

**CAPITAL UNIVERSITY OF SCIENCE AND
TECHNOLOGY, ISLAMABAD**



**Nature Connectedness, Depression and Anxiety
among Young Adults: The Mediating Role of
Climate Change Anxiety and The Moderating
Role of Social Connectedness**

by

Muqqadas Saba

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

in the

**Faculty of Management & Social Sciences
Department of Psychology**

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CERTIFICATE OF APPROVAL

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Young Adults: The Mediating Role of Climate Change
Anxiety and The Moderating Role of Social Connectedness**

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Abstract

Climate change is increasingly recognized as a global challenge with significant psychological consequences, particularly in low- and middle-income countries such as Pakistan, where mental health services remain limited. This study examined the relationships among nature connectedness, climate change anxiety, depression, anxiety, and social connectedness in Pakistani young adults. A quantitative cross-sectional design was employed with 388 university students aged 18–25 years ($M = 21.39$, $SD = 2.10$), recruited through convenience sampling. Participants completed the Nature Connectedness Scale, Climate Change Anxiety Scale, Patient Health Questionnaire-9, Generalized Anxiety Disorder-7, and Social Connectedness Scale. Data were analyzed using SPSS Version 26 and Mplus Version 7, with structural equation modeling (SEM) to examine mediation and moderation effects. Correlation analyses indicated that climate change anxiety was positively associated with depression and anxiety, whereas nature connectedness was not significantly related to climate change anxiety. The hypothesized structural model demonstrated acceptable fit ($X^2 = 2204.37$, $df = 1206$, $CFI = .901$, $RMSEA = .046$), although the path from nature connectedness to climate change anxiety was non-significant. The revised model showed that climate change anxiety significantly predicted depression ($\beta = .255$, $p < .001$) and anxiety ($\beta = .507$, $p < .001$). Because conventional fit indices are unavailable for latent interaction models, model comparison was based on differences in Akaike Information Criterion (AIC) values. Social connectedness significantly moderated the associations between climate change anxiety and both depression and anxiety. These findings highlight the psychological impact of climate change anxiety among young adults and underscore the protective role of social connectedness in mitigating climate-related psychological distress.

Keywords: Climate change anxiety, Nature connectedness, Anxiety, Depression, Social connectedness, Mediated moderation.

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Abbreviations

CCAS	Climate Change Anxiety Scale
GADS	Generalized Anxiety Disorder Scale
LMICs	Low- and Middle-Income Countries
NCS	Nature Connectedness Scale
PHQ	Patient Health Questionnaire
SCS	Social Connectedness Scale

Chapter 1

Introduction

1.1 Background of the Study

Mental health is a growing global concern, particularly among young adults. Particularly, depression and anxiety are the most prevalent mental health issues. Globally, 278.9 million individuals are living with mental disorders ages 10 to 24 years, including 93 million individuals with anxiety disorder and 57 million individuals living with depression in 2021 ([Wang et al., 2025](#)). Along with this, climate change has emerged as a multifaceted challenge worldwide. It extends from environmental degradation to affecting mental health and well-being ([Kaligis et al., 2024](#); [Ramadan et al., 2023](#)). Over the past few years, climate change became increasingly prominent and gained more media coverage, which highlights its adverse consequences. As environmental degradation intensifies worldwide, individuals with more emotional connection to nature experience increased distress or anxiety in response to ecological losses ([Thomson and Roach, 2023](#); [Verplanken and Roy, 2013](#)). While climate change anxiety is a significant psychological risk, individual differences in how people relate to the natural world may contribute to their responses towards climate-related negative events ([Coffey et al., 2021](#)). One such construct is nature connectedness, which is the extent to which individuals perceive themselves connected to nature. Individuals who feel more connected to nature tend to be more sensitive to environmental degradation and thereby increasing vulnerability to climate-related distress ([Wigley et al., 2025](#)). As a result,

this increased vulnerability may lead to climate change anxiety ([Whitmarsh et al., 2022](#)). This suggests that climate change anxiety may serve as an indirect pathway linking nature connectedness with mental health. Particularly, higher levels of nature connectedness lead to climate change anxiety, which in turn contributes to increased depression and anxiety levels. Moreover, persistent awareness and climate-related threat exposure have been linked with increased emotional distress, uncertainty, and diminished sense of security regarding the future ([Clayton, 2020](#)).

The hallmark of climate change anxiety includes negative cognitive, behavioral, and emotional reactions towards apprehensions about climate change ([Boivin et al., 2025](#)). Although these apprehensions are not inherently pathological, they become clinically significant when they become difficult to manage or cause distress ([Burke et al., 2018](#)). Moderate levels of concern may promote environmental awareness and may motivate adaptive responses such as pro-environmental behaviors and collective action ([Haslam et al., 2018](#)). However, when these concerns become overwhelming to an individual's coping capacity, they may interfere with routine functioning. Thus, they contribute to feelings of helplessness and increase psychological distress. Unlike generalized anxiety, which involves disproportionate and persistent worry across multiple life domains ([Aquin et al., 2017](#)), climate change anxiety is context-specific, future-oriented, and often collective in nature ([Clayton, 2020](#)). Consequently, these negative reactions, such as fear and helplessness, have been associated with increased risk of anxiety and depression ([Clayton, 2020](#); [Kappan and Thiagarajan, 2026](#)).

At the same time, social factors play a critical role in shaping psychological resilience. Social connectedness, defined as a subjective feeling of closeness and belongingness in interpersonal relationships, plays a buffering role by mitigating negative psychological impact including anxiety and depression particularly among youth ([Weziak-Bialowolska et al., 2022](#)). In this context, climate change anxiety often involves feelings of helplessness, isolation, and diminished perceived control over future outcomes ([Pihkala, 2020](#)). Individuals with greater and supportive

social networks are more likely to benefit from emotional validation, collective coping, shared meaning-making, and adaptive cognitive reappraisal during uncertainty (Birrell et al., 2025). Thus, stronger social connectedness may reduce the extent to which climate change anxiety leads to symptoms of depression and anxiety (Weziak-Bialowolska et al., 2022).

Persistent awareness and exposure to threats related to climate have been linked with increased emotional distress, uncertainty, and diminished sense of security regarding future (Clayton, 2020). Climate change anxiety has gained recognition as distinct psychological response to environmental degradation. It has been conceptualized not just as a response to environmental stressors but as a chronic and anticipatory psychological threat which impacts individual's emotional functioning and future oriented cognitions (Clayton, 2020).

Moreover, climate change anxiety is a multidimensional construct comprising of affective distress, preoccupation by intrusive cognitions, behavioral disturbance leading to functional impairment (Hogg et al., 2021). Unlike discrete traumatic events, climate related stressors often involve prolonged uncertainty, perceived loss of control, and anticipation of future harm, all of which are well established antecedents of chronic psychological distress (Grupe and Nitschke, 2013). Consequently, individuals may experience psychological burden even without direct exposure with stressors related to climate, as awareness of ongoing environmental degradation itself lead to chronic stress responses (Ramadan et al., 2023).

Recent studies suggest that mental health consequences of climate change extend beyond direct exposure to extreme weather conditions. These are also caused by chronic psychological burden associated with worrying about environmental degradation and perceived threat to nature (Nkemjika, 2025). Unlike generalized anxiety, which involves disproportionate and persistent worry across multiple life domains (Aquino et al., 2017), climate change anxiety is context-specific, future-oriented, and often collective in nature. It is also related to existential concern, moral responsibility, and ecological grief (Clayton, 2020). Consequently, these

negative reactions, such as fear and helplessness, have been associated with increased risk of depression and anxiety (Clayton, 2020; Kappan and Thiagarajan, 2026).

1.2 Gap Analysis

Existing research on mental health and climate change has majorly focused on high-income countries, leading to a considerable gap in low- and middle- income countries (LMICs) (Watts et al., 2018). Moreover, evidence suggests that LMICs are disproportionately affected by adverse mental health consequences of climate change (Hayes et al., 2018). These consequences include, but are not limited to increasing sea level, melting glacier, loss of biodiversity, extreme droughts, severe storms, floods and extinction of species, many of which appear immense and potentially irreversible (Pandey, 2025). This gap is particularly evident in South Asian regions including Pakistan, where frequent climate-related events such as glacial melting, floods and heatwaves, aggravate environmental instability and increase psychological vulnerability (Shujaat, 2024; Akhtar, 2025; Clayton, 2020).

Moreover, these challenges are further compounded by substantial treatment gaps in mental health services, which limits individual's capacity to cope with climate related stressors (Patel et al., 2007). Specifically, Pakistan represents as a vulnerable country, where the majority population is young adults, who are frequently exposed to socioeconomic challenges and burden by climate disruption (Soomro et al., 2024; Niedzwiedz et al., 2025). Pakistan has been ranked 9th among 162 countries susceptible to experience high peak and massive flash floods. As reported by National Disaster Management Authority (2025) approximately 6.3 to 6.9 million people were affected due to heavy monsoon rainfall and flooding. Such repeated exposure to climate related disruptions with prevailing stressors are experienced by both individuals and communities. Consequently, this intensifies psychological distress leading to increased anxiety, depression and feeling of helplessness. Recent evidence further suggests that climate related psychological distress is increasingly reported among young adults, who often experience increased levels

of climate-related worry, perceived stress and uncertainty about future (Soomro et al., 2024; Fatima, 2022)(Soomro et al., 2024; Fatima, 2022). Moreover, there is need to integrate complex and dynamic impact of environmental, psychological and social factors altogether (Hayes et al., 2018; Whitmarsh et al., 2022). One of the major conceptual limitations of prior research is that it has frequently examined direct association for example, studies between climate related distress or between mental health and climate change anxiety without sufficiently to address the psychological mechanisms that explain these relationships (Whitmarsh et al., 2022; Weziak-Bialowolska et al., 2022). These studies provide valuable insights into associations yet there is need to explain how climate change anxiety and nature connectedness may become emotionally distressful and manifest depression and anxiety. Additionally, another underexplored pathway is interpersonal factors. Although social connection has been recognized as predictor of resilience and there is a need to examine whether social connectedness specifically alters strength of this relationship (Weziak-Bialowolska et al., 2022).

1.3 Problem Statement

Climate change has been widely recognized as determinant of mental health (Clayton and Brown, 2024). As, climate related stressors are associated with adverse psychological outcomes including heightened anxiety and depression (Hayes et al., 2018). These outcomes are particularly evident in LMICs where individuals experience higher exposure to environmental stressors along with limited resources and inadequate mental health services (Patel et al., 2007). Among these, Pakistan represents particularly vulnerable due to predominantly more young population, limited mental health resources and repeated exposure to climate related stressors (Ishaque et al., 2022).

Furthermore, rapid digitalization and access to social media increased young adults' exposure to climate related negative information, potentially increasing emotional susceptibility towards the environment (Ardelia and Jaro'ah, 2025; Buck et al., 2025). At the same time, universities and higher education institutions actively

promoting climate awareness through initiatives aligned with United Nations Sustainable Development Goals, further strengthening youth engagement with environmental issues ([Hinduja et al., 2023](#)).

Although existing research emphasized psychological impact of climate change, limited evidence has examined factors and pathways underlying these associations. For instance, a study by [Fatima \(2022\)](#) highlighted that climate change impacts the psychological health of individual and communities differently. However, the factors that shape the severity of impact and causal explanation remains understudied. Emerging evidence indicates that nature connectedness act as both protective and risk factor for depression and anxiety depending on psychological processes involved ([Curl et al., 2022](#); [Wullenkord and Reese, 2021](#)). Moreover, social connectedness has been identified as important protective factor that can mitigate negative psychological impact including anxiety and depression particularly among young adults ([Weziak-Bialowolska et al., 2022](#); [Birrell et al., 2025](#)).

Therefore, the present study aims to bridge this gap by investigating relationship between nature connectedness, depression and anxiety; mediating role of climate change anxiety and the moderating role of social connectedness among young adults in Pakistan.

1.4 Theoretical Framework

The present study is informed by the Cognitive Appraisal Theory of Stress developed by [Lazarus and Folkman \(1984\)](#) which explains how people perceive, appraise, and react to potential stressors. The theory proposes that stress does not emerge directly from external events but from the meaning individuals assign to those events and their perceived capacity to respond effectively. Theory suggests that psychological distress arises in two phases of appraisal; primary appraisal includes how individuals perceive and interpret the event, and secondary appraisal is individuals' ability to assess coping and to manage perceived threat. Primary

appraisal determines whether an environmental event is evaluated as a threat, while secondary appraisal assesses available internal and external coping resources such as social connections. These appraisals lead to emotional and behavioral consequences ([Lazarus and Folkman, 1984](#)). When coping resources are perceived as insufficient, distress responses such as depressive and anxiety symptoms are more likely to occur ([Xu et al., 2025](#)).

Within the context of climate change, individuals experiencing high connectedness to nature tend to appreciate and emotionally invest in nature. Their nature-connectedness reflects a strong sense of inclusion of natural world within individuals' self-concept and increasing emotional sensitivity to climate change ([Mayer and Frantz, 2004](#)). Perceiving environmental degradation, they may appraise it as a major threat (primary appraisal), resulting in climate change anxiety ([Hogg et al., 2021](#)). This threat appraisal becomes stronger when environmental distress is interpreted as severe, irreversible, or personally meaningful ([Clayton and Karazsia, 2020](#)).

In the given model, climate change anxiety mediated the relationship between nature connectedness with depression and anxiety, as ongoing apprehensions and helplessness due emotional connection with nature may increase susceptibility to depression and anxiety ([Pihkala, 2020](#); [Wullenkord and Reese, 2021](#)). Persistent worry about environmental uncertainty may activate a prolonged cognitive emotional stress response, increasing psychological distress over time. This explains that individuals with a stronger connection to nature may experience increased vulnerability to internalizing symptoms of depression and anxiety due to ecological threats. At the secondary appraisal level, social connectedness may act as a protective moderator. Close interpersonal and social relationships improve perceived coping capacity (secondary appraisal) by providing emotional support, mutual understanding, and a sense of collective agency ([Lee and Robbins, 1995](#); [Haslam et al., 2018](#)). Social support strengthens resilience by increasing confidence in collective problem solving and reducing feelings of isolation during stressful experiences ([Cohen and Wills, 1985](#)). Therefore, the more socially connected

individuals are, the better they can regulate climate-related anxiety and maintain psychological well-being, whereas those with weaker social connections may be more susceptible to adverse mental health consequences. Supportive social connections facilitate adaptive coping while weak social relationships exacerbate distress due to limited psychosocial resources (McLean et al., 2022). Altogether, this theory provides a comprehensive framework to understand the interaction between personal values (nature connectedness), emotional reactions (CCA), and social resources (social connectedness) to determine mental health in young adults exposed to environmental threats.

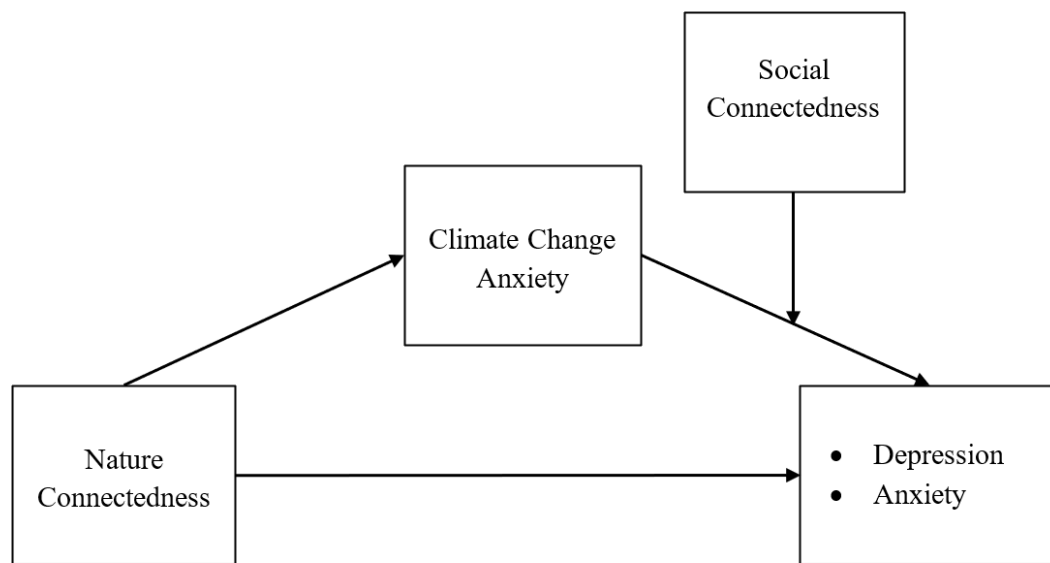


FIGURE 1.1: Conceptual Framework

1.5 Rationale

Increasing awareness of the effect of climate change on mental health captured global attention, yet research remains limited, particularly in Pakistan (Soomro et al., 2024). The majority of studies primarily focused on physical, agricultural, or economic impacts without considering the burden of emotion and cognitive aspects of climate change (Ishaque et al., 2022; Syed et al., 2022). This gap is particularly important due to the psychological response towards the climate crisis, with conditions like climate change anxiety recognized as a major public health concern globally (Clayton, 2020). Although research has established the relationship

between environmental stress and mental health, empirical evidence from LMICs remains limited ([Ogunbode et al., 2022](#)).

Pakistan is consistently ranked among top ten countries impacted by extreme weather events with increasing temperature, frequent flooding, and rapid environmental degradation ([Government of Pakistan et al., 2022](#)). These disruptions create a persistent uncertainty regarding environmental security, future stability, potentially exacerbating psychological distress among young adults. Despite this susceptibility, climate change related mental health consequences remain understudies within Pakistani context as mediators ([Asim and Ilyas, 2025](#)). Climate change anxiety in this context is not limited to physical damage but leads to negative psychological outcomes among young adults, particularly those who are increasingly being aware of climate change due to education and media ([Hinduja et al., 2023](#)). This age group is particularly relevant because emerging adulthood involved identity exploration and future-oriented decision-making, making individuals more vulnerable to perceived environmental uncertainty and existential threat ([Arnett, 2000](#)). Exposure to repeated climate-related disclosure may therefore increase emotional vulnerability and contribute towards symptoms of anxiety and depression.

Moreover, literature suggests that nature connectedness is generally associated with psychological well-being; however, strong emotional connection with nature may increase awareness of environmental degradation resulting in climate change anxiety ([Curl et al., 2022](#)). This indicated that climate change anxiety may function as a mediator through which environmental awareness influences mental health outcomes. In addition, social connectedness may shape individual response to environmental distress by strengthening emotional regulation, resilience, and collective coping ([Haslam et al., 2018](#)).

Supportive interpersonal relationships may buffer the negative impact of climate change anxiety, whereas weak social connection may exacerbate feelings of helplessness and isolation ([Pihkala, 2020](#)). Although nature connectedness has largely

been developed within Western environmental psychology, the human–nature relationship is not exclusive to Western cultures. Cross-cultural research across 65 nations supports its applicability across diverse cultural contexts while recognizing cultural differences in its expression and meaning (Swami et al., 2024). Thus, nature connectedness is relevant to the Pakistani context, although its meaning and expression may be shaped by local cultural and environmental factors. Therefore, the present study investigated the relationship between nature connectedness, depression, and anxiety; climate change anxiety as a mediator; and social connectedness as a moderator.

1.6 Research Objectives for This Study

The present study aims to:

- i) To examine the association between nature connectedness, depression, and anxiety among young adults, with climate change anxiety as a mediator and social connectedness as a moderator.
- ii) To examine the gender differences in levels of nature connectedness, climate change anxiety, depression, anxiety, and social connectedness among young adults.

1.7 Research Questions

This research explored the following questions:

- i) What is the association between nature connectedness, depression, and anxiety in young adults?
- ii) Is the relationship between nature connectedness, depression and anxiety mediated by climate change anxiety?
- iii) Does social connectedness moderate the relationship of climate change anxiety with depression and anxiety?

- iv) Are there any gender differences in levels of nature connectedness, climate change anxiety, depression, anxiety, and social connectedness among young adults?

1.8 Research Hypotheses for This Study

Hypotheses of the study are as follows:

H1: Nature connectedness is positively associated with depression and anxiety among young adults.

H2: Climate change anxiety positively mediates the relationship between nature connectedness, depression and anxiety among young adults.

H3: Social connectedness moderates (weaken) the relationship between climate change anxiety, depression and anxiety among young adults.

H4: Females report higher levels of nature connectedness, climate change anxiety, depression, anxiety, and social connectedness than males among young adults.

Chapter 2

Literature Review

Mental health concerns, particularly depression and anxiety significantly contribute to global disease burden especially among young adults who are considered as high-risk population ([World Health Organization, 2022](#)). Evidence suggests that approximately 15 to 20 percent of young adults experience clinically significant depression and anxiety symptoms every year, with increasing prevalence rates over the past decade ([GBD 2019 Mental Disorders Collaborators, 2022](#)). In LMICs, these rates are often underreported due to several factors including stigma, and limited resources for mental health ([Patel et al., 2007](#)).

In Pakistan, depression and anxiety constitutes major public health concern, with evidence suggesting approximately 51 percent of population experiences anxiety and depression ([Niazi et al., 2025](#)). Moreover, factors associated with environmental degradation particularly climate change emerged as psychological stressor leading to climate change anxiety ([Clayton and Karazsia, 2020](#)).

Within this context nature connectedness has been increasingly examined as emotional ecological construct that may be associated with psychological resilience and vulnerability depending on cognitive appraisal to environment ([Thomson and Roach, 2023](#)). This section presents overview of existing research on climate change anxiety, nature connectedness, anxiety, depression and social connectedness related contemporary and anticipated associations.

2.1 Nature Connectedness and Mental Health

Nature connectedness has been associated with positive mental health consequences. According to Wilson (1984), human possess an innate ability to affiliate with nature which enhances psychological functioning and support emotional stability. Such affiliation is biological rather cultural, indicating that human wellbeing may be inherently associated with exposure to natural environments (Wilson, 1984). Similarly, Kaplan (1995), found that exposure to nature restores depleted cognitive resources and mental fatigue thus improving wellbeing. They further explained that natural environments engage “effortless attention” allowing directed attention mechanisms to recover from cognitive overload commonly experienced in urban settings.

Moreover, research shows higher nature connectedness among individuals shows improved positive affect, greater life satisfaction (Richardson et al., 2020), improved wellbeing (Pritchard et al., 2019; Capaldi et al., 2014) and reduced anxiety and depression symptoms (Bakir-Demir et al., 2021). Meta analysis evidence found that nature connectedness functions as a generalizable predictor of subjective wellbeing instead of a context-specific phenomenon. This suggests that engagement with nature predicts long term impact on mental health and emotional resilience (Capaldi et al., 2014). However, emerging evidence suggests a more complex relationship. Recent study indicates that higher nature connectedness may correlate with increase psychological vulnerability when individuals are exposed to negative climate related events leading to climate change anxiety (Curl et al., 2022). This suggests a dual pathway model in which nature connectedness may simultaneously serve as a resource for psychological restoration and vulnerability, depending on environmental conditions and cognitive appraisal of ecological threat.

Nature connectedness is defined as degree to which individuals perceive themselves to be part of natural world and is directly related to pro-environmental behaviors and emotional wellbeing (Mayer and Frantz, 2004; Capaldi et al., 2014). This reflects cognitive affective integration process in which nature is associated

with self-identity, thereby impacting values, emotions and behavioral intentions (Schultz, 2002).

With increasing environmental degradation around the globe, individuals with strong emotional connection to nature face heightened emotional reactivity to ecological losses; experiencing increased distress, grief or anxiety (Thomson and Roach, 2023; Verplanken and Roy, 2013). This phenomenon is conceptualized as climate change anxiety or eco-anxiety, where environmental degradation is experienced as personal loss particularly among individuals with stronger environmental identity and concern for nature (Thomson and Roach, 2023). This shows higher nature connectedness indicated increased worry related to climate change, which in turn predicted alleviated psychological distress. These findings support a mediational pathway in which climate change anxiety acts as psychological mechanism linking nature connectedness with depression and anxiety.

In LMICs, including Pakistan, there is a paucity of research on nature connectedness. However, existing literature found nature connectedness is positively associated with life satisfaction and loneliness as moderator (Arshad et al., 2025). This shows that connection with nature enhances overall wellbeing. Consequently, nature connectedness can act as both protective and risk factor for mental health and how individuals evaluate environmental threats.

2.2 Climate Change Anxiety as a Mediator

An increasing body of literature associated climate change anxiety with negative mental health consequences. Among these, anxiety, depression, and psychological distress are frequently associated with climate change anxiety (Bashir et al., 2026). For instance, Mouguiama-Daouda et al. (2026) reported that depression has been linked to increased climate change anxiety. Furthermore, climate change anxiety is a multidimensional emotional response characterized by prolonged states of worry, helplessness, and apprehensions regarding negative consequences due to environmental degradation and future of environment (Clayton, 2020; Akhtar, 2025).

Climate change anxiety can encompass both self-oriented concerns, such as fears about personal safety, health, livelihood, and living conditions, and future-oriented concerns, including worries about future generations, ecological systems, and the long-term consequences of climate change (Soutar and Wand, 2022; Clayton and Karazsia, 2020). Qualitative evidence indicates that climate-related anxiety may arise from perceived threats to livelihoods as well as concerns about future generations and catastrophic environmental futures (Soutar and Wand, 2022; Clayton and Karazsia, 2020).

Thus, awareness of climate change may evoke worry and anticipatory fear regarding both immediate and future environmental threats (Wullenkord and Reese, 2021). Concerns associated with climate change involve worries related to personal safety and well-being and social altruistic concerns regarding future generations, communities, and ecosystems (Helm et al., 2018). As Clayton and Karazsia (2020) explained, climate change anxiety is not the same as general worry or concern regarding climate change but involves disruption in everyday functioning resulting in cognitive and emotional problems (e.g., trouble concentrating). This is further conceptualized as a multidimensional psychological response consisting of cognitive intrusion, emotional dysregulation, and behavioral disturbance linked to ecological threats (Clayton, 2020). Although climate change anxiety has been positively linked with worry and concern related to climate, it remains less prevalent due to its severity (Whitmarsh et al., 2022). Rather than being inherently pathological, climate change anxiety is increasingly understood as rational and anticipatory response to escalating global threat to environment.

Literature suggests that climate related anxiety may simultaneously promote adaptive responses, such as pro environmental behaviors and reduced carbon-intensive practices, while increasing vulnerability to emotional distress and functional impairment leading to excessive anxiety (Taylor, 2020). This aligns with ecological stress perspectives, which conceptualize emotional distress as an adaptive signaling system rather than a clinical dysfunction. Consequently, researchers caution against pathologizing climate-related anxiety because emotional concern regarding

environmental degradation reflects a response to ongoing ecological crisis rather than an irrational fear ([Verplanken and Roy, 2013](#); [Wullenkord et al., 2021](#)).

[Esteban et al. \(2025\)](#) showed that climate change anxiety manifest in rumination, hopelessness and emotional fatigue resulting in depressive symptoms. These findings further indicated that repetitive negative thinking about environmental threats serves as key cognitive mechanism linking climate awareness with internalizing disorders such as depression and anxiety. Similar symptoms pattern has been identified in anxiety disorder. However, generalized anxiety including fear disproportionate to actual threat, climate change anxiety differs because it emerges in response to legitimate global threat ([Veillard and Rizeq, 2026](#)). Furthermore, [Wullenkord et al. \(2021\)](#) and [Thomson and Roach \(2023\)](#) found that individuals with more nature connectedness were more prone to climate related worry, which subsequently predicted increased psychological distress. Research further indicates that climate change anxiety may negatively impact routine functioning in various domains of life, including occupational, academic and interpersonal. Individuals experiencing heightened climate change anxiety report difficulties in sleeping, impaired concentration, reduced productivity and strain in interpersonal relationships ([Hickman et al., 2021](#)).

While adaptive climate anxiety may motivate environmental engagement and problem-solving behaviors however, maladaptive climate related anxiety occurs when emotional responses become overwhelming and disrupts normal functioning ([Taylor, 2020](#); [Wullenkord et al., 2021](#)). At severe levels, individuals may experience helplessness, hopelessness, powerlessness, fear and avoidance-oriented coping strategies in response to climate related threats ([Stroebe et al., 2017](#); [Strife, 2012](#); [Taylor, 2020](#)). Moreover, researchers argue that climate change anxiety may, for certain individuals represent manifestation or extension of preexisting anxiety vulnerabilities rather than an entirely different psychological condition ([Wullenkord et al., 2021](#)). Climate change impacts psychological health in both chronic and acute ways. Acute impact arises from exposure related to environmental degradation or disasters such as storms, heatwaves, floods, etc., linked to increased

rate of psychological disorders ([Berry et al., 2010](#)). Whereas chronic impacts stem from ongoing change in negative environmental changes such as rising temperature, ecological loss, food shortage and insecurity leading to persistent psychological burden ([Clayton, 2020](#)). This chronic stress contributes to cumulative stress, which manifests as generalized anxiety, emotional exhaustion, and long-term depressive vulnerability. [Doherty and Clayton \(2011\)](#) proposed that climate change threatens psychological wellbeing through direct pathways involving traumatic exposure, indirect pathways involving exposure to environmental degradation and psychological pathways involving disruption to communities and social system.

Research in Europe and Asia indicate that greater climate change anxiety is associated with increased symptoms of anxiety and depression ([Thomson and Roach, 2023](#); [Ogunbode et al., 2022](#)). This indicates that climate change anxiety can be significant emotional mechanism by which environmental awareness and nature connectedness influence psychological outcomes such as depression and anxiety. Moreover, research showed that young adults are particularly susceptible to these outcomes as they hold strong environmental values but have limited control in policy and structural transformations.

Further, digital media exposure has been identified as a key intensifier of climate-related distress; repeated exposure to catastrophic events increases emotional reactivity and perceived environmental threat. Young adults also known as emerging adults are particularly vulnerable to climate change anxiety and psychological issues due to their ongoing biological and psychological development ([Veillard and Rizeq, 2026](#)). Studies indicated young adults report elevated levels of concerns, fear and emotional distress reading climate change and future environmental instability ([Hickman et al., 2021](#)). However, socio-ecological systems significantly influence how individuals experience and respond to climate threats ([Wasmus et al., 2025](#)). Furthermore, persistent exposure to fear-based climate media intensifies hopelessness and emotional overwhelm ([Parry et al., 2022](#)). Notably, climate change anxiety also exhibits dual functional role; while excessive levels may impair wellbeing, yet moderate levels can increase pro-environmental behaviors and collective

action ([Schwartz et al., 2022](#)).

2.3 Social Connectedness as Moderator

Social connectedness improves perceived coping strategies, reduced loneliness and stress responses ([Holt-Lunstad et al., 2015](#); [Williams and Galliher, 2006](#)). Social connectedness is an extent to which individuals feel a sense of belongingness and connection within their social networks. It reflects both structural and subjective aspects of interpersonal relationships including perceived acceptance, relational closeness and emotional integration ([Birrell et al., 2025](#)).

According to [Cunsolo et al. \(2020\)](#), suggest that individuals within supportive social networks report fewer depressive symptoms despite experiencing high climate-related stress. This protective impact is explained by stress buffering hypothesis which suggest that social support reduced psychological burden of stressful experiences by improving coping capacity and emotional reassurance ([Cohen and Wills, 1985](#); [Lam, 2024](#)).

On the other hand, weak connectedness increases feelings of isolation, despair and helplessness as reaction to environmental threats. This suggest that social connectedness may mitigate psychological impact of ecological degradation by providing emotional validation, collective meaning and pathways of collective action ([Pihkala, 2020](#)). Collective meaning making allow individuals to reframe the environmental threat as shared societal challenge rather isolated personal burden, thus reducing distress and improving adaptive emotional processing ([Haslam et al., 2018](#)). Whereas low social connectedness may lead to higher levels of depression and anxiety.

Thus, it was proposed that social connectedness may act as moderator in the relationship between climate change anxiety and psychological outcomes including depression and anxiety. Specifically, higher levels of social connectedness are

expected to weaken the positive relationship between climate change anxiety, depression and anxiety by enhancing adaptive coping.

2.4 Gender Differences among Nature Connectedness, Climate Change Anxiety, Depression, Anxiety and Social Connectedness

Evidence suggests that psychological and environmental attitudes vary across demographic groups. For instance, a study on climate change anxiety found differences by gender, age, marital status, and education. Results indicated women reported higher anxiety and individuals with higher education reported lower anxiety (Zareen et al., 2024). Similarly, Clayton and Karazsia (2020) reported that women consistently scored higher on climate-related anxiety than men. More recent evidence provides stronger support for this gender difference. A meta-analysis of 94 studies involving 170,747 participants across 27 countries found that women reported slightly higher levels of climate change anxiety than men, although the effect was small (?). This finding suggests that gender may be a relevant demographic factor in understanding climate-related psychological responses, while also indicating that gender alone does not fully explain individual differences in climate change anxiety.

Gender differences have also been observed in relation to nature connectedness. Studies reported women often exhibit stronger nature connectedness as compared to men (Dean et al., 2018; Sollis et al., 2025). However, evidence regarding gender differences in nature connectedness is less consistent. A comprehensive review found that although studies reporting gender differences more frequently indicated higher connectedness among women, many studies reported no significant gender differences, suggesting that any gender effect is likely to be small or context-dependent (Barragan-Jason et al., 2022). This mixed evidence highlights the importance of examining gender differences within specific cultural and environmental contexts rather than assuming that women and men necessarily differ

in their connection with nature.

Likewise, [Zhao et al. \(2022\)](#) reported significantly elevated levels of depression and anxiety symptoms among females, particularly during periods of heightened social and environmental stress. More broadly, a large meta-analysis of nationally representative studies from more than 90 countries found that females experienced higher levels of depressive symptoms and major depression than males, with gender differences particularly evident during adolescence and young adulthood ([Salk et al., 2017](#)). These findings suggest that gender may represent an important demographic factor when examining mental health outcomes such as depression and anxiety.

Furthermore, studies examining social connectedness have reported notable gender differences in interpersonal relationships and perceived social support. Females reported generally higher levels of perceived social support than males ([Lee and Robbins, 1995](#); [Cruwys et al., 2016](#)). However, these differences may depend on the type of social relationship and the cultural context. Evidence generally indicates that women tend to report greater perceived social support, whereas men and women may differ in how social support is obtained and utilized ([Tifferet, 2020](#)). Thus, gender may also be relevant to understanding social connectedness and its potential role in psychological well-being.

Overall, the literature suggests that gender differences are evident across climate change anxiety, mental health, nature connectedness, and social connectedness, but the magnitude and consistency of these differences vary across constructs and populations. Therefore, examining gender differences in the present study is important for determining whether the relationships observed among nature connectedness, climate change anxiety, mental health, and social connectedness are consistent across male and female participants.

Chapter 3

Research Methodology

This chapter describes the design and procedures used in the present study. Detailed descriptions of instruments and procedures are provided.

3.1 Research Design

The study used a quantitative cross-sectional research design to examine the relationship between nature connectedness, depression, and anxiety with climate change anxiety as a mediator and social connectedness as a moderator among young adults.

3.2 Ethical Considerations

Ethics approval was obtained from the Ethics Review Committee of the Faculty of Management and Social Sciences of Capital University of Science and Technology, Islamabad. Verbal permissions were obtained from relevant university authorities where data collection took place. Participants were provided with an informed consent form detailing the purpose of the study, rights of participants, confidentiality, and data handling procedures. Moreover, contact information was shared for any distress and further information. Participants were given the research protocol (attached in the appendix), including informed consent, a demographic sheet, and a series of questionnaires.

3.3 Time Horizon and Study Settings

The data was collected from universities within Islamabad and Rawalpindi. These cities have a high concentration of higher education institutes with a diverse population, which facilitated the collection of responses from students of varied backgrounds.

Data was collected from 6 universities, out of which 2 were public sector universities, 2 were private, and 2 were semi-government universities. These included International Islamic University Islamabad (IIUI), Quaid-e-Azam University, Bahria University H11 Campus, Shifa International University Islamabad, CUST University, and Foundation University Islamabad. Data collection was conducted within the duration of 42 days from April 20, 2026, to June 02, 2026. Students from various degree and academic programs were recruited for participation.

3.4 Sample Procedure

The sample comprised of 388 university students, aged 18 to 25 years ([Arnett, 2000](#)); enrolled in public and private universities within Islamabad and Rawalpindi. Both females and male participants were recruited. The convenience sampling technique was used for recruitment of participants. The data was collected using Google forms including information sheet, informed consent, a demographic section, and measures related to study variables. A QR code and short link were generated. Both were shared with students by on-site university visits and through personal connections and filled by students on their personal devices.

3.4.1 Inclusion Criteria

Following are the inclusion criteria for study:

- i) Participants with ages between 18 and 25 years, currently enrolled in universities within the twin cities of Pakistan.
- ii) Participants willing to give informed consent to participate in the study.

3.4.2 Exclusion Criteria

Following is the exclusion criterion for study:

- i) Individuals with any physical or psychological conditions which impede their ability to participate in the study were excluded.

3.5 Sample Size

Hair et al (2010) recommended rule of thumb of 5 to 10 participants per indicator was used for sample size calculation. The present study used five scales; connect- edness to nature scale (14 items), climate change anxiety scale (13 items), patient health questionnaire (9 items), generalized anxiety scale (7 items) and social con- nectedness scale (8 items), a total of 54 indicators. Using above mentioned rule of thumb (Hair et al., 2010), lower bound is 255 participants, whereas upper bound is 510 participants. According to model's complexity, a target sample size of 388 participants was chosen considering potential nonresponse and incomplete data.

3.6 Study Procedures

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. Par- ticipant were approached online and in person. Study related details with clear instructions were shared. Those participants who agreed to participant were pro- vided with link or QR code based on feasibility and ease of access. Participants were clearly informed about objectives of study; their rights and potential risks or benefits associated with 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 is no right of wrong 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, connectedness to nature scale, climate change anxiety scale, patient health questionnaire, generalized anxiety scale and social connectedness 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 thanked for their cooperation, valuable time, and participation in study.

3.7 Measures

3.7.1 Demographic Sheet

A demographic sheet to gather participant's background information including age, gender, marital status and level of education was used.

3.7.2 Climate Change Anxiety Scale

[Clayton and Karazsia \(2020\)](#) developed a 13 item CCAS to assess climate-related anxiety. One sample item includes, "I feel anxious when I think about the effects of climate change on the planet". Each item is rated on 5-point Likert scale 1= never to 5 = almost always. It takes approximately 5 to 10 minute to complete. The scale reported good internal reliability ranging from .84 to .92 Cronbach's alpha and convergent validity was also evaluated with through correlation with general anxiety and environmental worry. The scoring is conducted by averaging item responses; high scores indicate greater level of CCA. The scale has been widely

used with a Pakistani context, supporting applicability beyond western populations (Zareen et al., 2024). Importantly, Tam et al. (2023) examined the CCAS among 4,000 participants from China, India, Japan, and the United States and found configural and metric invariance across these countries, providing empirical support for its use in Asian populations.

3.7.3 Connectedness to Nature

Mayer and Frantz (2004) developed 14 item connectedness to nature scale. It was designed to assess the level to which people perceive themselves as part of nature rather than separate from it. A sample item includes, “I often feel a sense of oneness with natural world around me”. Three items (4, 12, and 14) reversed scored. Responses are collected using 5-point Likert scale ranging from 1= strongly disagree to 5=strongly agree. Scoring is done by summing all the responses; possible score ranges from 14 to 70, where higher scores show greater level of connectedness to nature. It is self administered scale and takes approximately 5 to 10 minutes to complete. The scale demonstrated strong internal reliability .84 Cronbach’s alpha and convergent validity was tested with environmental behaviours and well-being measures (Mayer and Frantz, 2004). Moreover, its cross-cultural applicability has subsequently been examined by Swami et al. (2024) across 65 nations and 40 languages, including Pakistan and several Asian countries.

3.7.4 Patient Health Questionnaire

Patient Health Questionnaire was developed by Kroenke et al. (2001). It is widely used to measure depressive symptoms. One sample item includes; “Feeling down, depressed, or hopeless”. Each item is scored on 4-point Likert scale ranging from 0= not at all to 3= nearly everyday focusing on how frequently symptoms occurred during past two weeks. Total score is computed by adding all responses with possible range of 0 to 27; high scores indicate severe depressive symptoms. Depression severity is categorized with established cutoff scores as minimal (0 to 4), mild (5 to 9), moderate (10 to 14), moderately severe (15 to 19) and severe (20 to 27). The scale demonstrated strong internal reliability of .89 Cronbach’s

alpha. Due to its brief nature and ease of use; it has been extensively used for both research and clinical purposes. A systematic review identified 25 PHQ-9 validation studies conducted in Asia, including China, India, Pakistan, Sri Lanka, Nepal, Malaysia, Thailand, Vietnam, Lebanon, and Iran ([Manea et al., 2017](#)). Previous literature supported its appropriateness to assess depressive symptoms among youth in Pakistan.

3.7.5 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 everyday. 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 cutoff 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. It takes approximately 5 to 7 minutes to complete and is widely used due to its brevity.

3.7.6 Social Connectedness Scale

[Lee and Robbins \(1995\)](#) developed an 8-item social connectedness scale to measure individual’s sense of interpersonal closeness and belongingness with others. A sample item includes; “I feel close to people in my community.” Each item is scored on 6-point Likert scale ranging from strongly disagree to strongly agree. The total score is computed by averaging all responses where higher scores show stronger social connectedness.

The scale demonstrated excellent internal reliability of .91 Cronbach’s alpha and good construct validity. Further evidence was provided by [Fu et al. \(2024\)](#), who found good reliability and construct, convergent, and discriminant validity of the Chinese SCSR among 345 psychiatric patients, showing appropriateness in the Asian context.

3.8 Data Analyses

The data was analyzed using IBM SPSS version 27 and MPlus Version 7. Prior to hypothesis testing, data were screened for completeness, missing values, outliers and normality. Descriptive statistics were computed to summarize study variables. Frequencies and percentages were computed to explain categorical variables, whereas mean, standard deviation, skewness and kurtosis were computed to examine central tendency and distribution of continuous variables. The normality of variables was evaluated using skewness kurtosis, histogram and Kolmogorov-Smirnov test. Since the value of skewness and kurtosis was in given range (between +2 and -2) distribution were found normal, parametric statistical analyses were conducted.

The internal consistency of all study measures was assess using Cronbach's alpha coefficient (α). Pearson correlation coefficients were computed to investigate bivariate relationships between nature connectedness, climate change anxiety, depression, anxiety and social connectedness. Correlation analyses were performed to determine the direction and strength of associations among the study variables. Independent samples t-tests was conducted to examine gender differences among nature connectedness, climate change anxiety, depression, anxiety, and social connectedness.

Before testing hypothesized structural relationships, confirmatory factor analysis (CFA) was conducted in Mplus Version 7. CFA was performed to assess whether the observed indicators adequately represented their respective latent variables and to establish the construct validity of measurement model. Each observed indicator was specified to load only its hypothesized latent construct, while measurement errors associated with indicators were assumed to be uncorrelated unless otherwise theoretically justified.

The overall fit of measurement model was evaluated using multiple goodness-of-fit indices, including chi-square statistic, comparative fit index (CFI), and Root

Mean Square Error of Approximation (RMSEA). The chi-square statistic was used to examine the discrepancy between the observed and model implied covariance matrices; however, because it is sensitive to the sample size, greater emphases was placed on practical fit indices. According to [Hu and Bentler \(1999\)](#), CFI values of 0.90 or above indicate acceptable fit, whereas values of .95 or above represent good fit. Similarly, RMSEA values less than .08 indicate and acceptable fit, while values less than .06 reflect good model fit. If model did not achieve satisfactory fit, theoretically justifiable model modifications were considered based on modification indices and standardized factor loadings while ensuring all changes were conceptually meaningful.

After establishing acceptable measurement models, structural model was estimated using SEM to test hypothesized structural relationships among latent variables. The structural model was used to evaluate mediating and moderating relationships in conceptual framework. The significance of structural paths was determined using standardized regression coefficients and associated p - values with statistical significance evaluated at $p < .05$. the adequacy of structural model was assessed using same model fit indices. Model comparison was based on differences in Akaike Information Criterion and Bayesian Information Criterion between competing models. Larger reductions in these indicate stronger empirical support for preferred model and greater model parsimony ([Burnham and Anderson, 2002](#)).

Chapter 4

Results

The present study was conducted to investigate the relationship between nature connectedness, depression, and anxiety among young adults. In addition, the study examined mediating role of climate change anxiety and social connectedness as moderator. This chapter presents the findings of the study. The results are organized into descriptive statistics, normality, reliability analyses, correlation analyses, and SEM including measurement and structural models.

4.1 Demographic Characteristics of Study Participants

In present study, data was collected from 388 university students. The sample comprised 231 female participants (59.5%) and 157 male participants (40.5%), demonstrating a relatively higher representation of females than males in the study. The participants were from different educational system including public, private and semi government. Of which, the majority of participants were enrolled in private educational institutions ($n = 255$, 65.7%). Participants studying in public or government institutions comprised 18.8% ($n = 73$) of the total sample, whereas those 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. Participants' age ($M=21.39$, $SD=2.1$) range was between 18 and 25 years.

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

Variable	Category	n	%
Gender	Female	231	59.5
	Male	157	40.5
Age (Years)	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
Educational Institution	Private	255	65.7
	Public	73	18.8
	Semi-Government	60	15.5
Educational Level	Bachelor's	336	86.6
	Master's	51	13.1
	PhD	1	0.3
Employment Status	Full-time Employed	29	7.5
	Part-time Employed	23	5.9
	Self-employed	14	3.6
	Student	26	6.7
	Unemployed	290	74.7
Financial Situation	Adequate	177	45.6
	Comfortable	98	25.3
	Significant Financial Strain	92	23.7
	Some Financial Strain	21	5.4

Note. n = frequency; % = percentage.

The majority of participants were 20 years old ($n = 77$, 19.8%), whereas the smallest age group consisted of participants aged 18 years ($n = 27$, 7.0%). Table 4.1 shows frequencies and percentages of demographic characteristics of the study participants. Most participants enrolled in bachelor's programs ($n = 336$, 86.6%).

Participants pursuing master's-level education constituted 13.1% ($n = 51$) of the sample, while only one participant (0.3%) reported being enrolled in a PhD program.

Nearly half of the participants reported having an adequate financial status ($n = 177$, 45.6%). Approximately one-quarter of the sample described their financial situation as comfortable ($n = 98$, 25.3%). Additionally, 92 participants (23.7%) reported experiencing significant financial strain, whereas 21 participants (5.4%) indicated some financial strain.

4.2 Cronbach's Alpha Reliability of Nature Connectedness, Climate Change Anxiety, Depression, Anxiety and Social Connectedness

Cronbach's alpha reliability (α) was analyzed to evaluate the internal consistency of scales administered.

TABLE 4.2: Means, Standard Deviations, Ranges, Skewness, Kurtosis, and Cronbach's Alpha Reliability Coefficients of the Study Variables ($N = 388$)

Scale	Items	M	SD	α	Potential Range	Actual Range	Skewness	Kurtosis
NCS	14	44.17	9.28	.88	14–70	14–70	-0.45	1.40
CCAS	13	2.11	0.84	.93	1–5	1–5	0.54	-0.21
PHQ-9	9	10.31	6.31	.86	0–27	9–27	0.11	-0.63
GAD-7	7	8.49	5.64	.89	0–21	7–21	0.38	-0.57
SCS	8	3.55	1.34	.91	1–6	1–6	0.37	-0.02

Note. Items = Number of items; M = Mean; SD = Standard Deviation; α = Cronbach's alpha reliability coefficient; NCS = Nature Connectedness Scale; CCAS = Climate Change Anxiety Scale; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder-7; SCS = Social Connectedness Scale.

Table 4.2 presents the Cronbach's alpha reliability coefficients for scales used to measure nature connectedness, climate change anxiety, depression, anxiety and

social connectedness. The Nature Connectedness Scale (NCS) showed good internal consistency, with an alpha coefficient of .88. The Climate Change Anxiety Scale (CCAS) demonstrated excellent internal consistency, with a Cronbach's alpha coefficient of .93. Similarly, the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder Scale-7 (GAD-7) demonstrated good reliability, with Cronbach's alpha coefficients of .86 and .89, respectively. The Social Connectedness Scale-Revised exhibited excellent internal consistency, with a reliability coefficient of .91. Overall, the reliability ranged from .86 to .93, indicating that all instruments showed good to excellent internal consistency and were suitable for subsequent analyses.

4.3 Descriptive Statistics of Nature Connectedness, Climate Change Anxiety, Depression, Anxiety and Social Connectedness

This section presents descriptive statistics of study variables including Climate Change Anxiety, Nature Connectedness, Depression, Anxiety, and social connectedness.

TABLE 4.3: Descriptive Statistics of Nature Connectedness, Climate Change Anxiety, Depression, Anxiety, and Social Connectedness ($N = 388$)

Scale	M	Mdn	SD	Skewness	Kurtosis
NCS	44.17	44.00	9.28	-0.45	1.40
CCAS	2.11	2.00	0.84	0.54	-0.21
PHQ-9	11.31	11.00	6.31	0.11	-0.63
GAD-7	8.49	8.00	5.64	0.38	-0.57
SCS	3.55	3.38	1.34	0.37	-0.02

Note. M = Mean; Mdn = Median; SD = Standard Deviation; NCS = Nature Connectedness Scale; CCAS = Climate Change Anxiety Scale; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder-7; SCS = Social Connectedness Scale.

Based on values of skewness, kurtosis and distributions curves confirmed that data met the assumption of normality, allowing for subsequent parametric testing. Nature Connectedness Scale (NCS) revealed mean score of 44.17, the median and the mode was 44. The data demonstrated standard deviation of 9.28, with skewness (-.45) and kurtosis (1.40); these values reveal a slight negative skewness and moderately leptokurtic data, which remains well within the acceptable range of -2.0 to $+2.0$ assumption for normality.

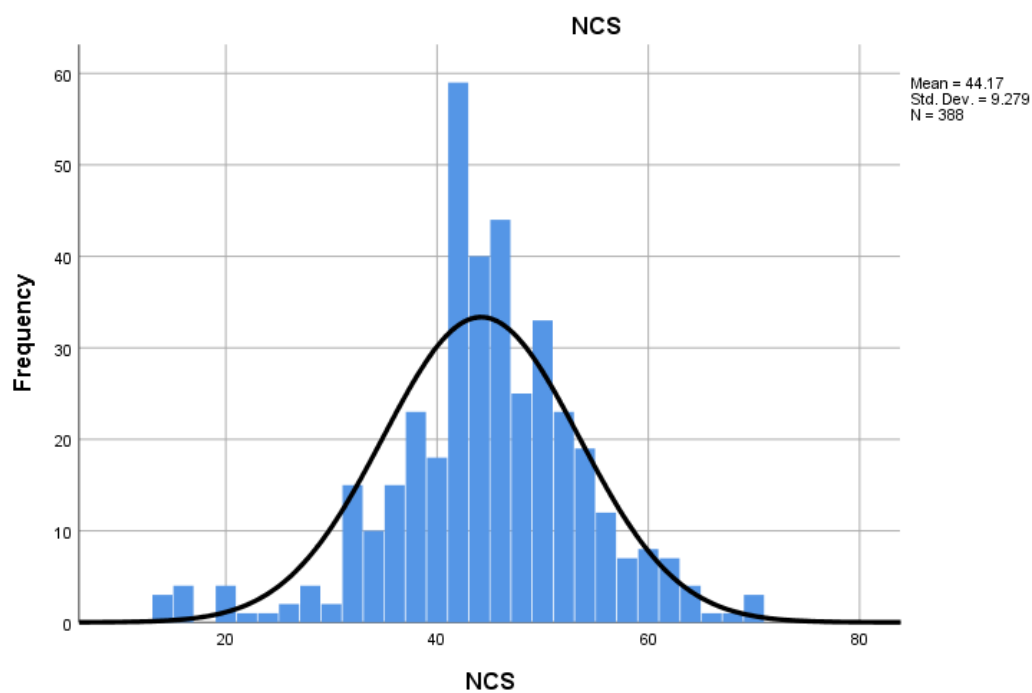


FIGURE 4.1: Distribution of Connectedness to Nature Scale

Descriptive analyses of climate change Anxiety revealed a mean score of 2.11, with both the median and mode was 2. The data demonstrated a standard deviation of 0.84, while skewness (0.54) and kurtosis (-0.21), these indicate a mild positive skewness and slightly platykurtic distribution, both of which fall safely within the conventional threshold of -2.0 to $+0.2$, demonstrating a distribution that satisfies the normality assumption.

Descriptive analyses of Patient Health Questionnaire (PHQ-9) showed mean score of 11.31, with median and mode of 11. The data demonstrated standard deviation

of 6.31, skewness (.11) and kurtosis (−.63); the near-perfect alignment between the mean and median, along with a minimal skewness index close to zero.

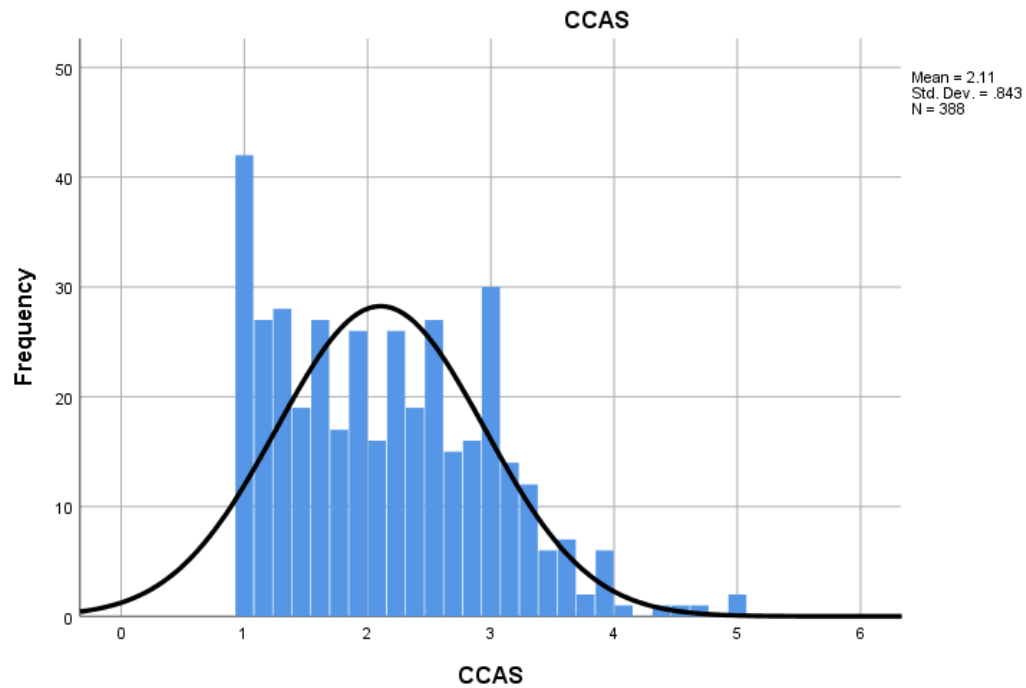


FIGURE 4.2: Distribution of Climate Change Anxiety Scale

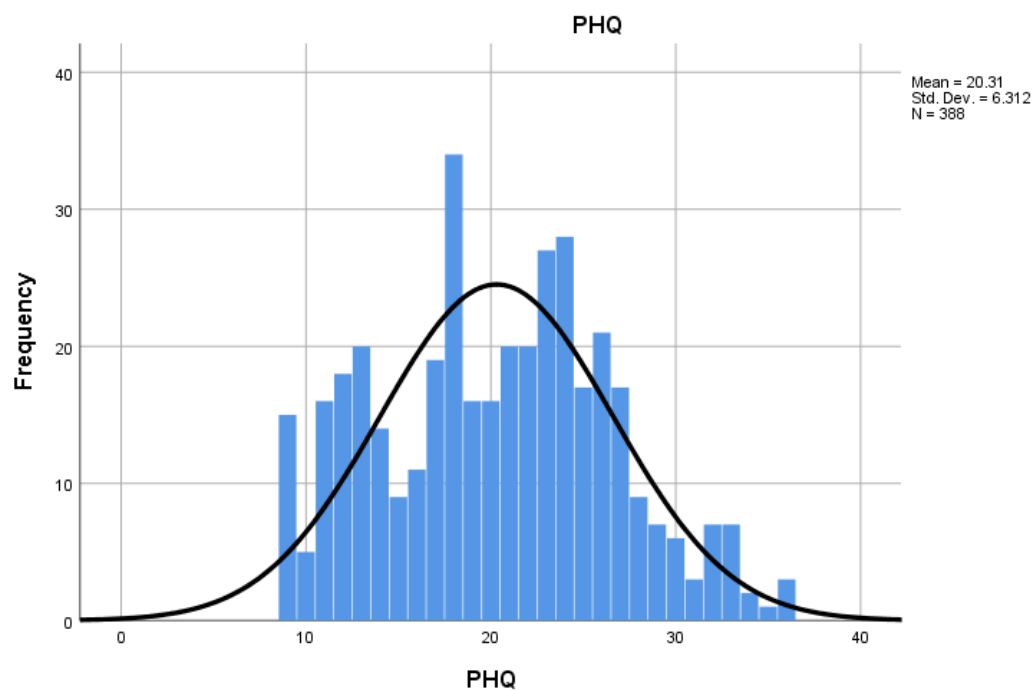


FIGURE 4.3: Distribution of Patient Health Questionnaire

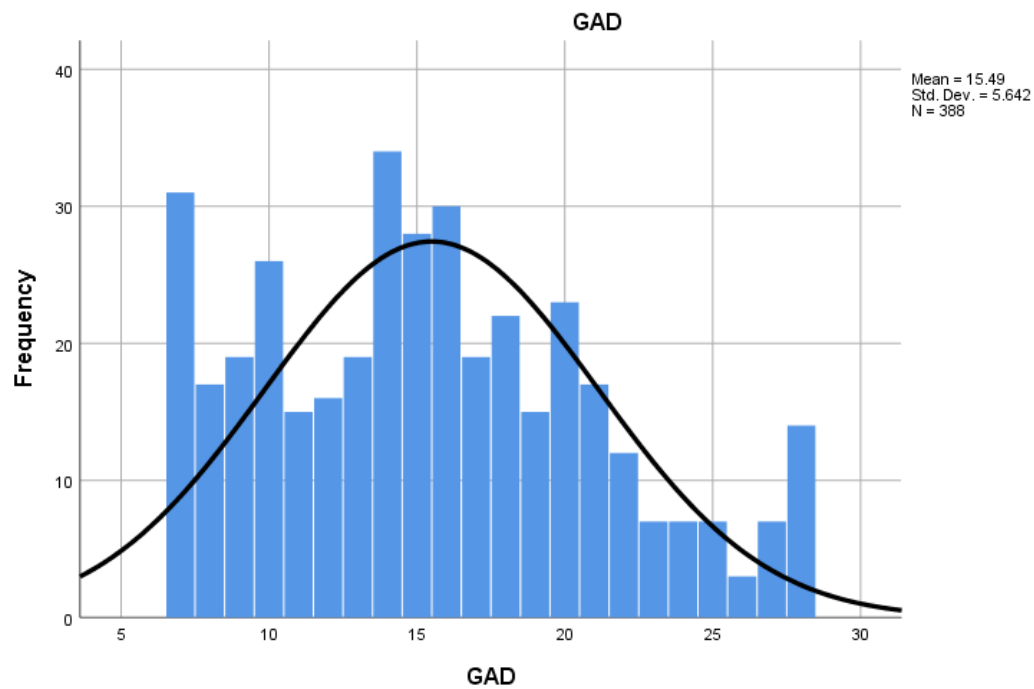


FIGURE 4.4: Distribution of Generalized Anxiety Disorder Scale

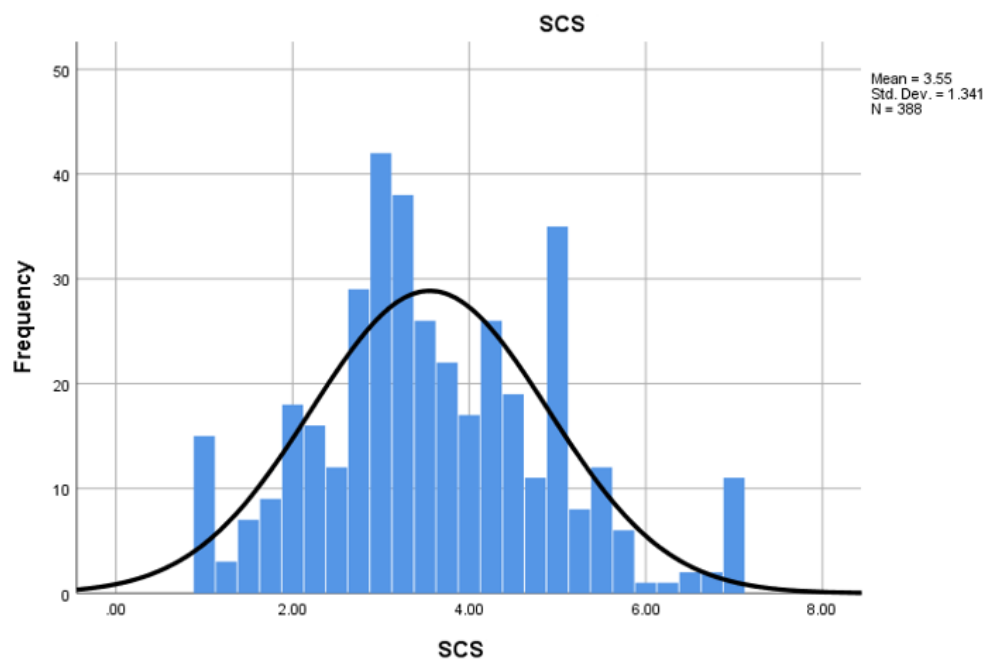


FIGURE 4.5: Distribution of Social Connectedness Scale

The mean score of the Generalized Anxiety Disorder scale (GAD) was 8.49, the median was 8.00, and the mode was 8. The obtained values of standard deviation,

skewness, and kurtosis were 5.64, .38, and $-.57$, respectively; this reflects a well-distributed dataset with minimal distortion, as the mild skewness.

The Social Connectedness Scale (SCS) demonstrated a mean score of 3.55, the median and mode was 3.38. The standard deviation was 1.34, with skewness (.37) and kurtosis ($-.02$); these values reflect an almost perfectly balanced bell shape with insignificant skewness. Normality was evaluated through values of skewness and kurtosis (-2 to $+2$) for all continuous variables (Field, 2024).

4.4 Correlations among Nature Connectedness, Climate Change Anxiety, Depression, Anxiety and Social Connectedness

The section presents results of correlations between Nature Connectedness, Climate Change Anxiety, Depression, Anxiety and Social Connectedness. Table 4.4 presents results of Pearson correlations among climate change anxiety, nature connectedness, depression, anxiety and social connectedness.

Climate change anxiety was positively and significantly associated with depression ($r=.361$, $p < .001$) and anxiety ($r=.387$, $p < .001$), indicating higher levels of climate change anxiety were related to greater depression and anxiety. Climate change anxiety was negatively correlated with social connectedness ($r=-.191$, $p < .001$), indicating that individuals with higher social connectedness experience lower levels of climate change anxiety.

Nature connectedness has no significant relationship with climate change anxiety ($r=.074$, $p = 0.72$), however a weak positive and significant relationship with depression ($r=.154$, $p < .001$), anxiety ($r=.157$, $p < 0.1s$) and social connectedness ($r=.133$, $p < .001$). Moreover, social connectedness was negatively associated with depression ($r=-.313$, $p < .001$) and anxiety ($r=-.300$, $p < .001$), suggesting that

higher social connectedness was related to lower levels of depression and anxiety whereas social connectedness may serve as protective factor.

TABLE 4.4: Descriptive Statistics and Pearson Correlations Among Nature Connectedness, Climate Change Anxiety, Depression, Anxiety, and Social Connectedness ($N = 388$)

Variable	M	SD	1	2	3	4	5
1. Climate Change Anxiety	2.11	0.84	–				
2. Nature Connectedness	44.17	9.28	.074	–			
3. Depression	10.31	6.31	.361**	.154**	–		
4. Anxiety	8.49	5.64	.387**	.157**	.732**	–	
5. Social Connectedness	3.55	1.34	-.191**	.133**	-.313**	-.300**	–

Note. M = Mean; SD = Standard Deviation. Pearson product-moment correlation coefficients are reported. ** $p < .001$.

4.5 Structural Equation Modeling

This section presents results of SEM including measurement models and structural models. Initially, confirmatory factor analysis was conducted to establish measurement model of constructs followed by structural pathway of SEM.

4.5.1 Measurement Model

4.5.1.1 Factor analysis of Climate Change Anxiety Scale

Climate change anxiety was assessed using standardized Climate change anxiety scales developed by Clayton and Karazsia (2020). The scale consists of 13 items designed to measure individuals' concerns about climate change. Participants responded to each item using five-point Likert scale ranging from 1 (never) to 5 (almost always). To examine the underlying factor structure of scale, first order confirmatory factor analysis (CFA) was conducted to evaluate hypothesized unidimensional measurement model. Based on proposed theoretical framework all 13 observed indicators were specified to load on single latent factor representing climate change anxiety.

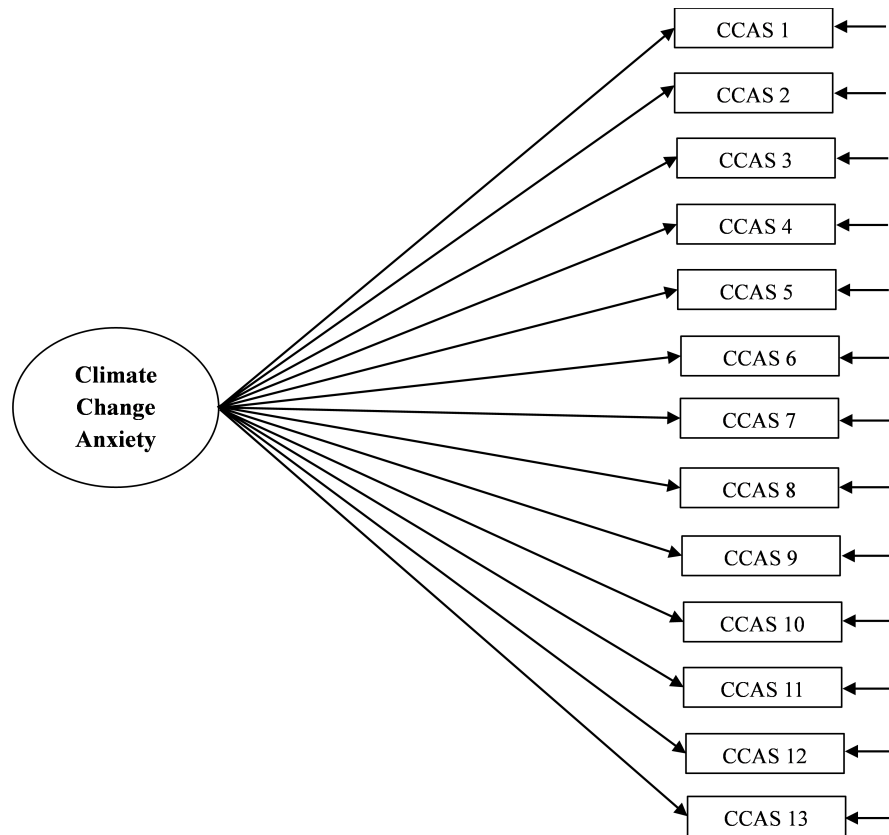


FIGURE 4.6: Hypothesized factor structure of CCAS

4.5.1.2 Hypothesized Model

The model showed a mean of Chi-square value X^2 was 243.33, with degree of freedom $df = 65$. Moreover, the comparative fit index (CFI) of 0.93 and the root mean square error of approximation (RMSEA) was 0.084. Although the CFI indicated an acceptable level of model fit, the RMSEA value exceeded the recommended cutoff for good model fit, suggesting that the hypothesized measurement model did not adequately fit the observed data. Therefore, theoretically justified model modifications were undertaken to improve the overall model fit. The hypothesized single-factor measurement model of the scale is presented in Figure 4.6.

4.5.1.3 Final Model

The revised measurement model was estimated after incorporating theoretically supported correlated residuals between CCAS1 was drawn with CCAS 2 ($r = .25$), and the next correlation, CCAS11, was drawn with CCAS12 ($r = .31$). These

modifications substantially improved model fit. The final CFA model produced X^2 value of 186.6, with 63 degrees of freedom, CFI of 0.94 and RMSEA value of 0.071 which collectively indicated that final model adequately represents observed an acceptable fit.

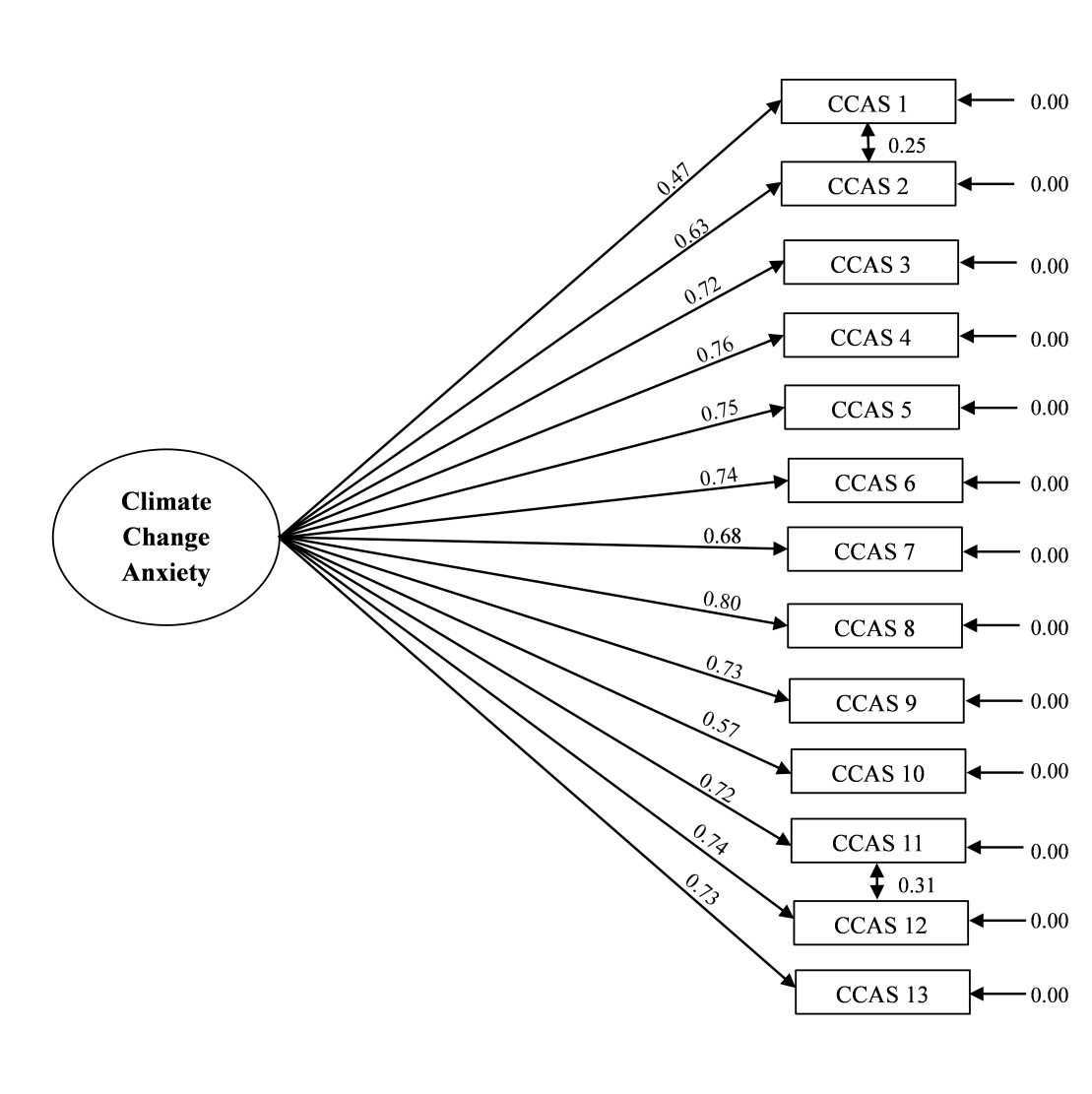


FIGURE 4.7: Final Measurement Model of CCAS

The standardized regression coefficients demonstrated every indicator made statistically significant contribution to latent construct of climate change anxiety ($p < .001$). Item loadings varied between .47 and .80, with CCAS1 exhibiting weakest association ($\beta = .47$) and CCAS8 indicating strongest relationship ($\beta = .80$). The remaining indicators showed moderate to high factor loadings, providing evidence that observed items adequately reflected underlying construct.

Comparison of initial and revised models showed improvement in measurement. The hypothesized model ($X^2 = 243.33$, $df = 65$, $CFI = .93$, $RMSEA = .084$) did not achieve an acceptable level of fit suggesting that specified covariance structure was insufficient to explain observed responses.

These findings provide empirical support for representing climate change anxiety scale as single latent construct in the present data. Figure 4.7 shows final measurement model, whereas table 4.5 summarized proportion of variance explained (R^2) by each indicator.

TABLE 4.5: Explained Variance (R^2) of Climate Change Anxiety Scale Indicators ($N = 388$)

Indicator	R^2	SE
CCAS 1	.22	.039
CCAS 2	.40	.041
CCAS 3	.52	.038
CCAS 4	.58	.036
CCAS 5	.56	.036
CCAS 6	.55	.037
CCAS 7	.47	.040
CCAS 8	.64	.033
CCAS 9	.53	.038
CCAS 10	.32	.041
CCAS 11	.52	.038
CCAS 12	.54	.037
CCAS 13	.54	.037

Note. R^2 = proportion of variance explained; SE = standard error. All R^2 estimates were statistically significant ($p < .001$).

4.5.1.4 Factor analysis of Connectedness to Nature Scale

Nature Connectedness was assessed using connectedness to nature scale developed by Mayer and Frantz (2004). The instrument comprises 14 items designed to evaluate individuals' emotional connection with the natural environment. To evaluate the construct validity of scale, first-order confirmatory factor analyses was performed based on theoretical base of instrument.

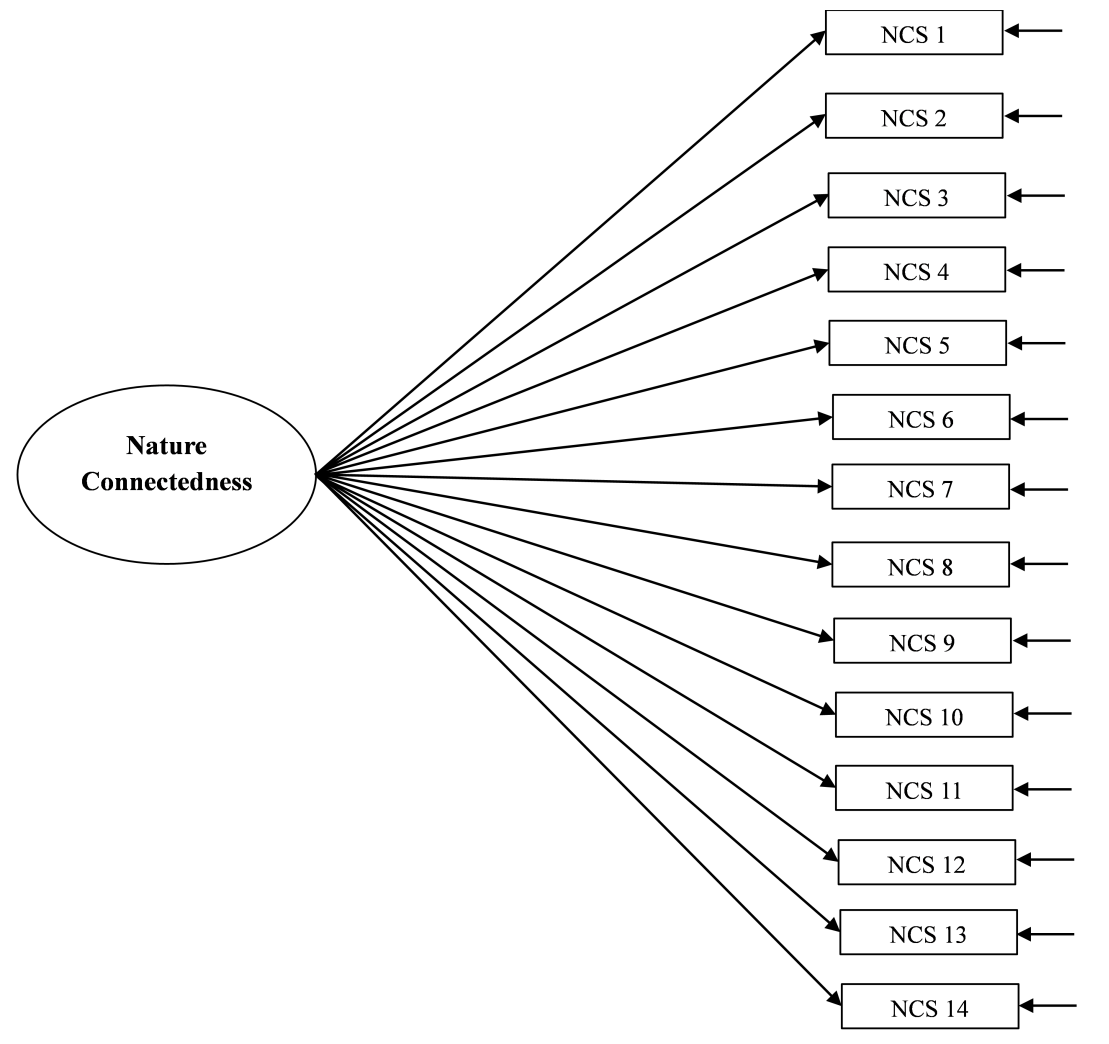


FIGURE 4.8: Initial Measurement Model of NCS

Consistent with proposed measurement model, all fourteen observed indicators were specified to load onto single latent factor representing nature connectedness. The scale was operationalized as unidimensional construct, with each indicator assumed to reflect common underlying dimension for subsequent structural equation

modeling analyses. The initial one factor measurement model of nature connectedness scale is presented in figure 4.8.

4.5.1.5 Hypothesized Model

The initial model demonstrated $X^2 = 297.50$ ($p < .001$), mean df was 3.86. The value of CFI was .874, value of RMSEA was 0.86 indicating poor fit of the data. All standardized factor loadings were statistically significant ($p < .001$), ranging from .243 to .688. The lowest standardized loading was observed for NCS 4 ($= .243$, $p < .001$), whereas the highest loading was observed for item NCS 11 ($= .688$, $p < .001$). However, despite all indicators loading significantly on the latent factor, the overall model fit indices suggested that the hypothesized one-factor model did not adequately represent the underlying structure of the data.

4.5.1.6 Final Model

The final model X^2 was 222.45, ($p < .001$) with df= 2.97, CFI of 0.91 and of RMSEA value was 0.071 that showed acceptable fit to the dataset. To improve the fit of the hypothesized measurement model, modification indices were examined in conjunction with theoretical considerations. Based on these indices, two covariance paths between the residuals of conceptually related items were specified: NCS 1 with NCS 2 ($\beta = .32$) and NCS 2 with NCS 3 ($\beta = .25$). Allowing these error covariances accounted for shared variance between the respective item pairs that was not fully explained by the latent construct of nature connectedness, thereby improving the overall model fit while maintaining the theoretical integrity of the measurement model.

Following these modifications, all observed indicators demonstrated statistically significant associations with the latent nature connectedness construct ($p < .001$). The standardized factor loadings ranged from .249 to .701, indicating that all items contributed significantly to the measurement of the latent factor, although the magnitude of their contributions varied. The lowest standardized factor loading was observed for NCS 4 ($\beta = .249$, $p < .001$), suggesting that this item was

the weakest indicator of the latent construct. In contrast, NCS 11 exhibited the highest standardized loading ($\beta = .701$, $p < .001$), indicating that it was the strongest indicator of nature connectedness. The remaining items demonstrated low to moderate standardized loadings, providing overall support for the unidimensional structure of the Nature Connectedness Scale.

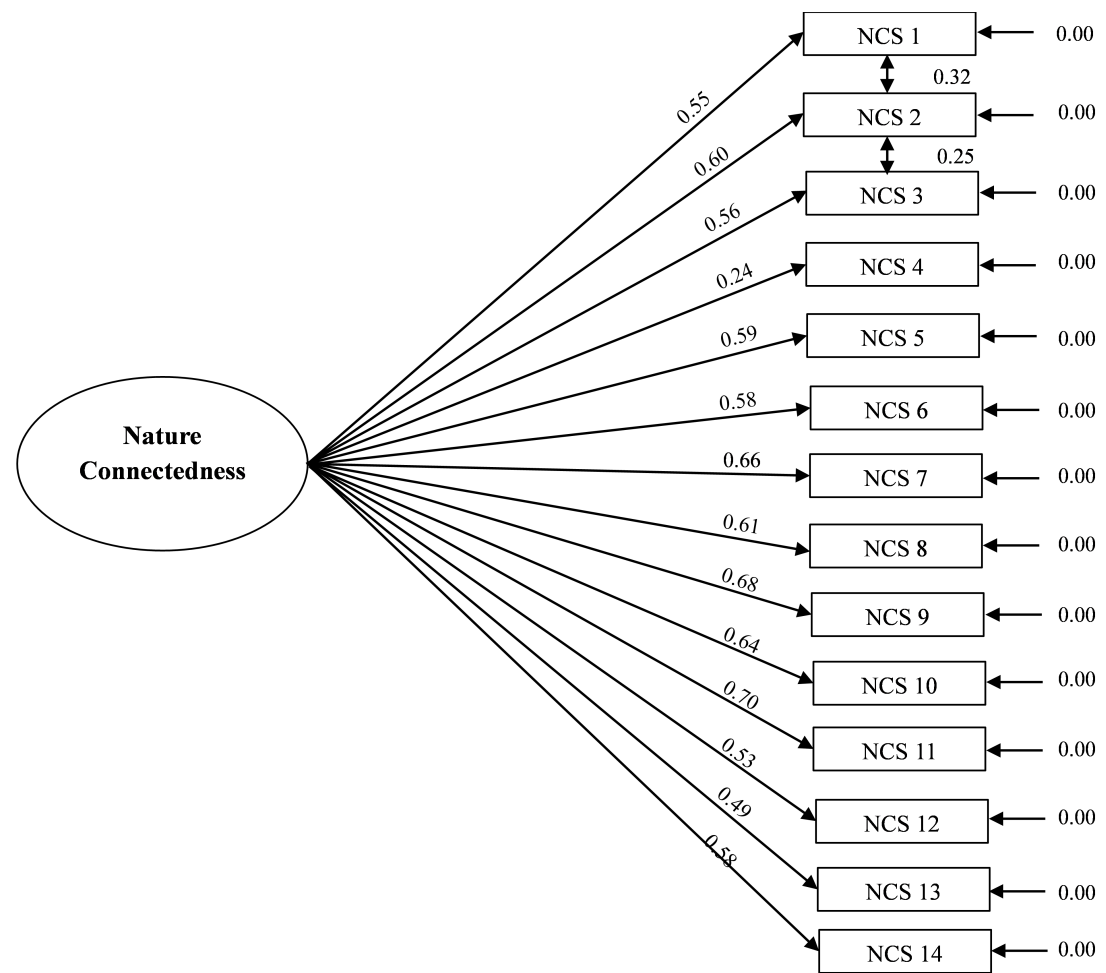


FIGURE 4.9: Final Measurement Model of NCS

The fit of the initial one-factor model was unsatisfactory, $X^2(77) = 297.50$, CFI = .87, and RMSEA = .086, indicating that the hypothesized model did not adequately reproduce the observed covariance matrix. After incorporating the theoretically justified correlated residuals, the revised model demonstrated a substantial improvement in model fit. The overall fit indices indicated that the final measurement model adequately represented the observed data, supporting the one-factor structure of the Nature Connectedness Scale. Moreover, all standardized

factor loadings remained statistically significant ($p < .001$), providing evidence for the construct validity of the measurement model. In addition to the factor loadings, the proportion of variance explained (R^2) for each observed indicator was examined to evaluate the contribution of individual items to the latent construct.

TABLE 4.6: Explained Variance (R^2) of Nature Connectedness Scale Indicators ($N = 388$)

Indicator	R^2	SE
NCS 1	.30**	.043
NCS 2	.36**	.043
NCS 3	.31**	.043
NCS 4	.06	.025
NCS 5	.35**	.043
NCS 6	.33**	.044
NCS 7	.44**	.043
NCS 8	.37**	.043
NCS 9	.47**	.042
NCS 10	.41**	.043
NCS 11	.49**	.042
NCS 12	.28**	.043
NCS 13	.24**	.042
NCS 14	.34**	.044

Note. R^2 = Variance; SE = Standard Error. ** $p < .001$.

The R^2 values indicated that the latent factor explained varying proportions of variance across the indicators, ranging from .06 to .49. NCS 11 demonstrated the highest explained variance ($R^2 = .49$), whereas NCS 4 exhibited the lowest explained variance ($R^2 = .06$), consistent with its comparatively lower standardized

factor loading. The explained variance for each indicator in the final one-factor measurement model is presented in Figure 4.9, while the corresponding R^2 values are summarized in Table 4.6.

4.5.1.7 Factor Analysis of Patient Health Questionnaire

Depression was measured by using the Patient Health Questionnaire developed by (Kroenke et al., 2001). The instrument comprises 9 items that evaluate the frequency of depressive symptoms experienced over preceding two weeks. Responses were recorded on four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day), with higher scores reflecting greater symptom severity.

To examine construct validity, first-order CFA was conducted based on instruments' proposed unidimensional structure. In measurement model, all nine observed items were specified as indicators of single latent factor representing depression.

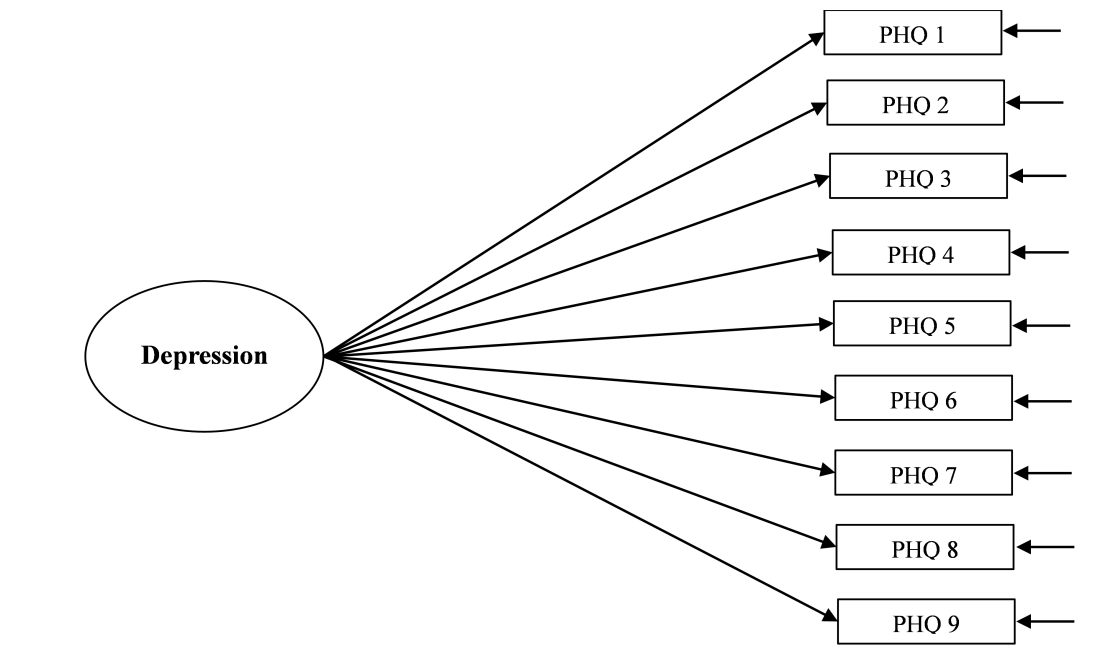


FIGURE 4.10: Hypothesized Factor Structure of PHQ-9

The scale was operationalized as unidimensional measure for subsequent analyses. The initial one-factor measurement model of PHQ-9 is presented in figure 4.10.

4.5.1.8 Hypothesized Model

The model χ^2 was 88.43 and value of df was 27. Moreover, the value of CFI of 0.95 and RMSEA of 0.07, indicating acceptable fit. The smallest standardized estimate was observed for PHQ1 (0.40, $p = .000$).

The standardized factor loadings demonstrated moderate to strong relationships between observed indicators and latent depression construct. Apart from PHQ1, which exhibited lowest standardized loading ($= .40$), the remaining items showed loadings ranging from .62 (PHQ4) to .75 (PHQ6).

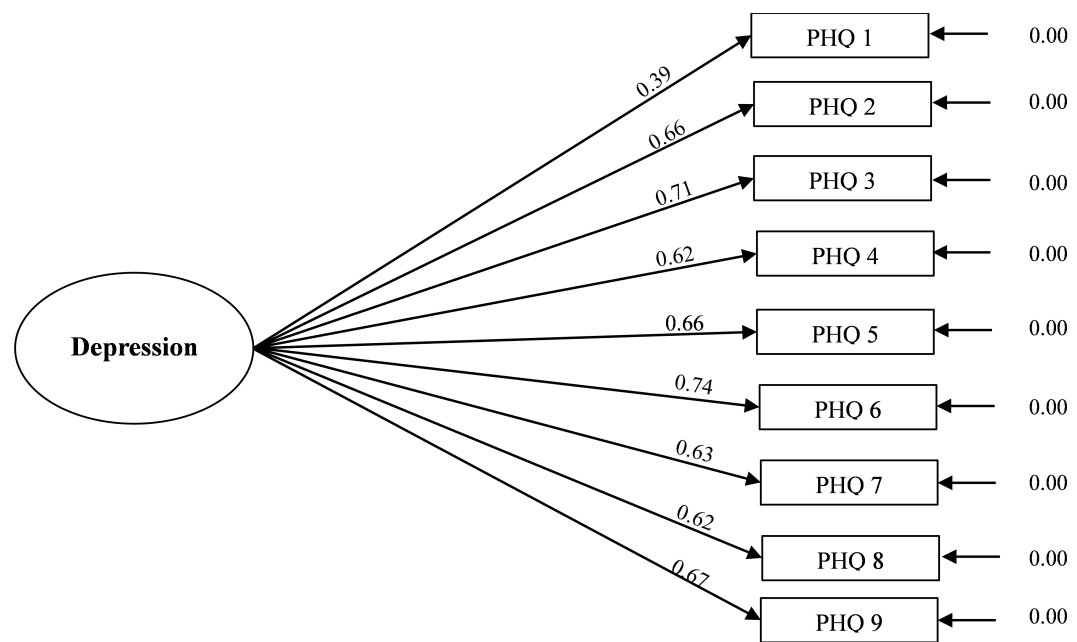


FIGURE 4.11: Obtained Factor Structure of PHQ-9

All factor loadings were statistically significant ($p < .001$), indicating that each indicator contributed meaningfully to measurement of depression. The values of R^2 showed that PHQ1 had the lowest explained variance ($R^2 = .16$), whereas the remaining items accounted for between .39 (PHQ8) and .56 (PHQ6). These findings provide further evidence of reliability of observed indicators.

Overall, goodness of fit indices indicated hypothesized one factor measurement model adequately represented the observed data. The statistically significant

TABLE 4.7: Explained Variance (R^2) of Depression Scale Indicators ($N = 388$)

Indicator	R^2	SE
PHQ 1	.15**	.037
PHQ 2	.44**	.043
PHQ 3	.51**	.042
PHQ 4	.38**	.044
PHQ 5	.44**	.043
PHQ 6	.55**	.041
PHQ 7	.40**	.044
PHQ 8	.39**	.044
PHQ 9	.45**	.043

Note. R^2 = Proportion of variance explained; SE = Standard error. ** $p < .001$.

factor loadings and acceptable model fit support construct validity of PHQ-9 in present study. The final model is presented in figure 4.11 while table 4.7 shows squared multiple correlations (R^2) for each PHQ-9 indicator.

4.5.1.9 Factor Analysis of Generalized Anxiety Scale

Anxiety was assessed using the Generalized Anxiety Disorder Scale (GAD-7) items developed by Spitzer et al., (2006). The answers were obtained by expanding the four-point Likert scale (0= not at all to 3= nearly everyday). An exploratory factor analysis of priori first order was subjected to the hypothesized one factor model. Consequently, all 7 items were loaded on single latent variable, treating GAD as unidimensional construct for final analysis. The hypothesized model showing a single-factor structure is shown in figure 4.12.

4.5.1.10 Hypothesized Model

The hypothesized model demonstrated $\chi^2 = 59.79$ ($p < .001$), mean df was 14. The value of CFI was .96, value of RMSEA was 0.92 indicating poor fit of the data. All standardized factor loadings were statistically significant ($p < .001$), ranging from .690 to .811. The lowest standardized loading was observed for GAD 1 (=

.690, $p < .001$), whereas the highest loading was observed for item GAD 3 (= .811, $p < .001$). However, despite all indicators loading significantly on the latent factor, the overall model fit indices suggested that the hypothesized one-factor model did not adequately represent the underlying structure of the data.

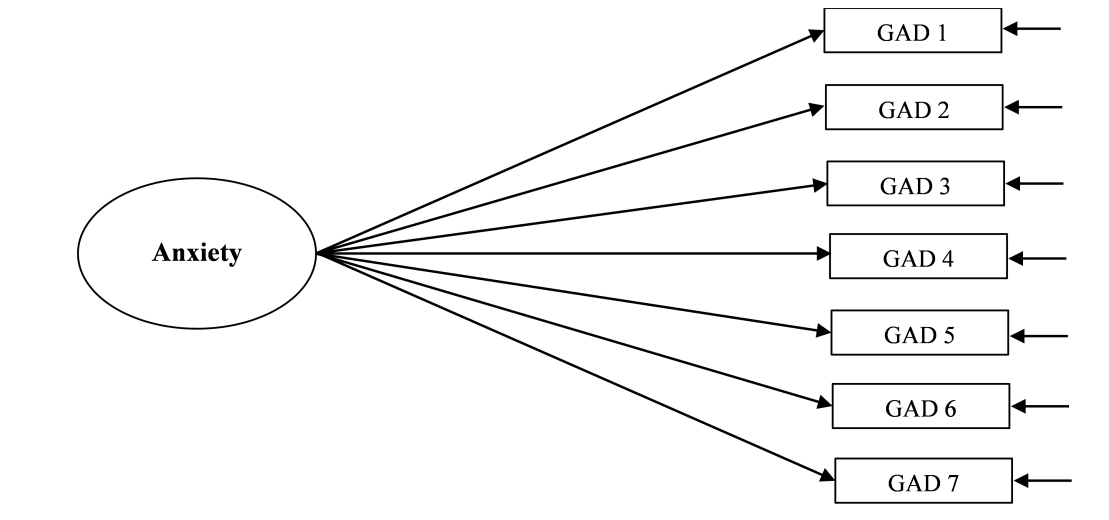


FIGURE 4.12: Initial Factor Structure of GAD-7

4.5.1.11 Final Model

The final model 2 was 34.63, with $df = 12$. Moreover, CFI was 0.98 and value of RMSEA was 0.070 which showed a good fit to the dataset. To improve the model fit, modification indices were examined and theoretically justifiable correlated items were specified. In the final model, correlation of GAD 2 was drawn with GAD 3 (0.180), and GAD 6 was drawn with GAD 7 (0.281).

All standardized factor loadings were statistically significant ($p < .001$), ranging from .689 to .781. The lowest standardized loading was observed for GAD 7 (= .689, $p < .001$), whereas GAD 3 showed highest loading (= .781, $p < .001$). Most indices indicated moderate loadings on latent construct of nature connectedness.

The factor analysis of final model indicated support for a one-factor model of anxiety. The initial hypothesized model showed poor fit to data ($X^2 = 59.79$, $df = 14$, CFI = 0.96, RMSEA = 0.92), indicating that model did not adequately represent

the underlying data structure. However, modifications were made, resulting in final model.

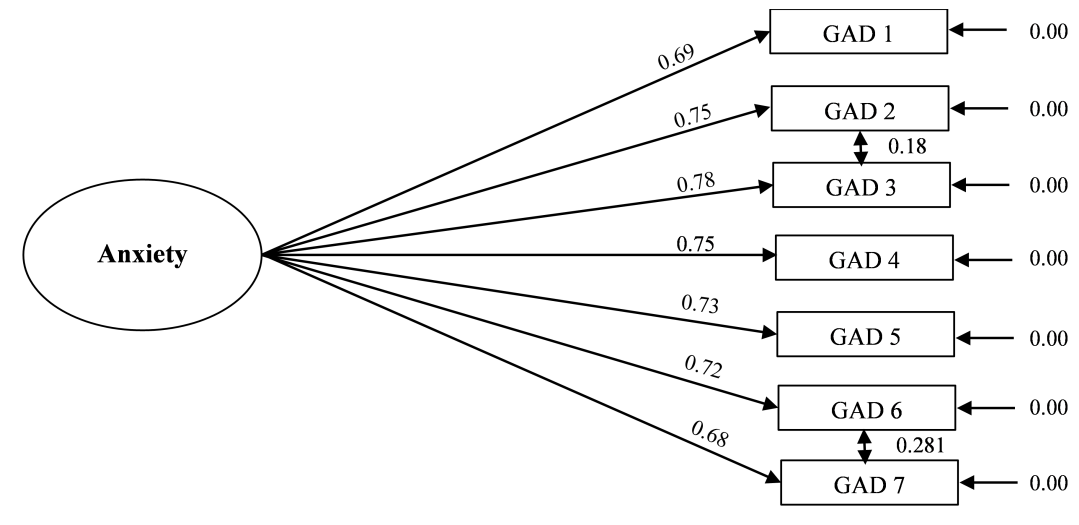


FIGURE 4.13: Final Factor Structure of GAD-7

TABLE 4.8: Explained Variance (R^2) of Anxiety Scale Indicators ($N = 388$)

Indicator	R^2	SE
GAD 1	.48**	.042
GAD 2	.56**	.041
GAD 3	.61**	.039
GAD 4	.56**	.040
GAD 5	.54**	.041
GAD 6	.53**	.042
GAD 7	.47**	.043

Note. R^2 = Proportion of variance explained; SE = Standard error. ** $p < .001$.

The overall model fit indices suggested that revised model provided good fit of data and all factor loadings were statistically significant. Figure 4.13 illustrate final factor structure and table 4.8 shows variation explained by each indicator for final one factor model.

4.5.1.12 Factor Analysis of Social Connectedness Scale (SCS)

Social Connectedness was measured by using a standardized Scale of 8 items developed by Lee and Robbins (1995). The answers were obtained by expanding the six-point Likert scale (strongly disagree to strongly agree). An exploratory factor analysis of priori first order was subjected to the hypothesized one factor model. Consequently, all 8 items were loaded on single latent variable, treating SCS as unidimensional construct for final analysis. The hypothesized model showing a single-factor structure is shown in figure 4.14.

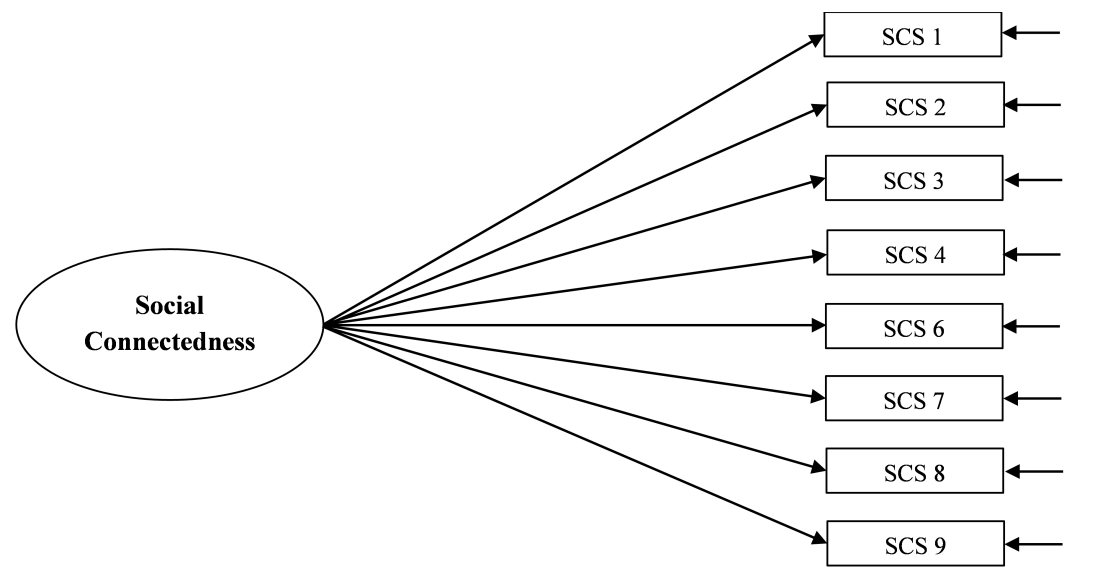


FIGURE 4.14: Hypothesized Factor Structure of SCS

4.5.1.13 Hypothesized Model

The hypothesized model demonstrated $\chi^2 = 245.23$ ($p < .001$), mean df was 20. The value of CFI was .887, value of RMSEA was 0.17 indicating poor fit of the data. All standardized factor loadings were statistically significant ($p < .001$), ranging from .68 to .84. The lowest standardized loading was observed for SCS 1 ($= .68$, $p < .001$), where as the highest loading was observed for item SCS 5 ($= .847$, $p < .001$).

However, despite all indicators loading significantly on the latent factor, the overall model fit indices suggested that hypothesized one-factor model did not adequately represent the underlying structure of the data.

4.5.1.14 Final Model

The final model χ^2 was 31.99, with $df = 13$. Moreover, CFI was 0.99 and value of RMSEA was 0.061 which showed a good fit to the dataset. To improve the model fit, modification indices were examined, and theoretically justifiable correlated items were specified.

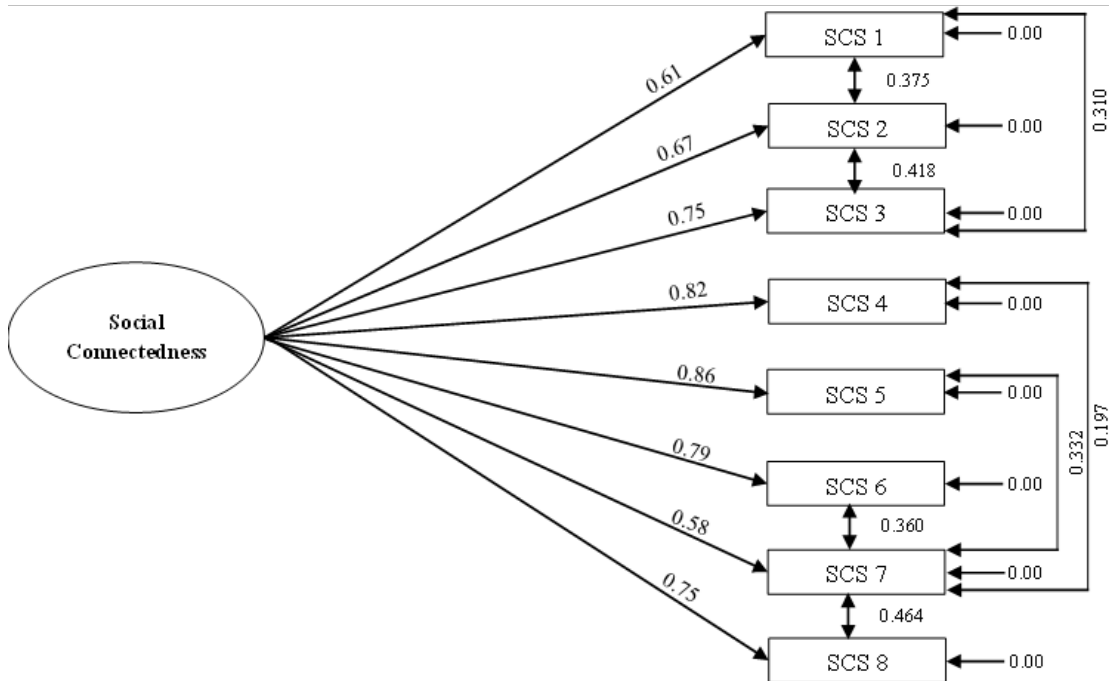


FIGURE 4.15: Obtained Factor Structure of SCS

In the final measurement model, several theoretically justifiable correlated error terms were added to improve model fit. Specifically, the residuals of SCS 1 were allowed to correlate with SCS 2 ($r = .375$), while SCS 3 was correlated with both SCS 1 ($r = .310$) and SCS 2 ($r = .418$). Additionally, the residual of SCS 7 was correlated with SCS 4 ($r = .197$), SCS 5 ($r = .332$), SCS 6 ($r = .360$), and SCS 8 ($r = .464$). These modifications accounted for shared variance among conceptually related items that was not fully explained by the latent social connectedness factor, thereby improving the overall measurement model.

All standardized factor loadings were statistically significant ($p < .001$), ranging from .585 to .861, indicating that each item made a meaningful contribution to the latent construct of social connectedness. Among the eight indicators, SCS

TABLE 4.9: Variance Explained (R^2) for the Indicators of Social Connectedness

Indicator	R^2	SE
SCS 1	.37**	.044
SCS 2	.45**	.041
SCS 3	.56**	.038
SCS 4	.67**	.033
SCS 5	.74**	.030
SCS 6	.62**	.036
SCS 7	.34**	.050
SCS 8	.56**	.038

Note. R^2 = proportion of variance explained; SE = standard error. ** $p < .001$.

7 demonstrated the lowest standardized factor loading ($\beta = .585$, $p < .001$), whereas SCS 5 exhibited the highest loading ($\beta = .861$, $p < .001$). Overall, the factor loadings were moderate to strong, suggesting that the observed items adequately represented the underlying construct and provided evidence of satisfactory convergent validity. The confirmatory factor analysis supported a unidimensional structure of the Social Connectedness Scale, indicating that all eight items measured a single latent construct.

The initially hypothesized one-factor model demonstrated poor fit to the observed data ($X^2 = 245.23$, $df = 20$, $CFI = .887$, $RMSEA = .170$), suggesting that the original model did not adequately capture the covariance structure among the observed indicators. Following an examination of the modification indices and theoretical considerations, a series of correlated residuals were incorporated into the model to improve its fit while preserving the theoretical integrity of the construct. The revised measurement model demonstrated an adequate-to-good fit to the observed data, indicating that the specified modifications substantially improved the model's ability to represent the relationships among the observed variables. Importantly, all factor loadings remained statistically significant after model respecification, confirming that each indicator continued to contribute significantly to the latent construct. Collectively, these findings provide empirical

support for the construct validity of the one-factor measurement model of social connectedness in the present sample. The proportion of variance explained (R^2) for each observed indicator is presented in Table 4.9, reflecting the extent to which the latent factor accounted for variability in each item.

4.5.2 Structural Model

Step 1: Structural Model 1 with Nature Connectedness as Predictor, Depression and Anxiety as Outcomes and Climate Change Anxiety as Mediator

Following the confirmation of measurement model, the hypothesized structural model was tested using structural equation modeling (SEM) to examine the proposed relationships between nature connectedness, climate change anxiety, depression, anxiety and social connectedness. Initially the model examined mediation pathway; whether nature connectedness predict climate change anxiety and subsequently climate change anxiety predicts depression and anxiety.

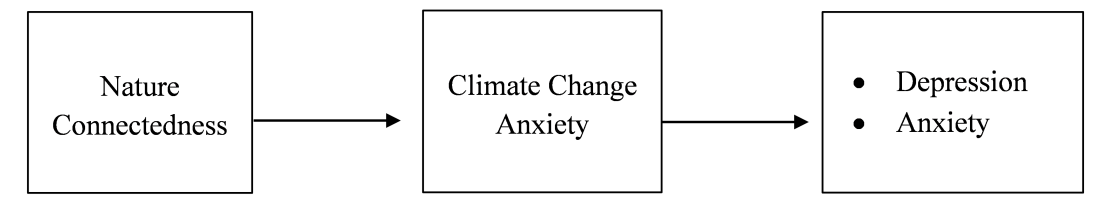
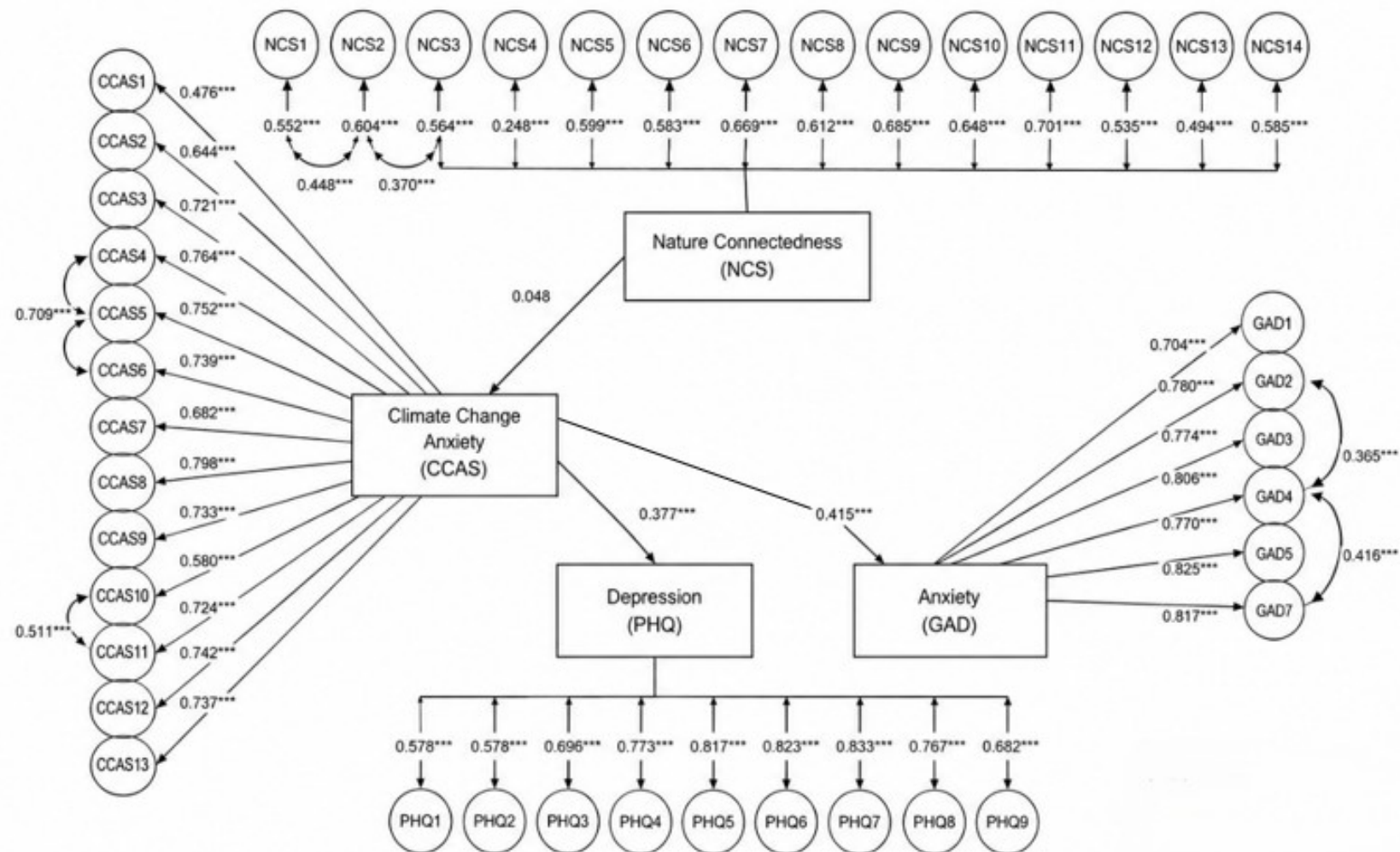


FIGURE 4.16: Hypothesized Structural Model of Mediation Pathway

Overall, the fit of hypothesized structural model was evaluated using multiple fit indices. The X^2 was 2204.37, ($p < .001$). Moreover, CFI was 0.901 and value of RMSEA was 0.046 which showed a good approximation of model. Overall, these fit indices suggested that hypothesized structural model adequately represented observed relationships among study variables. The structural parameter estimates indicated that nature connectedness did not significantly predict climate change anxiety ($\beta = .036$, $p = .394$). Therefore, the hypothesized relationship between nature connectedness and climate change anxiety was not supported as final model.



Note. *** $p < .001$; ns = non-significant.

FIGURE 4.17: Obtained Structural Model of Mediation Pathway

However, climate change anxiety significantly predicted depressive symptoms ($\beta = .253, p < .001$) indicating that greater climate change anxiety was associated with higher levels of depression. Similarly, climate change anxiety significantly predicted generalized anxiety symptoms ($\beta = .498, p < .001$) indicating increased climate change anxiety was associated with elevated symptoms of anxiety. Furthermore, depression and anxiety showed significant positive covariance ($\beta = .283, p < .001$) indicating significant overlap between two psychological outcomes.

Step 2: Structural Model 2 with Nature Connectedness as Predictor, Depression and Anxiety as Outcomes, Climate Change Anxiety as Mediator and Social Connectedness as Moderator

Following the evaluation of hypothesized structural model, nature connectedness was removed from model because its direct effect on climate change anxiety was found to be statistically non-significant. Subsequently, revised structural model was estimated to examine the direct effects of climate change anxiety on depression and anxiety and to explore moderating role of social connectedness. Figure 4.18 shows hypothesized Structural Model of social Connectedness as moderator in the relationship between climate change anxiety, depression and anxiety.

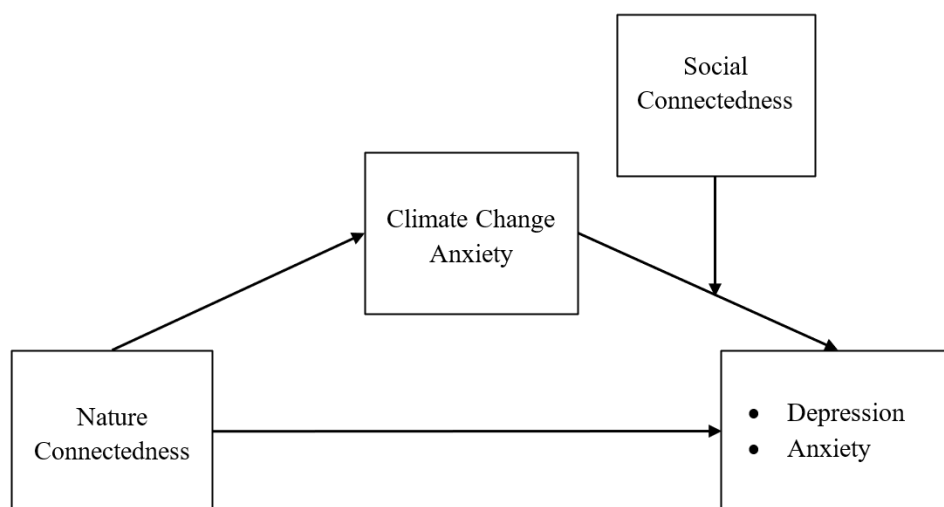


FIGURE 4.18: Hypothesized Structural Model of Social Connectedness as Moderator

The information criteria values demonstrated substantial improvement in final model compared to hypothesized structural model. The difference of Akaike Information Criterion AIC can be calculated as per the following formula and the AIC ($AIC_i - AIC_{min}$), ($53049.74 - 38439.99 = 14609.75$). The difference of initial model and revised model was 14609.75, which shows that revised model is better supported by data than initial model. Any difference greater than 10 indices essentially no support for competing model; therefore, the revised model was retained as final structural mode (Burnham and Anderson, 2002). The structural parameter estimates showed that climate change anxiety significantly predicted depression ($\beta = .253, p < .001$), indicating individuals with greater climate change anxiety reported significantly higher depressive symptoms. Similarly, climate change anxiety significantly predicted anxiety ($\beta = .498, p < .001$), suggesting increased climate change anxiety associated with higher anxiety symptoms. Moreover, moderating role of social connectedness, between climate change anxiety, depression and anxiety. The interaction between climate change anxiety and social connectedness significantly predicted depression ($\beta = .135, p = .004$) indicating social connectedness significantly moderated the relationship between climate change anxiety and depression. Similarly, social connectedness significantly moderated the relationship between climate change anxiety and anxiety ($\beta = .212, p = .005$).

4.6 Gender Differences among Study Variables

To examine the gender differences in nature connectedness, climate change anxiety, depression, anxiety, and social connectedness among young adults an independent sample t-test was conducted. Table 4.10 shows the gender differences in nature connectedness, climate change anxiety, depression, anxiety and social connectedness.

The results indicated no significant gender differences in nature connectedness, climate change anxiety, and social connectedness. However, significant gender differences were observed for depression and anxiety. Female participants ($M = 11.96, SD = 6.62$) reported significantly higher levels of depression than male participants ($M = 10.36, SD = 5.72$).

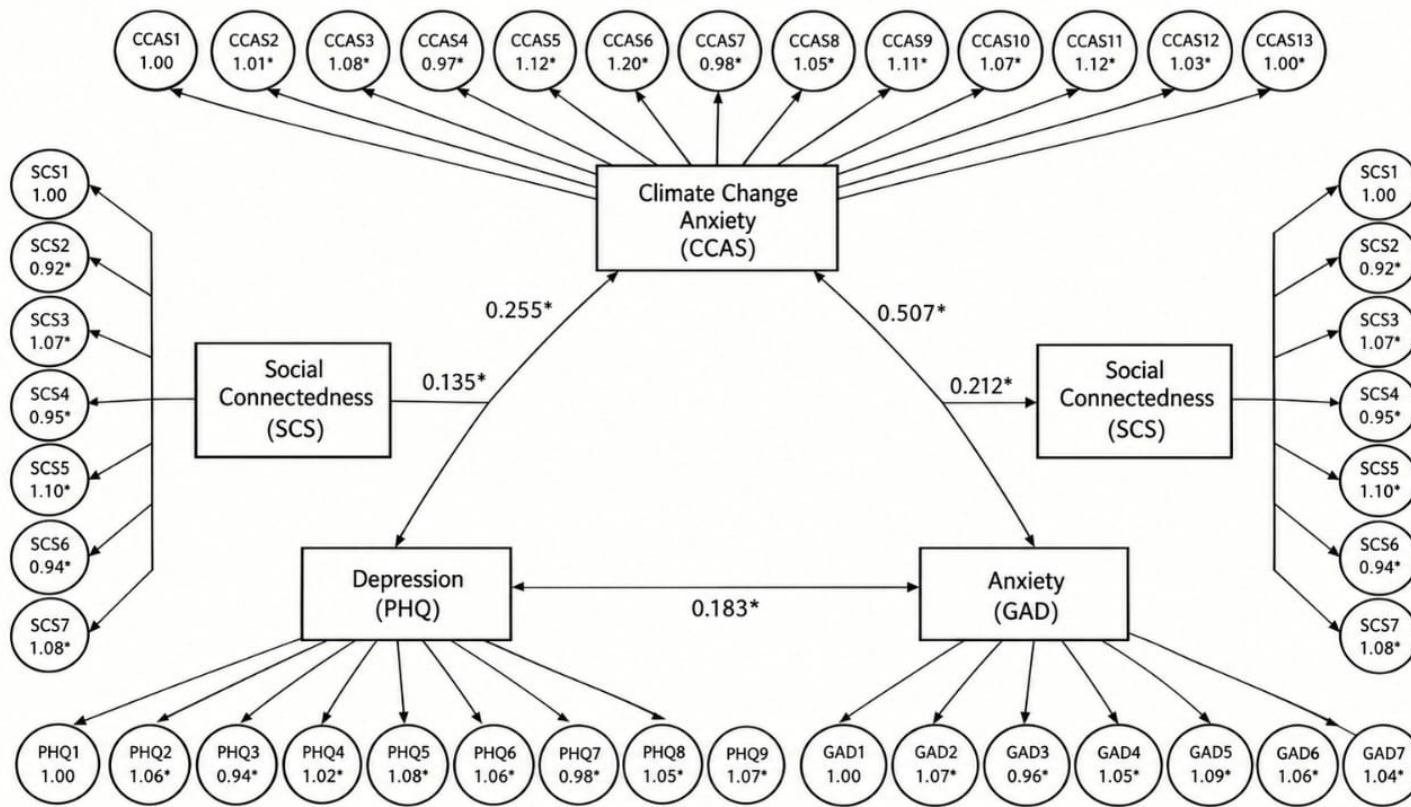


Figure: Final Structural Model
(Note: * = $p < 0.05$)

FIGURE 4.19: Obtained Structural Model of Social Connectedness as Moderator

TABLE 4.10: Gender Differences among Nature Connectedness, Climate Change Anxiety, Depression, Anxiety and Social Connectedness

Variable	Male	Female	<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
	(<i>n</i> = 157)	(<i>n</i> = 231)				
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)				
CCAS	2.09 (0.80)	2.11 (0.88)	-0.21	386.00	.834	-0.02
NCS	43.91 (10.54)	44.34 (8.33)	-0.43	282.04	.668	-0.05
PHQ-9	10.36 (5.72)	11.96 (6.62)	-2.54	364.34	.012*	-0.26
GAD-7	7.10 (4.70)	9.45 (6.03)	-4.31	378.87	< .001**	-0.42
SCS	3.49 (1.32)	3.59 (1.36)	-0.71	386.00	.478	-0.07

Note. *M* = Mean; *SD* = Standard Deviation; *df* = Degrees of freedom. **p* < .05. ***p* < .001.

Although the magnitude of difference is small. Similarly, female participants (*M* = 9.45, *SD* = 6.03) reported significantly higher levels of anxiety than male participants (*M* = 7.10, *SD* = 4.70) with small to moderate effect size.

Chapter 5

Discussion and Conclusion

The chapter discusses detailed finding of study in relation to research objectives and existing literature. The discussion includes demographic characteristics of participants, reliability and correlation analyses, measurement models and structural models of SEM.

The study aimed to investigate the relationship between nature connectedness, climate change anxiety, depression, anxiety and social connectedness among young adults. Moreover, study also examined climate change anxiety as mediator and social connectedness as moderator. The discussion also highlights implications of climate related psychological distress and protective role of social connectedness in mitigating adverse mental health outcomes including depression and anxiety. 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. Where students were invited to scan QR code on their mobile phones and complete form. This approach enhanced accessibility and convenience for participants, minimized data entry errors, and streamlined the overall data collection process.

5.1 Demographic Characteristics of Study Participants

The demographic characteristic of present study was examined to ensure 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 reflects with previous evidence indicates gender disparities in higher education in Pakistan. A study by [Mehmood et al. \(2018\)](#) found that gender disparities in higher education vary considerably across institutional types and academic disciplines with predominantly higher female participation. 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 emerging adults with age ranges from 18 to 25 years ($M = 21.39$, $SD = 2.10$). 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 climate change.

Most participants were enrolled in bachelor's degree programs (86.6%), 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 participation.

Participants reported varying perceptions of their financial situations. Nearly half of the participants (45.6%) described their financial situation as adequate, whereas one quarter considered themselves comfortable. However, approximately one third reported experiencing either significant or some degree of financial strain. These findings indicate considerable socioeconomic diversity within the study sample.

Financial circumstances represent an important contextual factor during emerging adulthood due to economic hardship, which may increase psychological stress and impact overall well-being. 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 ([Bashir](#)

et al., 2024). Therefore, the participants' inclusion from varying financial statuses strengthens the relevance of findings across different socioeconomic backgrounds.

5.2 Reliabilities and Measurement Models of Nature Connectedness, Depression, Anxiety, Climate Change Anxiety and Social Connectedness

The present study used standardized instruments: the connectedness to nature scale, climate change anxiety scale, patient health questionnaire, generalized anxiety scale and social connectedness scale.

Moreover, confirmatory factor analysis was used to build measurement models for five study constructs including; nature connectedness, climate change anxiety, depression, anxiety and social connectedness. Each model is discussed in this section.

The reliability analyses demonstrated that all study measures showed good to excellent internal consistency, with Cronbach's alpha coefficients ranging from .86 to .93. These findings indicated that instruments used in present study were psychometrically appropriate to assess intended constructs among university students of Pakistan.

The connectedness to nature scale demonstrated good internal reliability ($\alpha = .88$). This finding is consistent with original validation study conducted by (Mayer and Frantz, 2004), who reported satisfactory reliability of scale across different populations. The scale demonstrated unidimensional factor structure following model modification. Although initial model failed to achieve acceptable fit, however final model showed good fit (CFI = .91, RMSEA = .071) with significant factor loadings. Model fit improved following theoretically justified correlations between NC1 and NCS2 and between NCS2 and NCS3. These findings align with

original work of Mayer and Frantz (2004), who conceptualized connectedness to nature as single latent construct. Similarly, [Lovati et al. \(2023\)](#) validated single factor structure of scale in Italian context.

Climate change anxiety scale showed excellent internal consistency reliability ($\alpha = .93$), which is aligned with previous studies conducted on validation in different cultural contexts. The original developers of scale, ([Clayton and Karazsia, 2020](#)) reported excellent reliability coefficients for instrument. The scale demonstrated satisfactory psychometric properties supported unidimensional factor structure. Although the initial hypothesized model showed inadequate fit, the revised model however achieved good fit indices (CFI = .94, RMSEA = .071), with all factor loadings reaching statistical significance. Model fit improved after theoretically justified correlations between CCAS1 and CCAS2 and CCAS11 and CCAS12. These findings are aligned with literature exploring factor structure of climate change anxiety scale ([Hannachi et al., 2024](#); [Hempel et al., 2025](#)) which reported climate change anxiety functions as a unified psychological response to environmental threat.

Similarly, patient health questionnaire (PHQ-9) showed good internal consistency ($\alpha = .86$). This finding is consistent with previous studies on psychometric evaluation of PHQ-9 ([Kroenke et al., 2001](#)). The patient health questionnaire indicated good model fit without any substantial modifications supporting a unidimensional conceptualization of depression. All indicators loaded significantly on single latent construct with standardized factor loadings. These findings replicate the original psychometric validation of PHQ-9 [Jiraniramai et al. \(2021\)](#) confirmed psychometric adequacy and factorial validity.

Generalized anxiety disorder scale demonstrated good internal consistency ($\alpha = .89$). the findings are also consistent with previous literature measuring anxiety using GAD ([Aquin et al., 2017](#)). Scale confirmed good unidimensional factor structure following minor model modifications. Correlations were drawn between residuals of GAD2 with GAD3 and GAD6 with GAD7 to improve model fit. The

revised model showed good fit indices (CFI = .98, RMSEA = .070) with all significant factor loadings. These findings are aligned with previous studies examining factorial structure of anxiety repeatedly reported that correlated residual among conceptually related items often improve model fit without altering underlying theoretical construct (White and Karr, 2023; Riglea et al., 2025; López et al., 2025).

The social connectedness scale demonstrated excellent internal consistency reliability ($\alpha = .91$) exceeding reliability reported by developers (Lee and Robbins, 1995). The present findings further support cross-cultural applicability of scales. Social connectedness scale showed good psychometric properties supported unidimensional factor structure. Although initial model showed poor fit the modified model resulted in good fit indices (CFI = .98, RMSEA = .061) with significant factor loadings. These findings supported by previous studies investigating validity and factor structure of scale (Capanna et al., 2013).

Across all measurement models, the standardized factor loadings were statistically significant, indicating that each observed indicator contributed meaningfully to its intended latent constructs. Overall findings for measurement model provide strong empirical evidence supporting reliability and construct validity of all study instruments in Pakistani context. Although scales required theoretically justified modifications to achieve acceptable model fit.

H1: Nature connectedness is positively associated with depression and anxiety among young adults.

According to the first hypothesis, results showed that nature connectedness showed a weak but statistically significant positive relationship with depression and anxiety. Previous studies suggested that nature connectedness has been associated with better psychological well-being (Capaldi et al., 2014); emerging evidence suggests that individuals who feel more emotionally connected to the natural environment may also experience greater vulnerability when exposed to environmental

degradation and climate-related uncertainty (Pihkala, 2020; Thomson and Roach, 2023). Thus, stronger attachment to nature may increase awareness of environmental threats, potentially contributing to psychological distress among young adults.

However, nature connectedness has no significant relationship with climate change anxiety. The findings suggest that individuals with greater connectedness to nature reported slightly lower levels of depression and anxiety symptoms, while also experiencing higher levels of social connectedness. Although previous research has suggested that individuals with stronger connections with the environment may experience heightened climate change-related stress (Coffey et al., 2021; Thomson and Roach, 2023), the present study indicates that this relationship may vary across sociocultural contexts. In Pakistan, climate change may be influenced by various factors, including direct experience of environmental vulnerability, socioeconomic factors, and exposure to information related to climate change, more than by individuals' subjective sense of nature connectedness.

Findings indicated that climate change anxiety has a significant positive correlation with depression and anxiety. Specifically, individuals reporting increased levels of climate change anxiety also reported higher depression and anxiety symptoms. Findings are aligned with literature where climate-related stress is significantly associated with poorer mental health outcomes (Clayton, 2020; Hickman et al., 2021; Mouguiama-Daouda et al., 2022). Climate change is characterized by uncertainty, perceived lack of control, and anticipation of future threats, all of which are central features of anxiety-related psychological processes (Kuhner et al., 2025). The present findings are also consistent with recent evidence suggesting that climate change anxiety contributes to emotional distress, particularly among young adults (Esteban et al., 2025; Bashir et al., 2026; Ramadan et al., 2023).

Furthermore, social connectedness showed a significant negative correlation with depression and anxiety. These findings suggested that individuals with stronger

social relationships and sense of belongingness experience lower levels of psychological distress. This finding is consistent with previous studies ([Haslam et al., 2018](#); [Weziak-Bialowolska et al., 2022](#)). Literature reported that social connection has been an important determinant of psychological well-being ([Birrell et al., 2025](#); [Xu et al., 2025](#)).

H2: Climate change anxiety positively mediates the relationship between nature connectedness, depression and anxiety young adults.

For the proposed mediation model, it was hypothesized that climate change anxiety mediates the relationship between nature connectedness, depression, and anxiety among young adults. However, the structural path from nature connectedness to climate change anxiety was found to be statistically significant and was subsequently removed from final structural model. These findings suggest that among Pakistani young adults, individuals' connection with nature does not necessarily translate into increased climate change anxiety.

The absence of significant relationship contrast with some previous studies suggesting individuals with stringer emotional connections to nature experience greater distress related to climate change. For example, [Thomson and Roach \(2023\)](#) found that higher nature connectedness were associated with elevated climate change anxiety and psychological distress. Similarly, [Wullenkord et al. \(2021\)](#) reported that nature connection with nature predicted climate change-related thoughts. These studies suggested individuals who strongly identify with natural environment may perceive environmental degradation as personal threat, thus increasing vulnerability to climate-related distress. Despite these findings, emerging evidence also suggests that the relationship between nature connectedness and climate change anxiety is complex and context-dependent. Nature connectedness has traditionally has conceptualized as a protective psychological resource that promotes emotional well-being, resilience, and adaptive coping ([Bratman et al., 2021](#)). Therefore, stronger connection with nature do not necessarily result into greater climate-related anxiety. Several explanations may account for this finding.

First, climate change may be influenced strongly by factors such as direct exposure to climate-related events, perceived vulnerability, environmental knowledge, media exposure, and sociopolitical context rather than nature connectedness itself. Other than this, various cultural and contextual factors may shape how individuals experience and interpret environmental concerns. [Wullenkord et al. \(2021\)](#) argued that connection to nature does not uniformly cause climate change anxiety rather its effects depend on collective stress exposure and individuals' coping resources.

H3: Social connectedness moderates (weakens) the relationship between climate change anxiety, depression and anxiety among young adults.

According to hypothesis social connectedness weakens the relationship between climate change anxiety, depression and anxiety among young adults. The findings supported this hypothesis, demonstrating that social connectedness significantly moderates the relationship between climate change anxiety, depression ($\beta = .135$, $p = .004$) and anxiety ($\beta = .212$, $p = .004$). These findings are supported by research emphasizing buffering role of interpersonal relationships. Individuals with stronger social connections generally possess greater emotional resources that facilitate coping with stressors and reduce vulnerability to psychological distress ([Cohen and Wills, 1985](#); [Holt-Lunstad et al., 2010](#)).

Similarly, [Xu and Wei \(2013\)](#) found that perceived social support buffered the relationship between traumatic stress and depression, while ([Geoffroy et al., 2020](#)) reported that higher levels of social support were associated with lower levels of depression and anxiety. Overall, findings provide support that social connectedness weakens the association between climate change anxiety, depression, and anxiety among young adults.

H4: Females report higher levels of nature connectedness, climate change anxiety, depression, anxiety, and social connectedness than males among young adults.

The present study hypothesized that female young adults report higher levels of nature connectedness, climate change anxiety, depression, anxiety, and social connectedness as compared to male participants. The findings partially supported

hypothesis. No significant gender differences were observed in nature connectedness, climate change anxiety, and social connectedness. However, significant gender differences were observed for depression and anxiety. Previous studies have consistently reported high prevalence rates of depression and anxiety among females across cultures and age groups (Kessler et al., 2015; Zhao et al., 2022). The absence of gender differences in climate change anxiety suggests that this may be experienced similarly by male and female young adults. Although previous literature has supported higher climate change anxiety among women due to greater environmental concern and risk perception (Clayton and Karazsia, 2020).

5.2.1 Limitations

Despite contributing to a growing body of literature on climate change anxiety and mental health among young adults, the present study has certain limitations that must be acknowledged.

- i) Study used cross-sectional research design, in which SEM provides evidence for direction and strength of associations; however, causal inferences cannot be drawn from this data.
- ii) The sample consisted solely of young adults, particularly university students, thereby limiting the generalizability of results to individuals in other age groups, contexts, and populations. Cultural and environmental factors may influence perceptions of climate change and associated mental health outcomes across different populations.
- iii) Although nature connectedness was theoretically hypothesized to predict climate change anxiety, the relationship was not supported in the final structural model. This finding suggests that additional contextual, environmental, and psychological factors that are not included in the present study may play a more substantial role in explaining climate change anxiety.
- iv) The study did not specifically assess participants' direct exposure to climate-related disasters or environmental calamities (e.g., floods, heatwaves, droughts), which may influence climate change anxiety and the relationship between

nature connectedness and mental health. Given the heterogeneity of the Pakistani population, future research should examine disaster exposure and other contextual environmental factors to determine whether the observed relationships vary across individuals and regions.

- v) Lastly, the sample size was limited due to time constraints; data was collected around the lower bound, which may also contribute to limited generalizability.

5.2.2 Future Directions

The present study suggests several directions for future research.

- i) Research in future should consider using different research designs such as longitudinal and experimental to examine causal explanation of findings. Such designs would help provide better understanding of how climate-related distress develops and changes over time. Future research should investigate additional psychological outcomes and social factors that may influence climate change anxiety and its consequences.
- ii) Moreover, the role of social connectedness as protective of buffer should be further explored using experimental design. Further, researchers should conduct comparative and cross-cultural studies to examine whether relationships observed in present study are consistent across different contexts.
- iii) Studies should also explore other mental health outcomes associated with climate change anxiety including Eco-grief, hopelessness, life satisfaction and pro-environmental behaviors, to provide more inclusive understanding of psychological effects of climate change.

5.2.3 Implications of the Study

The present study has important theoretical implications.

- i) Study aids to bridge existing knowledge gap in exploration of climate change anxiety and psychological health in Pakistan. The findings contribute to emerging interdisciplinary literature by exploring climate change anxiety associated with depression and anxiety among young adults.
- ii) The study also highlights the importance of social factors such as social connectedness, when investigating psychological consequences of climate-related distress.
- iii) The results of factor structures align with existing literature. These results must be considered while using these instruments in future studies.
- iv) The study showed use of SEM in examining complex relationships among climate related psychological constructs, mental health outcomes and provides empirical evidence supporting use of latent interaction modeling to examine moderation.
- v) Moreover, mental health professional should use these findings to tailor assessment and intervention strategies to address climate related distress. For instance, in treatment of depression and anxiety it is suggested social connectedness should also be explored and emphasized as it buffers the impact of climate related distress and it should also be explored with other predictors of depression and anxiety.

5.3 Conclusion

The present study examined the relationship between nature connectedness, climate change anxiety, social connectedness, depression, and anxiety among young adults in Pakistan. The findings showed that climate change anxiety significantly predicted depressive and anxiety symptoms, indicating a critical role of climate change anxiety as a psychological factor that impacts mental health outcomes in young adults. The study also showed that climate change anxiety, depression and anxiety were significantly moderated by social connectedness, highlighting the importance of social connections on the mental health consequences of climate

change. The results are consistent with the literature on mental health in the context of climate change. The study contributes to growing literature by examining environmental, social and mental health variables within a single framework. Study conducted among Pakistani young adults adds context specific evidence. Findings support the growing recognition that climate change not only as environmental concern but also an important psychological and public health concern. The results emphasize the need for interventions and policies that address mental health impacts of climate change while strengthening social connectedness factors buffering impact of climate change anxiety among young adults in Pakistan.

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Appendix A

1. Information Sheet

You are being asked to participate in a study titled “Nature Connectedness, Depression and Anxiety among Young Adults: The Mediating Role of Climate Change Anxiety and The Moderating Role of Social Connectedness”. 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, Muqqadas Saba, am 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 study aims to examines relationship of nature connectedness with mental health outcomes and role of climate change anxiety and social connectedness. If you decide to take part in this study you will be asked to complete a questionnaire that will take approximately 20 to 30 minutes. Please note that there are no known risks or discomforts associated with this study. Moreover, there are no direct benefit to participate, however, information from this study may benefit other people now or in the future. All information collected about you during this study will be kept without any identifiers and 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

Muqqadas Saba

MSP243003@cust.pk

2. Informed Consent

Statement	Yes	No
I confirm that I have read and have understood the all the information for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.		
I understand that taking part in the study involves completing the questionnaire.		
I understand that my participation is voluntary and that I am free to stop taking part and can withdraw from the study at any time without giving any reason and without my rights being affected.		
I understand that I can ask for access to the information I provide, and I can request the destruction of that information if I wish at any time prior to anonymization. I understand that following anonymization, I will no longer be able to request access to or withdrawal of the information I provide.		
I understand that the information I provide will be held securely.		
I agree to take part in the above study.		

3. Demographic Sheet

Name:

Age:

Gender:

1) Male

2) Female

3) Other (Specify:)

Marital Status:

1) Single

2) Married

3) Separated

4) Divorced

5) Widowed

6) Others:

Education Level:

- 1) Intermediate
- 2) Bachelor's
- 3) Master's
- 4) PhD

4. Section 1

Instructions Please rate how often the following statements are true of you.

1= Never, 2= Rarely 3= Sometimes, 4= Often, 5= Almost always

Statement	1	2	3	4	5
Thinking about climate change makes it difficult for me to concentrate.					
Thinking about climate change makes it difficult for me to sleep.					
I have nightmares about climate change.					
I find myself crying because of climate change.					
I think, “why can’t I handle climate change better?”					
I go away by myself and think about why I feel this way about climate change.					
I write down my thoughts about climate change and analyze them.					
I think, “why do I react to climate change this way?”					
My concerns about climate change make it hard for me to have fun with my family or friends.					
I have problems balancing my concerns about sustainability with the needs of my family.					
My concerns about climate change interfere with my ability to get work or school assignments done.					
My concerns about climate change undermine my ability to work to my potential.					
My friends say I think about climate change too much.					

5. Section 2

Instructions Please answer each of these questions in terms of the way you generally feel. There are no right or wrong answers. Using the following scale, in the space provided next to each question simply state as honestly and candidly as you can what you are presently experiencing.

1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Almost Always

Statement	1	2	3	4	5
I often feel a sense of oneness with the natural world around me.					
I think of the natural world as a community to which I belong.					
I recognize and appreciate the intelligence of other living organisms.					
I often feel disconnected from nature.					
When I think of my life, I imagine myself to be part of a larger cyclical process of living					
I often feel a kinship with animals and plants					
I feel as though I belong to the Earth as equally as it belongs to me.					
I have a deep understanding of how my actions affect the natural world					
I often feel part of the web of life.					
I feel that all inhabitants of Earth, human, and nonhuman, share a common 'life force'.					
Like a tree can be part of a forest, I feel embedded within the broader natural world.					
When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature.					
I often feel like I am only a small part of the natural world around me, and that I am no more important than the grass on the ground or the birds in the trees.					
My personal welfare is independent of the welfare of the natural world.					

6. Section 3

Instructions Over the last 2 weeks, how often have you been bothered by any of the following problems?

Questions	Not at all (0)	Several days (1)	More than half the day (2)	Nearly every day (3)
Little interest or pleasure in doing things.				
Feeling down, depressed, or hopeless.				
Trouble falling or staying asleep, or sleeping too much.				
Feeling tired or having little energy.				
Poor appetite or overeating.				
Feeling bad about yourself or that you are a failure or have let yourself or your family down.				
Trouble concentrating on things, such as reading the newspaper or watching television.				
Moving or speaking so slowly that other people could have noticed? Or the opposite being so fidgety or restless that you have been moving around a lot more than usual.				
Thoughts that you would be better off dead or of hurting yourself in some way.				

7. Section 4

Instructions 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 being able to stop or control worrying				
Worrying too much about different things				
Trouble relaxing				
Being so restless that it is hard to sit still				
Becoming easily annoyed or irritable				
Feeling afraid, as if something awful might happen				

8. Section 5

Instructions Circle the answer that shows how much you agree or disagree with each of the following statements.

1 = Strongly Agree, 2 = Slightly Agree, 3 = Agree, 4 = Disagree, 5 = Slightly Disagree, 6 = Strongly Disagree

Statement	1	2	3	4	5	6
I feel disconnected from the world around me.						
Even around people I know, I don't feel that I really belong.						
I feel so distant from people.						
I have no sense of togetherness with my peers.						
I don't feel related to anyone.						
I catch myself losing all sense of connectedness with society.						
Even among my friends, there is no sense of brother/sisterhood.						
I don't feel that I participate with anyone or any group.						

Appendix B

Ethics Approval



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Your Journey Awaits

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April 13, 2026

RESEARCH ETHICS COMMITTEE CERTIFICATE OF REVIEW AND SUPPORT

This is to certify that Project titled: *"Nature Connectedness, Depression and Anxiety among Young Adults: The Mediating Role of Climate Change Anxiety and The Moderating Role of Social Connectedness"* submitted by Scholar: Muqquadas Saba MSP243003 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
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Data Collection Support



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Ref. CUST/IBD/PSY/Thesis-1925
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. Muqqadas Saba registration number MSP243003 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 "Nature Connectedness, Depression and Anxiety among Young Adults: The Mediating Role of Climate Change Anxiety and The Moderating Role of Social Connectedness". 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,

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