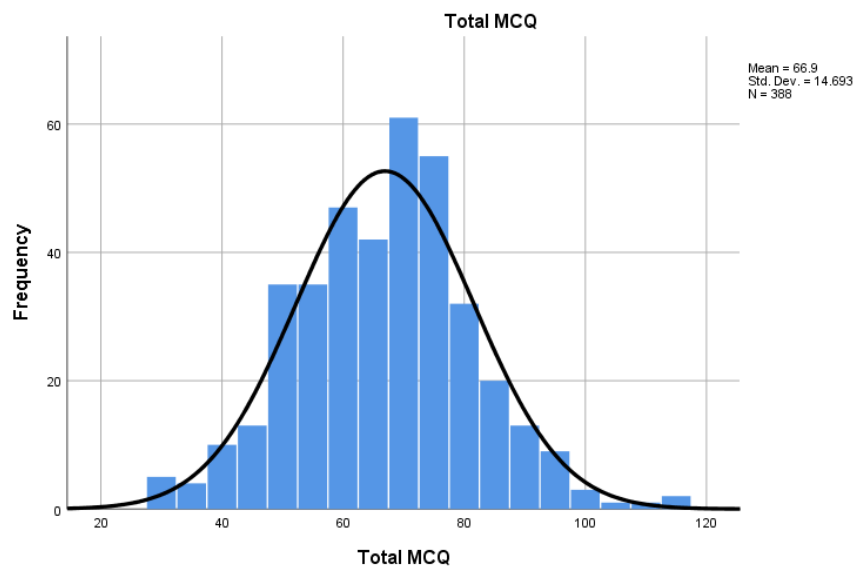


FIGURE 4.1: Distribution of scores for MCQ (N = 388)

Figure 4.2 illustrates the distribution of scores on the Penn State Worry Questionnaire (PSWQ):

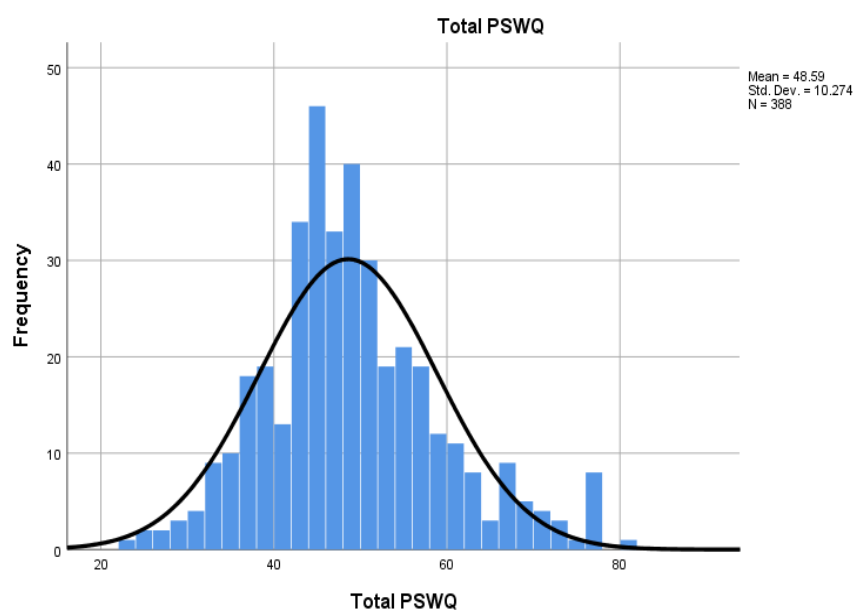


FIGURE 4.2: Distribution of scores for PSWQ (N = 388)

Figure 4.3 illustrates the distribution of scores obtained on the Ruminative Responses Scale (RRS):

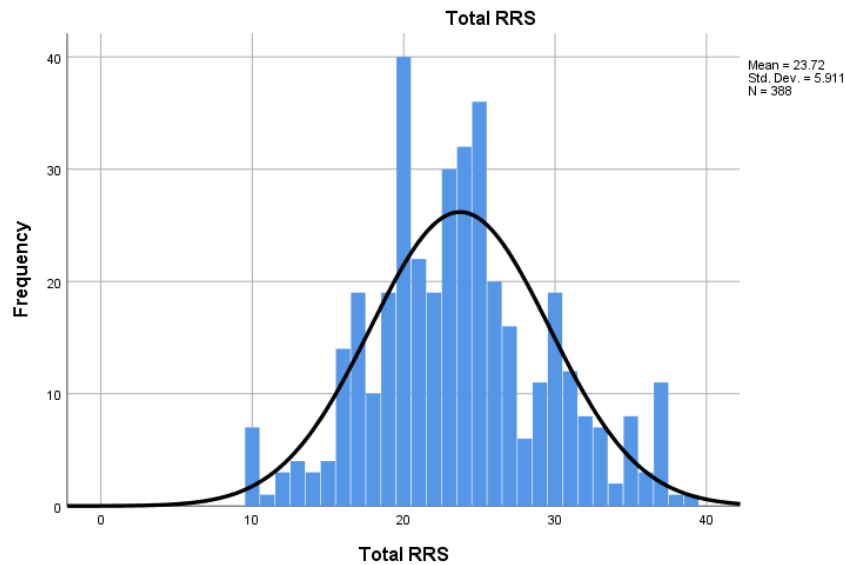


FIGURE 4.3: Distribution of scores for RRS (N = 388)

The distribution of Five Facet Mindfulness Questionnaire is shown in the figure below:

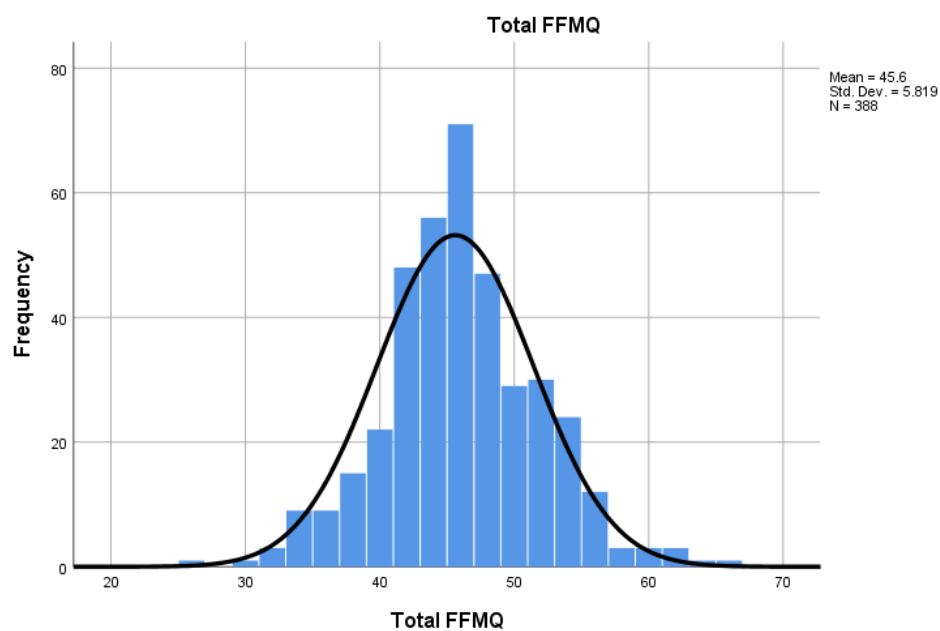


FIGURE 4.4: Distribution of scores for FFMQ (N = 388)

The distribution of Generalized Anxiety Disorder Scale is shown in the figure below:

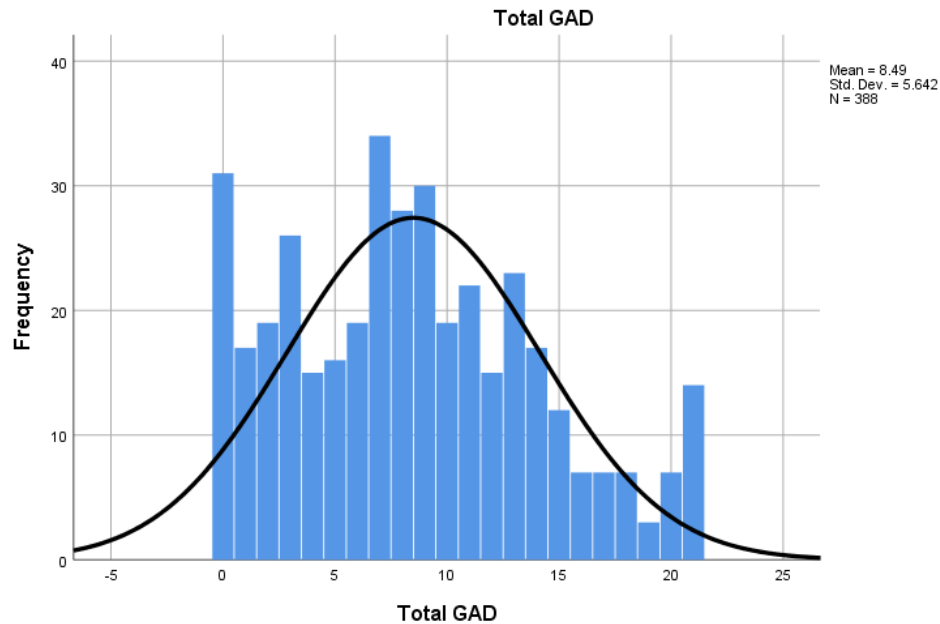


FIGURE 4.5: Distribution of scores for GAD (N = 388)

For the GAD-7, the mean score was 8.49 (SD = 5.64), with a median of 8.00 and a mode of 7. The skewness (.37) and kurtosis (.56) values fell within acceptable limits for normality. The Kolmogorov–Smirnov statistic for the scale was .07, providing additional evidence that the distribution was approximately normal.

4.4 Correlation Analysis of Dysfunctional Metacognitive Beliefs, Worry, Rumination, Mindfulness and Anxiety among Young Adults

Table 4.4 presents the correlations among dysfunctional metacognitive beliefs, worry, rumination, mindfulness, and anxiety in young adults. Table 4.4 shows that dysfunctional metacognitive beliefs have moderate, significant positive relationship with anxiety ($r = .47$, $p < 0.01$) which means that if dysfunctional metacognitive beliefs increases, anxiety also increases.

TABLE 4.4: Relationship between MCQ, PSWQ, RRS, FFMQ and GAD Among Young Adults (N = 388)

Variables	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. GAD	388	8.49	5.64	–				
2. MCQ	388	66.90	14.69	.47**	–			
3. PSWQ	388	48.59	10.27	.56**	.45**	–		
4. RRS	388	23.72	5.91	.54**	.53**	.51**	–	
5. FFMQ	388	45.60	5.81	-.35**	-.21**	-.30**	-.13**	–

Note. GAD = Generalized Anxiety Disorder Scale; MCQ = Metacognitions Questionnaire; PSWQ = Penn State Worry Questionnaire; RRS = Ruminative Response Scale; FFMQ = Five Facet Mindfulness Questionnaire. ** $p < .01$ (1-tailed).

Similarly, if dysfunctional metacognitive beliefs decreases, anxiety also decreases. The table also shows that worry have moderate, significant positive relationship with anxiety ($r = .56$, $p < 0.01$) which means that if worry increases, anxiety also increases. Similarly, if worry decreases, anxiety also decreases. The table shows rumination have moderate, significant positive relationship with anxiety ($r = .54$, $p < 0.01$) which means that if rumination increases, anxiety also increases. Similarly, if rumination decreases, anxiety also decreases. The table shows that mindfulness has moderate, significant negative relationship with anxiety ($r = -.35$, $p < 0.01$) which means that if mindfulness increases, anxiety decreases. Similarly, if mindfulness decreases, anxiety increases.

The above table also shows the relationship between dysfunctional metacognitive beliefs, worry, rumination and mindfulness. Dysfunctional metacognitive beliefs have moderate, significant positive association with worry ($r = .45$, $p < 0.01$) and rumination ($r = .53$, $p < 0.01$) whereas weak, significant negative relationship with mindfulness ($r = -.21$, $p < 0.01$) which means that if dysfunctional metacognitive beliefs increases, worry and rumination increases and mindfulness decreases. The above table shows that worry have moderate, significant positive relationship with ruminations ($r = .51$, $p < 0.01$) and whereas moderate, significant negative relationship with mindfulness ($r = -.30$, $p < 0.01$) which means that if worry

increases, rumination increases and mindfulness decreases. The table also shows that rumination have weak, significant negative relationship with mindfulness ($r = -.13$, $p < 0.01$).

4.5 Multiple Linear Regression Analysis of Dysfunctional Metacognitive Beliefs, Worry, Rumination and Mindfulness as Predictors of Anxiety

Multiple linear regression analysis was performed to examine the relationships between dysfunctional metacognitive beliefs, worry, rumination, mindfulness, and anxiety a using IBM SPSS Statistics. The following tables present the results of the regression analysis, illustrating the extent to which dysfunctional metacognitive beliefs, worry, rumination, and mindfulness predict anxiety among young adults.

Table 4.5 represents the impact of dysfunctional metacognitive beliefs, worry, rumination and mindfulness on anxiety. The dependent variable anxiety of this study is measured through GAD. The independent variables; dysfunctional metacognitive beliefs, worry, rumination and mindfulness are measured through scales MCQ, PSWQ, RRS and FFMQ, respectively. The predictors of anxiety in young adults were investigated using a multiple regression analysis The model significantly predicted anxiety (GAD) $F(3,388) = 81.99$, $p < .001$, explaining 46% of the variance in anxiety ($R = .67$, $R^2 = .46$, Adjusted $R^2 = .45$).

The coefficient of dysfunctional metacognitive beliefs (MCQ) is positive and significant ($B = 0.05$, $\beta = 0.14$, $p = .002$), indicating a positive relationship between dysfunctional metacognitive beliefs (MCQ) and anxiety (GAD). This suggests that higher dysfunctional metacognitive beliefs are associated with higher levels of anxiety. The standardized coefficient indicates that increase in one standard deviation in dysfunctional metacognitive beliefs increases anxiety with 0.144 of a

standard deviation, while holding the others predictors constant. The standardized regression coefficient demonstrated increase in one standard deviation in dysfunctional metacognitive beliefs (MCQ) is associated with a 0.144 standard deviation increase in anxiety (GAD), after controlling for the other predictors in the model.

Similarly, the coefficient of worry (PSWQ) is positive and significant ($B = 0.16$, $\beta = 0.29$, $p < .001$), shows a positive relationship between worry (PSWQ) and anxiety (GAD). This indicates that greater worry associated with higher levels of anxiety. The standardized coefficient indicates that increase in one standard deviation in worry, increases anxiety with 0.295 of a standard deviation, while holding the others predictors constant. The standardized regression coefficient for the Penn State Worry Questionnaire (PSWQ) indicates that a one standard deviation increase in worry is associated with a 0.295 standard deviation increase in anxiety (GAD), after controlling for the other predictors in the model.

Furthermore, the regression coefficient for rumination (RRS) was positive and statistically significant ($B = 0.27$, $\beta = .287$, $p < .001$), indicating a positive association between rumination and anxiety. Specifically, higher levels of rumination were associated with higher levels of anxiety. The standardized regression coefficient further suggests that a one standard deviation increase in rumination is associated with a 0.287 standard deviation increase in anxiety, while holding the other predictors constant.

On the other hand, the coefficient of mindfulness (FFMQ) is negative and significant ($B = -0.19$, $\beta = -0.19$, $p < .001$), indicating a negative relationship between mindfulness (FFMQ) and anxiety (GAD). This means that higher levels of mindfulness is associated with lower levels of anxiety. The standardized coefficient indicates that increase in one standard deviation in worry, increases anxiety with 0.198 of a standard deviation, after holding the others predictors constant. This can also suggest that one standard deviation increase in FFMQ will decrease GAD by approximately 19.80%.

TABLE 4.5: Multiple Linear Regression Analysis of Dysfunctional Metacognitive Beliefs, Worry, Rumination, and Mindfulness as Predictors of Anxiety (N = 388)

Scales	Unstandardized Coefficients		Standardized Coefficients		<i>p</i>	95% CI	
	<i>B</i>	<i>SE</i>	β	<i>t</i>		LL	UL
Constant	-0.84	2.41	—	-0.34	.722	-5.59	3.91
MCQ	0.05	0.01	0.14	3.13	.002	0.02	0.09
PSWQ	0.16	0.02	0.29	6.34	.000	0.11	0.21
RRS	0.27	0.04	0.28	6.03	.000	0.18	0.36
FFMQ	-0.19	0.03	-0.19	-4.90	.000	-0.26	-0.11

Note. *SE* = Standard Error; β = Standardized beta coefficient; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit.

The assumptions underlying multiple linear regression were examined prior to analysis and were found to be adequately met. The standardized residuals were approximately normally distributed ($M = .000$, $SD = .995$), with values ranging from -4.817 to 3.385 . No influential outliers were identified, as indicated by Cook's distance values (maximum = 0.147 , mean = 0.003). Inspection of the residuals also suggested homoscedasticity, with residual values ranging from 20.05 to 14.09 , indicating an approximately constant variance across predicted values. Furthermore, no evidence of multicollinearity was observed. The tolerance values for MCQ (.66), PSWQ (.65), RRS (.62), and FFMQ (.89), along with the corresponding variance inflation factor (VIF) values of 1.50 , 1.53 , 1.61 , and 1.11 , respectively, were all within acceptable limits, confirming that multicollinearity was not a concern.

The tolerance values ranged from 0.62 to 0.89 and VIF values ranged from 1.11 to 1.61 . The assumptions of independence of errors was calculated using Durbin-Watson statistic. The obtained value (1.85) lies within acceptable range of 1.5 to 2.5 . This indicates that the residuals were independent and that there was no autocorrelation. The relationship between predictors and the outcome was linear, as assessed through the scatter plot of standardized residuals versus standardized predicted values.

4.6 Gender Differences in Dysfunctional Metacognitive Beliefs, Worry, Rumination, Mindfulness and Anxiety among Young Adults

To examine the gender differences in dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety among young adults, an independent sample t-test was conducted. The results indicated that there is no gender difference in dysfunctional metacognitive beliefs and mindfulness. However, significant gender differences were observed for worry, rumination and anxiety. Female participants ($M = 9.45$, $SD = 6.03$) reported significantly higher levels of anxiety than male participants ($M = 7.10$, $SD = 4.70$). Although the effect size was moderate to

small. Similarly, female participants ($M = 50.36$, $SD = 11.23$) reported significantly higher levels of worry than male participants ($M = 45.97$, $SD = 8.02$) with small to moderate effect size. Female participants ($M = 24.82$, $SD = 6.07$) reported significantly higher levels of rumination than male participants ($M = 22.11$, $SD = 5.29$) with small to moderate effect size.

TABLE 4.6: Gender Differences in Dysfunctional Metacognitive Beliefs, Worry, Rumination, Mindfulness and Anxiety Among Young Adults ($N = 388$)

Variable	Male	Female	t	df	p	Cohen's d
	M (SD)	M (SD)				
MCQ	67.35 (15.46)	66.25 (13.50)	0.74	362.62	.458	0.08
PSWQ	50.36 (11.23)	45.97 (8.02)	4.50	385.04	.000	0.44
RRS	24.82 (6.07)	22.11 (5.29)	4.67	363.13	.000	0.47
FFMQ	45.80 (6.16)	45.32 (5.29)	0.82	365.53	.414	0.08
GAD	9.45 (6.03)	7.10 (4.70)	4.31	378.87	.000	0.42

Note. M = Mean; SD = Standard Deviation; df = Degrees of Freedom; MCQ = Metacognitions Questionnaire; PSWQ = Penn State Worry Questionnaire; RRS = Ruminative Response Scale; FFMQ = Five Facet Mindfulness Questionnaire; GAD = Generalized Anxiety Disorder Scale. Statistical significance: $p < .05$.

Chapter 5

Discussion and Conclusion

This chapter discusses the study findings in the context of the research objectives and interprets the results including demographic characteristics, Cronbach's alpha reliability, Pearson's correlation analysis and multiple linear regression analysis in light of the existing literature. The aim of the study was to investigate the relationship of dysfunctional metacognitive beliefs, worry, rumination, mindfulness with anxiety among young adults.

The discussion also highlights whether dysfunctional metacognitive beliefs, worry, rumination, and mindfulness were significant predictors of anxiety. To address this objective, multiple linear regression analysis was performed with anxiety as dependent variable and dysfunctional metacognitive beliefs, worry, rumination, and mindfulness entered simultaneously as independent variables. The data was collected from public, private and semi-government university students in twin cities of Pakistan. The sample comprised of 388 university students between the ages of 18 and 25 years. Convenience sampling techniques was used for participant recruitment. Data were collected using google forms developed on basis of research protocol.

The survey link was shared online through relevant contacts, while QR codes were used to facilitate on site participation in university cafeterias and classrooms. The

students were invited to scan QR code on their mobile phones and complete form. This strategy helped maximize participant involvement.

5.1 Discussion on Demographic Characteristics

The demographic characteristic of present study was examined to ensure the sample representativeness and generalizability of results. The sample consisted of 388 university students recruited from public, private and semi-government higher educational institutes. Demographic variables examined included gender age, educational institute, education level, and financial status.

The sample comprised of greater proportion of female participants (59.5%) than male participants (40.5%). Although both genders were adequately represented, the higher proportion of females may reflect differences in accessibility and willingness to participate during data collection rather than actual gender distribution of university students in Pakistan. This aligns with previous studies indicates gender disparities in higher education in Pakistan. A study by [Sharjeel Younas et al. \(2026\)](#) found that gender dynamics in higher education is changing with institutional types and academic disciplines with female participation excel academically, increasingly matching and exceeding their male counterparts in terms of enrollment, academic performance and overall willingness to engage in educational activities. Due to the use of convenience sampling, no claims are made regarding gender representativeness of sample. However, the inclusion of both male and female participants enabled the evaluation of gender differences among study variables.

Participants were recruited from public, private and semi government universities; however, approximately two-third of the sample (65.7%) belonged to private educational institutions. Students from public and semi government institutes represented 18.8% and 15.5% of sample, respectively. The greater representation of students from private universities may be attributed to easier institutional access, greater administrative cooperation, and higher students' availability during data

collection period. The rapid expansion of private higher educational sector in Pakistan as substantially increased opportunities for university education, particularly in urban areas where private institutions enroll considerable number of students.

The sample was young adults with age ranges from 18 to 25 years. This developmental stage is characterized by significant psychological, education and occupational transitions that influence overall wellbeing and vulnerability to mental health problems. Emerging adults experience increasing demands related to academia, career, uncertainty about future, financial dependence and identity exploration while simultaneously exposed to global challenges such as anxiety.

Most participants were enrolled in bachelor's degree programs (72.2%), whereas only 13.1% were master's students and only one participant was perusing doctoral degree program. This distribution reflects enrollment structure of higher education in Pakistan where undergraduate students constitute the largest proportion of university enrollment. Moreover, the greater representation of undergraduate students is also likely to be attributable to more accessibility for research participations. Participants reported varying perceptions of their financial situations. Nearly half of the participants (45.6%) described their financial situation as adequate, where as one quarter considered them comfortable.

However, approximately one third reported experiencing either significant or some degree of financial strain. These findings indicate considerable socioeconomic diversity within study sample. Financial circumstances represent an important contextual factor during emerging adulthood due to economic hardship may increase psychological stress and impact overall wellbeing. Previous studies have reported that family income, expenditure on education and socioeconomic conditions significantly impact access to higher education and educational outcomes among Pakistani students ([Ain et al., 2025](#); [Delavande and Zafar, 2019](#)). Therefore, the participant's inclusion from varying financial status strengthens the relevance of finding across different socioeconomic backgrounds.

5.2 Discussion on Reliabilities of Scales

The present study used standardized instruments; Metacognitions Questionnaire (MCQ), Penn State Worry Questionnaire (PSWQ), Ruminative Response Scale (RRS), Five Facet Mindfulness Questionnaire (FFMQ) and Generalized Anxiety Disorder Scale (GAD). Each of the reliabilities of the scales are discussed below. The reliability analyses demonstrated that all study measures showed good to excellent consistency, with Cronbach's alpha coefficient ranging from .82 to .90. These findings indicated that instruments used in present study were psychometrically appropriate to assess intended constructs among university students of Pakistan. The Metacognitions Questionnaire (MCQ) showed high reliability for the Metacognitions Questionnaire (MCQ) scale with a Cronbach's alpha coefficient of $\alpha = .90$. This finding is consistent with original validation study conducted by Wells and Cartwright-Hatton (2004) who reported satisfactory reliability of scale across different populations. This excellent reliability confirms instrument's stability in assessing the specific metacognitive beliefs (Solem et al., 2015). This high level of internal consistency is important for validating the correlational and regression analyses (Nordahl et al., 2023).

The Penn State Worry Questionnaire (PSWQ) reported a good internal consistency with a Cronbach's alpha coefficient of $\alpha = .82$. This finding is aligned with previous studies conducted on validation in different cultural contexts. The original developers of scale (Meyer et al., 1990), reported good reliability coefficients for instrument. The scale demonstrated satisfactory psychometric properties. Similarly, the Ruminative Response Scale (RRS) also showed a good internal consistency with a Cronbach's alpha coefficient of $\alpha = .82$. This finding is consistent with the previous studies on psychometric evaluation of RRS (Townshend and Hajhashemi, 2025). The strong internal consistency of PSWQ and RRS in this sample further supports their widespread use in the distinct but overlapping constructs of worry and rumination, which are central to the maintenance of anxiety (Anyan et al., 2020). Also, the Five Facet Mindfulness Questionnaire (FFMQ) also demonstrated good internal consistency with a Cronbach's alpha coefficient of $\alpha = .82$. The

finding is consistent with the original developers of scale (Baer et al., 2012) and also the study conducted for the validation and psychometric properties of FFMQ in Pakistan (Iqbal et al., 2023). FFMQ's reliability of .82 corroborates its effectiveness in assessing mindfulness, which is central to the maintenance of anxiety (Fisak and von Lehe, 2011).

The Generalized Anxiety Disorder Scale (GAD-7) showed an excellent internal consistency with a Cronbach's alpha coefficient of $\alpha = .89$. The findings are also consistent with previous literature measuring anxiety using GAD (Kaur, 2026; Villarreal-Zegarra et al., 2024). This internal consistency of the scale confirms its sensitivity in detecting anxiety symptoms in non-clinical young adults, a demographic where subclinical anxiety is prevalent and often linked to developmental transitions (Gomez-Baya et al., 2022). The consistency of these reliability coefficients with previous literature enhances the generalizability of the current findings, suggesting that the study measures perform reliably across different cultural and educational contexts, including the specific demographic profile of the study sample mainly consists of university students (Ramadhani and Faturohman, 2024). The values exceeding the conventional threshold of .70 recommended for established scales, indicating that the items within each instrument consistently measure the same underlying construct (Jackson and Jones, 2025). This higher internal consistency observed across all scales established a methodological foundation for the subsequent hypothesis testing, ensuring that the statistical power of the study is not compromised by the measures (Nordahl et al., 2023).

In addition to internal consistency, the descriptive statistics provides insights into the distribution of scores within the sample. The actual ranges of the scales are close to the potential ranges, indicating sufficient inconsistency in participants' responses. The MCQ ranged from 30 to 116 out of a potential 120, and PSWQ scores ranged from 23 to 80 out of 80. This inconsistency is important for correlation and regression analyses. The skewness and kurtosis values reported for each scale were within acceptable limits, suggesting that the data approximated a normal distribution, which is a key assumption for the parametric tests used in this

study (White et al., 2024). The mean scores for each scale provides a baseline understanding of levels of metacognitive beliefs, worry, rumination, mindfulness and anxiety in this specific population of young adults. The mean MCQ score of 66.90 suggests a moderate level of dysfunctional metacognitive beliefs, which is consistent with the findings in non-clinical student populations where these beliefs may be elevated due to academic pressures but not necessarily pathological (Ryum et al., 2017). Similarly, the mean GAD-7 score of 8.49 indicates mild to moderate anxiety levels. This reflects the increased stress often experienced during young adulthood (Gomez-Baya et al., 2022). These descriptive statistics along with high reliability coefficients, confirm that the data collected are both reliable and representatives of the constructs.

5.3 Discussion on Descriptives of Scales

The descriptive analysis of the study variables provides information on central tendencies, skewness, kurtosis and normality tests of dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety in young adults. The measurement of these statistical parameter is important for validating the appropriateness of Pearson correlation analyses and multiple linear regression which assumes the normality of data (White et al., 2024). The results demonstrated the study variables have normal distributions.

The mean score for the Metacognitions Questionnaire (MCQ) was 66.90 (SD = 14.69), with a median of 68.00 and a mode of 71. These central tendency suggests that, participants reported moderate level of dysfunctional metacognitive beliefs. The slight positive skewness (.13) and low kurtosis (.24) indicates a distribution that is symmetrical and mesokurtic and resembles a standard normal curve (White et al., 2024). Recent studies also showed similar results for the psychometric evaluations of MCQ-30 in non-clinical populations. The mean scores ranged between 60 to 70 which represents that these dysfunctional metacognitive beliefs are significant predictors of anxiety (White et al., 2024; Solem et al., 2015).

The Penn State Worry Questionnaire (PSWQ), the mean score was 48.59 (SD = 10.27), with a median of 45.50 and a mode of 45. The positive skewness (.54) and positive kurtosis (.49) This indicates a slight tendency towards lower scores with a longer tail extending towards higher scores (Ryum et al., 2017). This pattern is a characteristic of community samples, where a majority of individuals report manageable levels of worry, while some individual's experiences increased levels of worry (Ryum et al., 2017). The Kolmogorov-Smirnov test statistic of .09, statistically significant, represents a small effect size. This combines with distribution curve, supports the assumption of normality testing (Nordahl et al., 2023). The mean PSWQ score aligns with previous findings in undergraduate population, where academic pressures and future uncertainty increases levels of worry (Ryum et al., 2017).

The Ruminative Response Scale (RRS), the mean score was 23.72 (SD = 5.91), with a median of 23.00 and a mode of 20. The distribution was nearly symmetric, with a skewness (.25) and a kurtosis (-.07). This suggests a platykurtic distribution that is slightly flatter than a normal curve. This indicates that rumination levels are evenly distributed across the sample. The moderate mean score reflects the transdiagnostic nature of rumination, which is prevalent among young adults experiencing various forms of emotional distress including anxiety and depression (Gentes and Bonchonsky, 2026; Anyan et al., 2020).

The Five Facet Mindfulness Questionnaire (FFMQ) demonstrated a mean score of 45.60 (SD = 5.82), with a median of 45.00 and a mode of 45. The distribution was highly symmetric, with a skewness (.10) and a kurtosis (.71), indicates a leptokurtic distribution with a sharp peak and heavier tail compared to normal distribution. This suggests that most participants report average levels of mindfulness, there are some individuals who report very low or very high mindfulness traits (Solem et al., 2015). The Kolmogorov-Smirnov test statistic of .08, further supports the normality of data. The mean FFMQ score suggests that this demographic demonstrates moderate mindfulness that can be used in interventions targeting to reduce anxiety (Aydm et al., 2022). The Generalized Anxiety Disorder Scale (GAD-7) demonstrated a mean score of 8.49 (SD = 5.64), with a median of 8.00

and a mode of 7. The distribution showed a positive skewness (.37) and a negative kurtosis (-.56), indicates a slightly rightward skew. A mean score of 8.49 falls within the range of mild to moderate anxiety symptoms. This aligns with recent study finding in university student populations facing academic and social transitions (White et al., 2024; Nordahl et al., 2023). The overall descriptive statistics confirm that the data meet the assumptions required for analysis.

5.4 Discussion Correlation Analysis of Dysfunctional Metacognitive Beliefs, Worry, Rumination, Mindfulness and Anxiety

The Pearson's Correlation Analyses was conducted to identify the relationships between study variables including dysfunctional metacognitive beliefs, worry, rumination, mindfulness with anxiety. The results showed moderate to strong relationships between variables.

The first correlation showed that dysfunctional metacognitive beliefs have moderate, significant positive relationship with anxiety ($r = .47$, $p < 0.01$) which means that if dysfunctional metacognitive beliefs increases, anxiety also increases. Similarly, if dysfunctional metacognitive beliefs decreases, anxiety also decreases. These findings are consistent with the Metacognitive model of emotional disorders, suggesting that it is not the content of the thoughts, but rather the individual's beliefs about their own cognitive processes leads to anxiety (Barahmand, 2009). Specifically, positive metacognitive beliefs (e.g., "Worrying helps me cope") initiate the engagement in worry as a coping strategy, while negative metacognitive beliefs (e.g., "My worrying is uncontrollable and dangerous") maintains the process, leading to the Cognitive Attentional Syndrome (CAS). This CAS is maintained by sustain threat monitoring and maladaptive self-regulation (Solem et al., 2015). The magnitude of correlation observed in this study aligns with psychometric evaluations of the Metacognition Questionnaire (MCQ-30) which distinguish clinical and non-clinical populations

and predicts anxiety (White et al., 2024).

The moderate strength of this association ($r = .47$) suggests that while metacognitive beliefs operate within a complex network of cognitive and emotional vulnerabilities. In the context of emerging adulthood, young adults may form rigid metacognitive beliefs in response to academic and social stressors (Gomez-Baya et al., 2022). The data indicates that as dysfunctional metacognitive beliefs related to uncontrollability and danger of thoughts increase, the severity of anxiety symptoms also increase. This linear relationship highlights the transdiagnostic nature of dysfunctional metacognitive beliefs. This means these beliefs are not only a contributor of anxiety but also other conditions such as depression and post-traumatic stress disorder (Ådnøy et al., 2023). Furthermore, recent longitudinal studies demonstrated that dysfunctional metacognitive beliefs precede the development of anxiety. This suggests that dysfunctional metacognitive beliefs have a causal pathway with anxiety (Nordahl et al., 2023).

The significance of this finding is further amplified when considering the specific demographic profile of the sample, which consisted largely of unemployed students facing uncertainty. In these contexts, the belief that one cannot control their worrying may exacerbate feelings of helplessness and hopelessness, thereby increasing anxiety (Dinc et al., 2024). This relationship between dysfunctional metacognitive beliefs and anxiety in this specific cultural and developmental context indicates the targeting of metacognitive processes in therapeutic interventions (Solem et al., 2015). Hence, this correlation supports the previous studies that dysfunctional metacognitive beliefs is an important factor for young adults facing anxiety.

The second correlation between worry and anxiety showed that worry have moderate, significant positive relationship with anxiety ($r = .56$, $p < 0.01$) which means that if worry increases, anxiety also increases. Similarly, if worry decreases, anxiety also decreases. This relatively strong association observed between worry and anxiety demonstrates the core feature of Generalized Anxiety Disorder, where excessive and uncontrollable worry is the primary feature (White et al., 2024). The

magnitude of this correlation ($r = .56$) greater than of dysfunctional metacognitive beliefs ($r = .47$) and rumination ($r = .54$), suggests that worry is more closely linked to anxiety than dysfunctional metacognitive beliefs and rumination.

The findings also align with the previous literature describing worry as a primary symptom in anxiety (Ryum et al., 2017). In the context of young adults, who often face ambiguous future threats regarding career and financial stability, worry may serve as a maladaptive coping mechanism that leads to heightened physiological arousal and emotional distress (Dinc et al., 2024). The moderate to strong correlation suggests that interventions aimed at reducing anxiety should directly address the frequency and intensity of worry episodes. Hence, this study highlights that worry is an important factor in the psychopathology of worry among young adults.

The third correlation between rumination and anxiety showed that rumination have moderate, significant positive relationship with anxiety ($r = .54$, $p < 0.01$) which means that if rumination increases, anxiety also increases. Similarly, if rumination decreases, anxiety also decreases. This strong association of rumination with anxiety in this study aligns with the previous researches that suggests rumination is a transdiagnostic process that contributes to the maintenance of both depression and anxiety disorders (Ådnøy et al., 2023). The magnitude of the correlation ($r = .54$) as compared to worry ($r = .56$), indicates that both forms of repetitive negative thinking are equal potential predictors of anxiety in this population.

The results also align with research that suggests both worry and rumination share common underlying mechanisms, including dysfunctional metacognitive beliefs about the uncontrollability of the thoughts and the use of strategies to regulate negative affect (Anyan et al., 2020). Also, the temporal and reciprocal relation between worry and rumination suggests that these variables interact with each other and contributes to the maintenance of anxiety (Anyan et al., 2020). In the context of young adults, rumination on past failures or social interactions trigger anticipatory anxiety about future events. This creates a link between past oriented

rumination with future oriented anxiety ([Gomez-Baya et al., 2022](#)).

The significant correlation between rumination and anxiety also highlights young adults who engage in high levels of rumination are likely to experience elevated anxiety symptoms, possibly due to prolonged activating of negative affect and the impairment of problem-solving abilities ([Ådnøy et al., 2023](#)). Hence, this study highlights the need for a broader understanding of repetitive negative thinking in anxiety and targeting both worry and rumination for interventions ([Anyan et al., 2020](#)).

The fourth correlation between mindfulness and anxiety showed that mindfulness has relatively low, significant negative relationship with anxiety ($r = .35, p < 0.01$) which means that if mindfulness increases, anxiety decreases. Similarly, if mindfulness decreases, anxiety increases. This finding indicate that the higher level of mindfulness, as measured by the Five Facet Mindfulness Questionnaires (FFMQ), is associated with lower levels of anxiety symptoms. The negative correlation also suggests that individuals who have increased mindfulness can regulate their emotional responses to stressors, and experience less anxiety. The results align with the studies that demonstrates the efficacy of mindfulness-based interventions in reducing anxiety symptoms ([Solem et al., 2015](#)). The mechanisms through which mindfulness reduces anxiety may involve the disruption of Cognitive Attentional Syndrome. By promoting a non-judgmental awareness of present moment experiences, mindfulness allows individuals to disengage from the repetitive negative thinking patterns such as worry and rumination ([Ådnøy et al., 2023](#)). Instead of getting caught in the cycle of analyzing past events or worrying about the future, individuals with mindfulness can observe their thoughts and feelings without reacting to them ([Solem et al., 2015](#)).

The moderate strength of the correlation ($r = .35$) suggests that mindfulness is significant protective factor and is one of the important variables influencing anxiety, along with dysfunctional metacognitive beliefs, worry and rumination. The results also align with the studies that suggests that young adults who often face high

levels of academic and social stressors, mindfulness may serve as a coping resource (Gomez-Baya et al., 2022).

This result supports the integration of mindfulness training into anxiety prevention and treatment programs young adults. These programs can help individuals develop the skills necessary to manage their emotional responses, attention and reducing the prevalence and severity of anxiety symptoms (Fisak and von Lehe, 2011). The findings also highlight the potential of mindfulness as transdiagnostic protective factor that can enhance mental health in young adults (Ådnøy et al., 2023).

5.5 Discussion on Multiple Regression Analysis of Dysfunctional Metacognitive Beliefs, Worry, Rumination and Mindfulness as Predictors of Anxiety

The multiple linear regression analysis provides a comprehensive multivariate understanding of the factors contributing to anxiety symptoms among young adults, moving beyond the simple bivariate associations to identify unique predictive contributions. The final model demonstrated robust explanatory power, as for 46% of the variance in Generalized Anxiety Disorder scale (GAD) scores ($R^2 = .46$, Adjusted $R^2 = .45$) with a highly significant overall fit with $F(3, 388) = 81.99$, $p < .001$. This significant proportion of variance highlights Clinical and theoretical relevance of dysfunctional metacognitive beliefs, worry, rumination and mindfulness as central components in the etiology and maintenance of anxiety in young adults. The magnitude of this effect size is consistent with previous longitudinal and cross-sectional studies that have identified worry, rumination and dysfunctional metacognitive beliefs as primary features of emotional distress suggesting that these metacognitive mechanisms, not only the correlates but can also determine anxiety symptoms (Solem et al., 2015; Barahmand, 2009). The model's ability to explain nearly half of the variability in anxiety symptoms highlights the efficacy of targeting

the specific metacognitive processes in therapeutic interventions particularly in young adults facing the developmental uncertainty.

Worry, measured by the Penn State Worry Questionnaire (PSWQ), demonstrated itself as the strongest predictor of anxiety in the regression model, with the standardized beta coefficient of $\beta = 0.29$ ($p < .001$). This finding indicates that every, one standard deviation increase worry, anxiety symptoms increase by approximately 0.295 standard deviations holding all the other variables constant. The results also highlight importance of worry in predicting anxiety aligns with the metacognitive model of Generalized Anxiety Disorder, which states that worry is the core cognitive process maintaining pathological anxiety through the activation of Cognitive Attentional Syndrome (CAS) (White et al., 2024). These results align with the studies that states worry may serve as a maladaptive coping strategy in young adults who face ambiguous future threats regarding academic performance, career prospects and social relationships (Ådnøy et al., 2023). The results also showed strong predictive value which supports the transdiagnostic nature of the repetitive negative thinking as it is a central feature for different anxiety and depression Nordahl et al. (2023). The fact that worry remains a significant predictor even when controlling for rumination and dysfunctional metacognitive beliefs, suggests that it has a unique variance associated with anxiety, due to its direct impact on the attentional resources and threat monitoring systems (Dinc et al., 2024).

Rumination, as measured by the Ruminative Response Scale (RRS), was also a significant positive predictor of anxiety in the regression model, with the standardized beta coefficient of $\beta = 0.28$ ($p < .001$). This finding indicates that every, one standard deviation increase worry, anxiety symptoms increase by approximately 0.28 standard deviations holding all the other variables constant. These findings highlight the importance of rumination alongside with worry in clinical interventions for therapeutic efficacy (Nordahl et al., 2023; Gomez-Baya et al., 2022).

Dysfunctional metacognitive beliefs, measured by Metacognitions Questionnaire (MCQ-30), demonstrated a significant but smaller contribution to the prediction

or anxiety with a standardized beta coefficient of $\beta = 0.14$ ($p = .002$). This positive relationship indicates that individuals who hold stronger beliefs about the uncontrollability and danger of their thoughts are more likely to experience increased anxiety symptoms even after controlling the effects of worry, rumination and mindfulness (White et al., 2024). The results also indicate that every, one standard deviation increase in worry, anxiety symptoms increase by approximately 0.14 standard deviations holding all the other variables constant. The smaller beta coefficient for dysfunctional metacognitive beliefs compared to worry and rumination suggests that the influence of dysfunctional metacognitive beliefs may be mediated by worry and rumination. These dysfunctional metacognitive beliefs lead to increased engagement in worry and rumination, which in turn can drive anxiety symptoms (Solem et al., 2015; Barahmand, 2009). This pathway is consistent with the longitudinal studies which suggests that dysfunctional metacognitive beliefs predict future anxiety symptoms through their impact on cognitive strategies (Barahmand, 2009).

Mindfulness, as assessed by the Five Facet Mindfulness Questionnaire (FFMQ), was a significant negative predictor of anxiety, with a standardized beta coefficient of $\beta = -0.19$ ($p < .001$). The results also demonstrated that everyone standard deviation increase in mindfulness, anxiety symptoms decrease by approximately 0.19 standard deviations holding all the other variables constant. This finding indicates that higher levels of mindfulness are associated with lower levels of anxiety symptoms independent of dysfunctional metacognitive beliefs, worry, and rumination. The protective role of mindfulness in this model aligns with the literature that demonstrates mindfulness-based interventions effectively reduce anxiety by enhancing emotional regulation, attentional control, and present-moment awareness (Nordahl et al., 2023; Ryum et al., 2017). The results also align with studies that demonstrates mindfulness exerts its protective effect by disrupting the CAS, allowing individuals to disengage from repetitive negative thinking patterns and observe their thoughts and feelings without judgment or reaction (Nordahl et al., 2023). The significant negative association between mindfulness and anxiety, even after controlling for other variables suggests that mindfulness has a unique mechanism

for anxiety reduction that is different from the absence of worry or rumination ([Ådnøy et al., 2023](#)).

These findings are further supported by the satisfactory fulfillment of all regression assumptions. The absence of multicollinearity as the tolerance values ranging from 0.62 to 0.89 and the Variance Inflation Factor (VIF) values between 1.11 and 1.61, confirms that the predictors are distinct and that their individual contributions to the model are reliable. Durban Watson statistic of 1.85 confirms the independence of errors, indicating no autocorrelation in the residuals, while the normal distribution of the standardized residuals (mean = .000, SD = .995) validates the use of parametric statistical model. The lack of influential outliers, as indicated by the Cook's distance values (max = 0.147), further strengthens the generalizability of the results. Therefore, these statistical validations confirm that the observed relationship between dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety.

5.6 Discussion on Gender Differences in Dysfunctional metacognitive beliefs, Worry, Rumination, Mindfulness and Anxiety among Young Adults

The absence of gender differences in dysfunctional metacognitive beliefs suggests that this may be experienced similarly by male and female young adults. Although previous literature has reported that females exhibited significantly higher anxiety than males and endorsed stronger dysfunctional metacognitive beliefs, particularly negative beliefs concerning the uncontrollability and danger of worry, indicating greater vulnerability to anxiety disorders ([Bahrami and Yousefi, 2011](#)), whereas [Lenzo et al. \(2016\)](#) found that although overall levels of dysfunctional metacognitive beliefs did not differ significantly between men and women. The female gender has reported more worry than males suggests that females experience more worry than

males. This aligns with the literature suggests that women experienced significantly greater worry and engaged in more coping strategies than men (Sweeny et al., 2019). The female gender has reported more rumination than males suggests that females experience more rumination than males. This aligns with the literature that suggests women reported significantly higher levels of rumination than men, and rumination was more strongly associated with depressive symptoms among women (Umegaki et al., 2024). The absence of gender differences mindfulness suggests that this may be experienced similarly by male and female young adults. Although previous literature has reported that males demonstrated higher dispositional mindfulness (Kingery et al., 2023). The female gender has reported more rumination than males suggests that females experience more rumination than males. This aligns with the literature that suggests females exhibited significantly higher anxiety than males (Bahrami and Yousefi, 2011).

5.6.1 Limitations

Despite contributing to growing body of literature on dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety among young adults, the present study has several limitations.

- i. The present study used cross-sectional research design, in which multiple regression analysis provides evidence for relative contribution of dysfunctional metacognitive beliefs, worry, rumination, and mindfulness in predicting anxiety however, causal inferences cannot be drawn from this data.
- ii. The study used convenience sampling and recruited participants from private and public sector universities of Islamabad and Rawalpindi. Therefore, these findings may not be generalized to young adults who are not enrolled in universities or to individuals from other geographical regions.
- iii. Sample consisted solely of young adults particularly university students which may limit generalizability of findings to other age groups, contexts and populations as cognitive and metacognitive processes may vary across different developmental stages.

- iv. Although, the regression model explained a substantial proportion of variance in anxiety, approximately 54% of the variance remained unexplained. This suggest that additional psychological, biological, and environmental factors not included in the present study may also contribute to anxiety among young adults.
- v. Lastly the sample size was limited due to time and resource constraints, which may also contribute to limited generalizability.

5.6.2 Future Directions

The present study has several future directions for future research.

- i. Future studies should use longitudinal and experimental research design to examine causal relationships. Such designs would help provide better understanding of how dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety develop and change over time.
- ii. Future research should investigate additional psychological outcomes and social factors that may influence these metacognitive processes and anxiety.
- iii. Future studies should examine the potential mediating and moderating mechanisms within the Self-Regulatory Executive Function (S-REF) model where worry and rumination may be examined as mediators between dysfunctional metacognitive beliefs and anxiety and mindfulness may act as a protective moderator between the variables.
- iv. Future research should recruit participants from different provinces and educational as well as community settings to improve the generalizability of findings.
- v. Further, researchers should conduct comparative studies involving clinical and non-clinical populations and cross-cultural studies to examine whether relationships observed in present study differ according to diagnostic status and across different contexts.

5.6.3 Implications of the Study

The present study has important theoretical implications.

- i. The study contributes to the existing literature by examining the relative contribution of dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety within a single metacognitive framework among Pakistani young adults.
- ii. The study showed the use of multiple regression analysis in examining the complex relationships among metacognitive processes and anxiety and provides empirical evidence supporting the use of this analysis.
- iii. The findings also support the application of metacognitive therapy and mindfulness-based interventions for anxiety.
- iv. The study provides a context-specific evidence that may inform future research, clinical practice, and mental health policy regarding anxiety among Pakistani young adults.

5.7 Conclusion

The present study examined the relationship between dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety among young adults in Pakistan. The findings showed that dysfunctional metacognitive beliefs, worry, rumination are positively correlated with anxiety whereas mindfulness is negatively correlated with anxiety. The findings also showed that dysfunctional metacognitive beliefs, worry, and rumination significantly and positively predicted anxiety, whereas mindfulness significantly and negatively predicted anxiety, indicating a critical role of these underlying processes in the maintenance of anxiety. The findings in gender differences showed that females have more worry, rumination and anxiety whereas, no gender differences were shown in dysfunctional metacognitive beliefs and mindfulness. The results are consistent with the literature on anxiety in the context of the underlying metacognitive processes. These findings provide

empirical support for the Self-Regulatory Executive Function (S-REF) model and emphasize the importance of examining maladaptive and adaptive cognitive processes simultaneously rather than independently. The study contributes to growing literature by examining between dysfunctional metacognitive beliefs, worry, rumination, mindfulness and anxiety within a single framework. Study conducted among Pakistani young adults adds context specific evidence. Findings support the application of metacognitive therapy and mindfulness-based interventions for anxiety among young adults in Pakistan.

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Appendix A

1. Information Sheet

You are being asked to participate in a research study. The purpose of this form is to provide you information that may affect your decision as to whether or not to participate. Please feel free to ask if there is anything that you do not understand.

I, Mouj e Sehar, student of MS Psychology at Capital University of Science and Technology, Islamabad. I am conducting research thesis as a part of my degree requirement. This research aims to study the impact of mindfulness on mental health outcomes. If you decide to take part in this study you will be asked to complete a questionnaire that will take approximately 10 to 15 minutes. Please note that there are no known risks or discomforts associated with this study. Moreover, there are no direct benefit of participation. All information collected during this study will be kept confidential. Your participation is entirely voluntary, and you can refuse to participate at any time without penalty.

If you have any questions about this study now or in the future, you may contact,

Mouj e Sehar at msp243015@cust.pk

Dr. Sabahat Haqqani at sabahat.haqqani@cust.edu.pk

2. Informed Consent

	Yes	No
I confirm that I have read and have understood all the information for the above study.	☐	☐
I understand that taking part in the study involves completing the questionnaire.	☐	☐
I understand that my participation is voluntary and that I may withdraw at any time.	☐	☐
I agree to take part in the above study.	☐	☐

3. Demographic Sheet

Gender:

☐ Male ☐ Female ☐ Other(Specify): _____

Age in years: (18 – 25)* _____

Education System:

☐ Private ☐ Public/Government ☐ Semi-government

Marital Status:

☐ Single ☐ Married ☐ Engaged ☐ In a relationship ☐ Divorced

Employment Status:

☐ Full-time ☐ Part-time ☐ Self-employed ☐ Unemployed ☐ Student

Current financial situation:

☐ Comfortable ☐ Adequate ☐ Some financial strain ☐ Significant financial strain

Family System:

☐ Joint ☐ Nuclear ☐ Single Parent

Religion:

☐ Islam ☐ Christianity ☐ Other: _____

Any diagnosed physical/mental disability: Yes/No

If Yes, please specify: _____

4. Section 1

This section is concerned with beliefs people have about their thinking. Listed below are number of beliefs that people have expressed. Please read each item and say how much you generally agree with it by marking the appropriate number. Please respond to all the items; there are no right or wrong answers.

Statement	1	2	3	4
Worrying helps me to avoid problems in the future.	Do not agree	Agree slightly	Agree moderately	Agree very much
My worrying is dangerous for me.	Do not agree	Agree slightly	Agree moderately	Agree very much
I think a lot about my thoughts.	Do not agree	Agree slightly	Agree moderately	Agree very much
I could make myself sick with worrying.	Do not agree	Agree slightly	Agree moderately	Agree very much
I am aware of the way my mind works when I am thinking through a problem.	Do not agree	Agree slightly	Agree moderately	Agree very much
If I did not control a worrying thought, and then it happened, it would be my fault.	Do not agree	Agree slightly	Agree moderately	Agree very much
I need to worry in order to remain organized.	Do not agree	Agree slightly	Agree moderately	Agree very much
I have little confidence in my memory for words and names.	Do not agree	Agree slightly	Agree moderately	Agree very much
My worrying thoughts persist, no matter how I try to stop them.	Do not agree	Agree slightly	Agree moderately	Agree very much
Worrying helps me to sorted out things sorted out in my mind.	Do not agree	Agree slightly	Agree moderately	Agree very much
I cannot ignore my worrying thoughts.	Do not agree	Agree slightly	Agree moderately	Agree very much
I monitor my thoughts.	Do not agree	Agree slightly	Agree moderately	Agree very much
I should be in control of my thoughts all of the time.	Do not agree	Agree slightly	Agree moderately	Agree very much
My memory can mislead me at times.	Do not agree	Agree slightly	Agree moderately	Agree very much
My worrying could make me go mad.	Do not agree	Agree slightly	Agree moderately	Agree very much

I am constantly aware of my thinking.	Do not agree	Agree slightly	Agree moderately	Agree very much
I have a poor memory.	Do not agree	Agree slightly	Agree moderately	Agree very much
I pay close attention to the way my mind works.	Do not agree	Agree slightly	Agree moderately	Agree very much
Worrying helps me cope.	Do not agree	Agree slightly	Agree moderately	Agree very much
Not being able to control my thoughts is a sign of weakness.	Do not agree	Agree slightly	Agree moderately	Agree very much
When I start worrying, I cannot stop.	Do not agree	Agree slightly	Agree moderately	Agree very much
I will be punished for not controlling certain thoughts.	Do not agree	Agree slightly	Agree moderately	Agree very much
Worrying helps me to solve problems.	Do not agree	Agree slightly	Agree moderately	Agree very much
I have little confidence in my memory for places.	Do not agree	Agree slightly	Agree moderately	Agree very much
It is bad to think certain thoughts.	Do not agree	Agree slightly	Agree moderately	Agree very much
I do not trust my memory.	Do not agree	Agree slightly	Agree moderately	Agree very much
If I could not control my thoughts, I would not be able to function.	Do not agree	Agree slightly	Agree moderately	Agree very much
I need to worry, in order to work well.	Do not agree	Agree slightly	Agree moderately	Agree very much
I have a little confidence in my memory for actions.	Do not agree	Agree slightly	Agree moderately	Agree very much
I constantly examine my thoughts.	Do not agree	Agree slightly	Agree moderately	Agree very much

5. Section 2

Please use the 1 (never or rarely very true) to 5 (very often or always true) scale provided to indicate how true the below statements are of you.

Statement	1	2	3	4	5
When I take a shower or a bath, I stay alert to the sensations of water on my body.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I'm good at finding words to describe my feelings.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I notice how food and drinks affect my thoughts, bodily sensations, and emotions.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I have trouble thinking of the right words to express how I feel about things.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I do jobs or tasks automatically without being aware of what I'm doing.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I think some of my emotions are bad or inappropriate and I shouldn't feel them.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
When I have distressing thoughts and images I am able to just notice them without reacting.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true

Even when I'm feeling terribly upset I can find a way to put it into words.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I find myself doing things without paying attention.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
I tell myself I shouldn't be feeling the way I'm feeling.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
When I have distressing thoughts or images I just notice them and let go.	Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true

6. Section 3

Rate each of the following on a scale of 1 (“not at all typical of me”) or 5 (“very typical of me”).

Statement	1	2	3	4	5
If I do not have enough time to do everything, I do not worry about it.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
My worries overwhelm me.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I do not tend to worry about things.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
Many situations make me worry.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I know I should not worry about things, but I just cannot help it.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
When I am under pressure I worry a lot.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I am always worrying about something.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I find it easy to dismiss worrisome thoughts.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
As soon as I finish one task, I start to worry about everything else I have to do.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I never worry about anything.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
When there is nothing more I can do about a concern, I do not worry about it anymore.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I have been a worrier all my life.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me

I notice that I have been worrying about things.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
Once I start worrying, I cannot stop.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I worry all the time.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me
I worry about projects until they are all done.	Not at all typical of me	Rarely typical of me	Sometimes typical of me	Often typical of me	Very typical of me

7. Section 4

Please read each of the items below and indicate whether you almost never, sometimes, often, or almost always think or do each one when you feel down, sad, or depressed. Please indicate what you generally do, not what you think you should do.

No.	Statement	1	2	3	4
1.	Think "What am I doing to deserve this?"	almost never	sometimes	often	almost always
2.	Analyze recent events to try to understand why you are depressed.	almost never	sometimes	often	almost always
3.	Think "Why do I always react this way?"	almost never	sometimes	often	almost always
4.	Go away by yourself and think about why you feel this way.	almost never	sometimes	often	almost always
5.	Write down what you are thinking and analyze it.	almost never	sometimes	often	almost always
6.	Think about a recent situation, wishing it had gone better.	almost never	sometimes	often	almost always
7.	Think "Why do I have problems other people don't have?"	almost never	sometimes	often	almost always
8.	Think "Why can't I handle things better?"	almost never	sometimes	often	almost always
9.	Analyze your personality to try to understand why you are depressed.	almost never	sometimes	often	almost always
10.	Go someplace alone to think about your feelings.	almost never	sometimes	often	almost always

8. Section 5

Over the last two weeks, how often have you been bothered by the following problems?

Statement	Not at all (0)	Several days (1)	More than half the day (2)	Nearly every day (3)
Feeling nervous, anxious, or on edge.	Not at all	Several days	More than half the day	Nearly every day
Not being able to stop or control worrying	Not at all	Several days	More than half the day	Nearly every day
Worrying too much about different things	Not at all	Several days	More than half the day	Nearly every day
Trouble relaxing	Not at all	Several days	More than half the day	Nearly every day
Being so restless that it is hard to sit still	Not at all	Several days	More than half the day	Nearly every day
Becoming easily annoyed or irritable	Not at all	Several days	More than half the day	Nearly every day
Feeling afraid, as if something awful might happen	Not at all	Several days	More than half the day	Nearly every day

Appendix B

9. Ethics Approval



Capital University of Science & Technology
Your Journey Awaits

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Kahuta Road Zone V,
Islamabad Pakistan.

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W www.cust.edu.pk

Ref: CUST/DERC/PSY/ERC/2026/126

April 13, 2026

RESEARCH ETHICS COMMITTEE CERTIFICATE OF REVIEW AND SUPPORT

This is to certify that Project titled: *“Association of Metacognitive Beliefs with Worry and Rumination: The Moderating Role of Mindfulness among Young Adults”* submitted by Scholar: Mouje Sehar MSP243015 and supervised by: Dr. Sabahat Haqqani reviewed by the Research Ethics Committee of Faculty of Management and Social Science, meets the requirements of the American Psychological Association’s Ethical guidelines for Human Research and is **REVIEWED** and **APPROVED** by Research Ethics Committee of Faculty of Management and Social Sciences.

It is the Scholar’s responsibility to ensure that all researchers associated with this project are aware of the conditions of approval and which documents have been approved.

The Scholar is required to notify the Research Ethics Committee in case of any amendment in the project, specifically:

- Any significant change to the project and the reason for that change, including an indication of ethical implications (if any)
- Serious adverse effects on participants and the actions taken to address those effects
- Any other unforeseen events or unexpected developments that merit notification
- The inability of the Principal Investigator to continue in that role, or any other change in research personnel involved in the project
- A delay of more than 12 months in the commencement of the project; and,
- Termination or closure of the project.

Dr. Sabahat Haqqani

Convener, Research Ethics Committee
Faculty of Management and Social Sciences
Capital University of Science and Technology
Islamabad

10. Data Collection Support



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Ref. CUST/IBD/PSY/Thesis-1926
April 13, 2026

SUBJECT: REQUEST FOR DATA COLLECTION

Capital University of Science and Technology (CUST) is a federally chartered university. The university is authorized by the Federal Government to award degrees at Bachelor's, Master's and Doctorate level for a wide variety of programs.

Ms. Mouj e Sehar registration number **MSP243015** is a bona fide student in MS Psychology program at this University from Fall-2024 till date. In partial fulfillment of the degree, she is conducting research on "*Association of Metacognitive Beliefs with Worry and Rumination: The Moderating Role of Mindfulness among Young Adults*". In this continuation, the student is required to collect data from your institute.

Considering the forgoing, kindly allow the student to collect the requisite data from your institute. Your cooperation in this regard will be highly appreciated.

Please feel free to contact undersigned if you have any query in this regard.

Best Wishes,

Dr. Sabahat Haqqani
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sabahat.haqqani@cust.edu.pk