NEUROTICISM, COGNITIVE FAILURES, AND MIND-WANDERING; EXPLORING THE MEDIATING ROLE OF MINDFULNESS.

A

Thesis submitted

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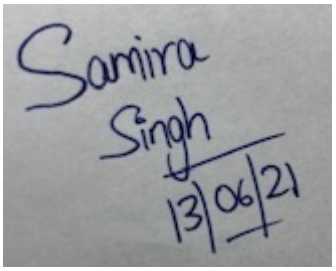
CERTIFICATE

This is to certify that the thesis entitled, **"Neuroticism, Cognitive Failures, and Mind-wandering; Exploring the Mediating Role of Mindfulness**" being submitted in partial fulfillment of requirements for the award of degree of **Master of Arts in Psychology**, submitted in the **School of Humanities and Social Sciences, Thapar Institute of Engineering and Technology, Patiala** is a bonafide work carried out under the supervision of Dr. Santha Kumari, Professor, School of Humanities and Social Sciences, Thapar Institute of Engineering and Technology, Patiala and that no part of this project has been submitted for the award of any other degree.



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CANDIDATE'S DECLARATION

I hereby declare that the work presented in this thesis entitled, **"Neuroticism, Cognitive Failures, and Mind-wandering; Exploring the Mediating Role of Mindfulness**" in partial fulfillment of the requirement for the award of the degree of **Master of Arts in Psychology**, submitted in the **School of Humanities and Social Sciences, Thapar Institute of Engineering and Technology, Patiala,** is an authentic record of my own work carried out under the supervision and guidance of Dr. Santha Kumari, Professor, School of Humanities and Social Sciences, Thapar Institute of Engineering and Technology, Patiala and refers other researcher's work which are duly listed in the reference section.

The matter embodied in this thesis has not formed the basis for the award of any other degree of this or any other university.

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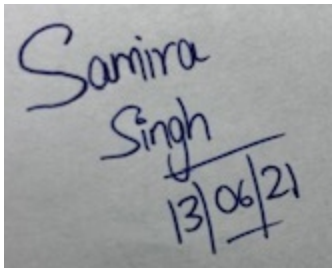

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ABSTRACT

An intact cognitive system is very important for the smooth functioning of an individual on a routine basis. However, just like any other thing in the world, the cognitive system too is imperfect; it does experience a glitch from time to time, which although common for humans to endure, is a little more common for more individuals. Of the many factors underpinning this phenomenon, certain personality traits seem to be quite influential. Neuroticism has consistently been found to predict cognitive failures, more readily than the other personality traits; it has often been associated with workplace accidents and errors, and in general poor cognitive performance. Therefore, the present study has chosen to solely focus on this personality trait, with an attempt to add on to the "Mental-Noise Hypothesis" of neuroticism by Robinson and Tamir (2005). Investigating mindfulness in terms of a missing piece in this funny relationship is the core of this research effort. In the present study, correlational design was employed, and alongside partial least squares structural equation modelling (PLS-SEM) was undertaken. A mediation model has been proposed in this study, with respect to two parallely running, yet independent relationships; the relationship between neuroticism and cognitive failures, and that between neuroticism and mind-wandering (a sub-type of cognitive failures) were investigated simultaneously, with the mediating role of mindfulness in each. The results of the data obtained from a sample of 122 people have supported the mediation model completely. It turns out that that trait neuroticism potentially influences the inherent mindfulness levels of individuals, consequently influencing their propensity to experience cognitive failures as a whole, at least partially, and mind-wandering, fully.

Keywords: cognitive failures, neuroticism, mental-noise hypothesis, mindfulness, mind-wandering

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CHAPTER I

INTRODUCTION

It is so baffling to find ourselves in a position where we forget what we had intended to do in a specific situation while we are at it, and sometimes end up doing something we didn't even have on our minds, at least not in our conscious awareness. Isn't it so? How many times have you found yourself in such a funny, but sometimes embarrassing situation? Perhaps, while cooking something you went to the refrigerator to grab an ingredient, but the very next moment you found yourself standing there with the refrigerator door open, trying to remember what exactly you wanted from there? Or that while segregating your clean clothes from the soiled one's in your wardrobe you suddenly realized, when the job was almost done, that you had been throwing the former in the laundry basket while the latter were being neatly placed in the wardrobe? We all our guilty of having committed such blunders in our lives. These simple mistakes that we all tend to commit are defined as cognitive failures. While as harmless as these appear to be, they can be quite frustrating at times, and may even cause more harm than we can think of, for instance if such a mistake occurs while one is driving. While research has linked cognitive failures to scores of factors, personality seems to be quite pivotal , in my opinion, given that personality traits come with their own set of patterns of overall functioning. Neuroticism has consistently been found to predict cognitive failures, more readily than the other traits; it has often been associated with workplace accidents and errors, and in general poor cognitive performance. Therefore, the present study has chosen to solely focus on this personality trait, with an attempt to add on to the "Mental-Noise Hypothesis" of neuroticism by Robinson and Tamir (2005). Investigating mindfulness in terms of a missing piece in this funny relationship is the core of this research effort.

1.1 COGNITIVE FAILURES

"The term 'cognitive failures' was coined by Broadbent et al. (1982) to refer to minor slips that cause the normally smooth flow of intended action (physical or mental) to be disrupted" (Carrigan & Barkus, 2016, p.4). Although these are quiet funny, and

sometimes embarrassing as well, for some people these do become a source of constant frustration (Carrigan & Barkus, 2016). These errors reflect "a global liability towards frequent lapses in cognitive control" (Carrigan & Barkus, 2016, p.4), and quite evidently impact the individual's concentration, memory, and perception.The late nineteen's saw a growing interest in the domain of cognitive psychology, with cognitive failures being one of the intriguing phenomena researchers dwelled into. Martin (1983) in his paper on cognitive failures mentioned about three major reasons that justify efforts in this area:-

- First, cognitive failures, though very normal and harmless most of the time, can prove detrimental in some cases. For instance, in factories, hospitals, aviation industry, while driving, and in many such situations where a split second of distraction can put someone's life in danger. Thus, it makes it imperative to explore the why's and how's of such a phenomenon.
- Second, it may add on to the knowledge of the psychological functioning of individuals.
- Thirdly, it may also facilitate our understanding of the organization of higher order functions.

Cognitive failures, according to Broadbent, Cooper, FitzGerald, and Parkes (1982), doesn't imply absence of ability or a complexity about the task at hand, there is a mere temporary deflection from an ongoing, otherwise smooth functioning, and a deviation from intention. Following the trend of studying everyday slips and errors, Broadbent and his colleagues contributed to this domain by formulating the most prominently used self-report measure of cognitive failures, CFQ; Cognitive Failure Questionnaire, that takes into errors in memory, perception, and actions. They established the measure's external validity by having the spouses of their respondents rate them as well on the questionnaire. Further, they found a trait-like stability about this concept; the respondents seemed to remain on the same level of cognitive-failure experience throughout their lives. Additionally they tried studying cognitive failures-distress association. As opposed to the common sense belief that stress may be contributing to cognitive failures, Broadbent and his colleagues found quite the opposite; cognitive failures were found to result in distress rather than be triggered by it.

Broadbent, Cooper, FitzGerald, and Parkes (1982) give the credit to Reason, of stirring a trend towards the exploration of slips and errors. That said, a possible role of such cognitive errors in psychopathology also seemed a reason large enough, for such an arousing interests according to them. Speaking of Reason, in a chapter, titled *Lapses of Attention in Everyday Life* (1984), he has acknowledged the influence of William James, Jastrow, as well as Norman on his works. He writes in this chapter that although the concept of slips and lapses has been prevalent from the time of Aristotle, contemporary cognitive psychologists look upto the works of William James for he concerned himself with "the immediate, ordinary, and recognizable aspects of mental life" (p. 515), an approach that was missing in the work of the later psychologists. As far as the subject of cognitive errors is concerned, habit and attention were the two arenas on which James had emphasized in his writings (Reason, 1984). James theorized, as summarized in Reason's (1984) chapter, that initially when a skill/activity is being learned/practiced, attention plays a very vital role, but as we master that skill/activity the entire execution shifts on an autopilot mode with little involvement of attentional process. Nonetheless, James proposed, attention is still vital, in order to ensure successful execution of actions, and slips of actions are the biggest testimonial to this (Reason, 1984). To sum it up, James opined that cognitive failures occur only in relation to activities that have been practised a multiple times and have essentially become habits (Reason, 1984). Adding to this, his junior contemporary, Jastrow, stated that such errors take place during moments of inattention (Reason,1984).

1.2 CLASSIFICATION OF COGNITIVE FAILURES BY NORMAN (1981)

As acknowledged by Norman (1981) in his paper, the first of the interpretations of slips and lapses, to be more specific verbal slips, was given by none other but Freud, an eminent name in the field of psychology. Freud considered slips to be representation of thoughts/actions in the unconscious mind that come on surface level because the individual experiencing them wishes to express them but is unable to do so due to some compelling reasons. This is just one such explanation. Given that verbal slips had been studied quite extensively, Norman (1981) focused his attention

on the largely under explored counterparts of verbal slips, action lips.First and foremost, Norman (1981), provided a distinction between two types of slips:-

- "One form of action slip is the performance of a well-formed habit in inappropriate circumstances." (p. 416)
- "Other action slips result when a thought that was not intended to be voiced or performed gets done anyway." (p. 416)[In order to differentiate the two types of cognitive failures, the terms slips and lapses came to be denoted for the former and latter, respectively. It is implied here that "cognitive failures" is a broader term that was coined later on and takes into account different types of slips and lapses, associated with different mental faculties, such as memory and attention, to name a few.]

Norman (1981) proposed a theory of actions; how actions are executed. His theory, "Activation-Trigger-Schema system (ATS) assumes that action sequences are controlled by sensorimotor knowledge structures: schemas" (Norman, 1981, p. 416). In a nutshell, Norman (1981) proposed a hierarchical model of actions, wherein the superordinate schemas, called parent-schemas, need to be triggered so that the subordinate schemas, called child schemas, are triggered, which ultimately take up the task of executing an entire action without the intervention of the parent schema. It is important to mention here that each action is controlled by multiple but specific schemas. Certain conditions are supposed to be met to trigger the entire network. It is when an issue in this mechanism occurs that slips and lapses occur, according to Norman (1981), who proposed three different categories of slips, according to the way they are triggered. Given below are the two relevant categories of cognitive failures that Norman (1981) proposed, the third one has not been included as it is not identified as a slip of action per se.

BROADER CATEGORIES	SUBTYPES
Slips that result from faulty activation of schemas	1.Unintentional activation: when schemas not part of a current action sequence become activated for extraneous reasons, then become triggered and lead to slips ➢ Capture errors: when a sequence being performed is similar to another more frequent or better learned sequence, the latter may capture control

	➢ Data-driven activation: external events cause activation of schemas ➢ Associative activation: currently active schemas activate others with which they are associated 2.Loss of activation: when schemas that have been activated lose activation, thereby losing effectiveness to control behavior ➢ Forgetting an intention (but continuing with the action sequence) ➢ Misordering the components of an action sequence ➢ Skipping steps in an action sequence ➢ Repeating steps in an action sequence
Slips that result from faulty triggering of active schemas	1.False triggering: a properly activated schema is triggered at an inappropriate time ➢ Spoonerisms: reversal of event components ➢ Blends: combinations of components from two competing schemas ➢ Thoughts leading to actions: triggering of schemas meant only to be thought, not to govern action ➢ Premature triggering 2.Failure to trigger: when an active schema never gets invoked because:- ➢ The action was preempted by competing schemas ➢ There was insufficient activation, either as a result of forgetting or because the initial level was too low ➢ There was a failure of the trigger condition to match, either because the triggering conditions were badly specified or the match between occurring conditions and the required conditions was never sufficiently close

Source: Norman (1981)

Summing it all up, research in this domain of psychology is receiving considerable amount of attention, however, nothing conclusively has been said regarding the factors underpinning cognitive failures, as far as disparity among individuals is concerned (Carrigan & Barkus, 2016). Such research has mainly taken into account subjective reports regarding cognitive failures in recent past. Broadbent's Cognitive Failure Questionnaire (CFQ) is the most prominently used measure of this interesting phenomena (Carrigan & Barkus, 2016). That said, researchers have acknowledged the importance of supplementing subjective measures with objective ones so as to have a deeper understanding of how this phenomena comes to play in real life and more

specifically regarding the underlying mechanisms (Unsworth, Brewer & Spillers, 2012). However, success has not yet been achieved in such attempts.

1.3 NEUROTICISM

"The personality trait of neuroticism refers to relatively stable tendencies to respond with negative emotions to threat, frustration, or loss" (Lahey, 2009, p.1). Neuroticism is defined by emotional instability, volatility, and withdrawal (Puryear, 2020).Temperamental sensitivity to negative stimuli is another defining feature of neuroticism, along with difficulty to overcome emotionally charged experiences, events, stimuli (Nash, 2007). The term negative affectivity is often used to denote neuroticism, since this personality construct embodies traits like emotionality, anxiety, and ego strength (Hyde, 2001). Individuals high on this personality trait tend to contemplate a great deal and are highly sensitive to criticism (Hyde, 2001). Infact they are susceptible to experiencing more of negative emotions, including anger, fear, dejection, shame, etc, which seems to impact their interpersonal skills (Costa & McCrae, 2012). They also seem to be low on habituation and adaptation (Netter, 2004), which is quite likely to makes things all the more difficult.

Trait neuroticism seems to predispose its carriers to experiencing distress across a wide variety of settings (Matthews, 2016). It shares a strong correlation with psychopathology, more than any other personality trait, particularly with disorders having emotional distress as a central feature (Watson,2001). Neuroticism has also been found to be associated with body image attitudes and its correlates, such as those related to eating and exercising (Fawkner, 2012). Individuals with this personality trait seem to have a larger share of miseries in their life than others (Robinson, 2005). In a study conducted on testicular-cancer survivors, trait neuroticism was significantly associated with a plethora of negative experiences, such as those related to physiological functioning, substance abuse, self-esteem, parenting problems, increased healthcare visits, economical issues, sexual problems, everyday medication, and so on. (Gorv et al., 2008).

Given the share of negative experiences they seem to be bequeathed with, neuroticism seems to be a crucial trait with public health implications (Lahey, 2009), and therefore it is justifiably one of the most robustly studied personality trait (Flehmig, Steinborn, Langner & Westhoff, 2007).

1.4 NEUROTICISM AND COGNITION

Given that this personality trait shows a propensity towards negative experiences, it makes absolute sense to assume that perhaps some differences at the cognitive level must be discovered (Robinson & Tamir, 2005). Indeed, research has found neuroticism to be negatively associated with cognition (Munoz et al., 2013). High neuroticism predicts poor task performance (Sosnowska et al., 2019). Attention-demanding tasks seem to bear the most prominent negative influence of trait neuroticism (Munoz et al., 2013). Neuroticism has also been found to be linked to neurocognitive disorders like Alzheimer and Dementia (Ducheck et al., 2007). Wilson et al. (2005) also found distress, which is inherent in trait neuroticism, to be related to increased cognitive decline in old age. Moutafi, Furnham and Paltiel (2005) found that neuroticism negatively predicted general intelligence, numerical ability, as well as abstract reasoning. Munoz et al. (2013) reported a negative relationship between neuroticism and cognitive performance, and infact found intrusive thoughts to be mediating this link.

1.5 THE MENTAL-NOISE HYPOTHESIS OF NEUROTICISM

In 2005, Robinson and Tamir conducted study, specific to trait neuroticism, and proposed the conception of “mental noise” inherent in individuals who are high on this trait of instability. Because neuroticism had been accepted by the research fraternity to be related to various negative outcomes as well as inconsistencies in behavior and experiences, it seemed reasonable to these researchers to hypothesis, and thereafter test, that neuroticism must be promising certain inconsistencies at the cognitive level. As Robinson and Tamir (2005) set out to test their hypothesis, they found themselves to be right. People high on neuroticism, in the three studies conducted by the researchers, showed significant variability in reaction time standard

deviation, which was taken as an indicator of neural noise impacting the information processing process. In fact, in a later study, on the somewhat same lines, Robinson, Wilkowski and Meier (2006) concluded this variability in reaction time standard deviation might be moderating the neuroticism-distress relationship.

1.6 MINDFULNESS

Mindfulness has taken the form of yet another fad in the present era. The concept is gaining unmatched attention in varied disciplines, especially in health sciences, owing to the numerous benefits that it encompasses. But before we dwell onto the concept and the related research, it is pre-eminent to have a basic understanding of what does mindfulness actually mean. There are two major perspectives with respect to exploring the concept of mindfulness. One perspective concerns itself with relating mindfulness to meditation, referred to as Buddhist mindfulness, and is rather a comprehensive viewpoint; this concept of mindfulness is a translation of the Pali word "sati" by T.W. Rhys Davids, who concluded, "Mindfulness therefore involves contemplating the four domains of the body, feelings, states of mind, and experiential phenomena (dhamma), and the purpose of the practice is the extinction of suffering and the attainment of nirvana" (Sun, 2014, pg 8). The alternative understanding of the term is concerned with mindfulness merely in terms of "bare attention" as was first coined by the German monk, Ven. Nyanaponika Thera, who posited that mindfulness "applies preeminently to the attitude and practice of bare attention in a purely receptive state of mind and is kept to a bare registering of the facts observed, without reacting them to them by ... self-reference (like, dislike, etc.), judgement or reflection" (Sun, 2015, pg 10). With the passage of time, mindfulness has become to be used, casually, as being synonymous to awareness. In fact , the present study too aims to study mindfulness solely in terms of this crucial element that defines an inseparable characteristic that is embedded in it's treatment, howsoever. Therefore, from the perspective of this study, if we we are to loosely define what mindfulness is, then, it simply denotes awareness of the present moment, as you are experiencing it.

1.7 WHY PROPOSE THE MEDIATING ROLE OF MINDFULNESS WITH RESPECT TO NEUROTICISM-COGNITIVE FAILURES ASSOCIATION

The idea that this study wishes to propose germinates from the findings of diverse studies, dwelling on the neuroticism-cognition and neuroticism-mindfulness associations:-Flehmig, Steinborn, Langner and Westhoff (2007) in their study had found neuroticism and cognitive failures to be positively associated. Additionally, they had found, by means of application of Norman's (1981) classification of cognitive failures, that the cognitive failures majorly involved internally generated disturbance. The aforementioned findings are exactly what Robinson and Tamir (2005) had proposed through their "mental-noise hypothesis" of neuroticism; dominant trait neuroticism engenders a neural noise that impedes cognitive performance. Munoz et al. (2013) had also reported to have found intrusive thoughts to mediate the relationship between neuroticism and cognitive performance. All these findings, thus, seem to indicate, indirectly, towards an existing role of mindfulness in the neuroticism-cognitive failure relationship, because mindfulness taken in one, non-comprehensive understanding, implies conscious awareness, which is in a way opposite to what exists between the neuroticism-cognitive failure link; mindfulness entails non-judgemental experiencing of the present moment in its totality.

The opposing functionality of neuroticism and mindfulness, as commented on by Brown and Ryan (2003), provides yet another reason to explore the mediating role of cognitive failures; the fact that neuroticism implies excessive worry, anxiety, emotional instability, excessive rumination, negative affectivity, and the like, it might just be acting as an impediment as far as the state of being mindful is concerned, in a person, speaking in terms of getting out of one's head- self-worry. Taking from here, naturally a person who is absorbed by self-worry and excessive rumination is bound to be prone to slips and lapses in everyday activities.

Furthermore, mindfulness has been found to work as a protective factor against neuroticism, preventing the negative consequences that it is associated with, for example, as discovered by Barnhofer, Duggan, and Griffith, (2011), and Feltman, Robinson and Ode (2009) in their respective studies. Now that the existing body of literature already supports that neuroticism adversely impacts cognitive performance,

mindfulness can definitely help dampen that relationship too. Indeed, this is what research states; Froeliger, Garland, and McClernon (2012), Zanesco et al. (2018), and Kearney et al. (2015) found mindfulness to enhance cognitive functioning and reduce cognitive failures. This brings us to another empirically supported fact that although mindfulness is typically seen as a disposition, that inherently dictates an individuals capacity to sustain attention in the present, repetitive practice of mindfulness as a skill can contribute to the development of it as a disposition, continuing to persist over longer periods (Froeliger, Garland, & McClernon, 2012). Thus, there is a strong empirical base that steers us in the direction which this studies aims to venture into.

1.7 MIND-WANDERING

"In direct contrast to mindfulness, which entails a capacity to avoid distraction, mind-wandering is characteristically described as the interruption of task focus by task-unrelated thought" (Mrazek, Smallwood & Schooler, 2012, pg 1).

Mindfulness can be seen as an inherent ability of an individual to engage one's attention in an ongoing event in the present, for as long as they can. Thus, mindfulness can be seen as an ability to sustain attention in the here-and-now. By contrast, sometimes humans tend to, involuntarily, get immersed in thoughts generated internally, with no relevance to the present task at hand. This temporary disengagement from the present moment, owing to endogenous stimuli, denotes mind-wandering. Mind-wandering, thus, is a type of cognitive failure, and naturally it will bear the same negative consequences for an individual experiencing it frequently as in the context of cognitive failures; they cost an individual in terms of time lost, efficiency of working, his productivity, and also quality of life (Cheyne, Carriere & Smilek, 2006) to state the least.

Research indicates that humans spend a great deal of their waking hours mind-wandering. Although mind-wandering has been acknowledged in the area of research eversince it has been observed by scholars, only recently has it garnered enormous attention, particularly in the domain of cognitive psychology and cognitive neuroscience, given that it has become to be associated, robustly, with cognitive

functioning (Robison, Gath, & Unsworth, 2017). Furthermore, as already indicated above, mind-wandering is conceptually a sub-type of cognitive failure, nevertheless it has never been studied in terms of one. Thus, this study attempts to do so.

1.8 MINDFULNESS AND MIND-WANDERING; AN ALTERNATE PERSPECTIVE

It is given that a characteristic feature of attention is that it is fleeting in nature. In light of the universal acceptance of this statement, it would not be wrong to say that mindfulness and mind-wandering will inevitably oscillate, although some techniques could help minimize wandering of the mind. This is to say that, the way the two phenomena intertwine makes us readily presume that they are opposite constructs, as was proposed by Mrazek, Smallwood and Schooler (2012). However, it is important to illuminate here that mindfulness is perceived not just as a state, but also as a disposition. In psychology, we speak of a disposition having a consequence, in terms of specific action/thought patterns that a person will exhibit, for example neuroticism leads to excessive anxiety, worry, rumination tendencies, etc in an individual. In view of this practice, since mindfulness is treated as a disposition, especially when it is measured using MAAS, it seems somewhat rational to posit it to precede the frequency of mind-wandering that an individual will indulge in.Thus, this study additionally attempts to propose a different perspective for understanding the kind of interaction mindfulness and mind-wandering could have, but secondarily. That said, this new proposition would also be based on the findings of the study with respect to the additional path that is contended, and is explained below.

Primarily, the objective of the present study is to explore the link between neuroticism-mindfulness-mind-wandering, by drawing parallels from the neuroticism-mindfulness-cognitive failures hypothesis. Because mind-wandering is a concept that falls under the umbrella of cognitive failures, it is needless to say that it is expected to have a similar relationship to neuroticism, as cognitive failures; in fact, research aligns with this assumption as indicated in studies of Marcusson-Clavertz, D. (2016), Kane et al. (2017), and Robison, Gath, and Unsworth (2017).One of the crucial studies that led to the development of this new perspective is given below.

Cheyne, Carriere and Smilek (2006) conducted a research to specifically study performance errors that result from lapses of attention, which could be defined, in the simplest terms, an absence of attention/consciousness, or a disengagement from the activity at hand. The Cognitive Failure Questionnaire (CFQ), by Broadbent, Cooper, FitzGerald, and Parkes (1982), takes into account errors of distinct nature, like distractability, memory, attention to name a few, assuming that there is a single mechanism underlying all. However, many researchers, including Cheyne, Carriere and Smilek, thought otherwise. Cheyne, Carriere and Smilek (2006) were of the view that lapses of attention per se lead to distinct errors that are measured by CFQ. Consequently, the researchers constructed a scale of their own that specifically measured errors in performance related directly to attentional lapse, referred to as the Attention-Related Cognitive Errors Scale (ARCES). In this particular research work, Cheyne, Carriere and Smilek, (2006) correlated their measure with the Mindful Attention Awareness Scale (MAAS), which was taken to be a measure "as directly assessing a propensity to experience such lapses". In fact,the researchers were right in their approach, as revealed by statistical analyses; MAAS, as a measure of propensity to attentional lapses, strongly predicted errors related to attention, measured by ARCES.

Now, if mindfulness can predict both, cognitive failures as a whole, and attention related errors in performance as an independent phenomenon, it is not far-fetched to assume that it can predict mind-wandering, a type of cognitive error. Therefore, the multiple findings that led us to construct a framework concerning neuroticism-mindfulness-cognitive failures, have also contributed to think of a similar model with mind-wandering.

CHAPTER II

REVIEW OF LITERATURE

2.1 Cognitive failures and Neuroticism

Cognitive failures denote minor slips of action or thought, of varying kinds, such as those related to attention, memory, distractability, or perception, etc that disrupt an otherwise smoothly occurring action. And, neuroticism is a stable personality trait that is consistently associated with disproportionate anxiety, worry, rumination, negative emotionality, and negative consequences of distinct nature. Trait neuroticism has been acknowledged to impede effective cognitive performance on concrete empirical grounds. Therefore, expecting a positive correlation between the two variables makes absolute sense. Indeed, research efforts directed towards this arena has always documented the two variables to be related in the expected fashion:-

Flehmig, Steinborn, Langner and Westhoff (2007) explored the relationship between neuroticism and cognitive failure liability in everyday life, to explore the proposition of "mental noise hypothesis" by Robinson and his colleagues. By employing a self-report methodology, they found that neuroticism shares a positive correlation, although small, with cognitive failures; individuals high on this personality trait showed a propensity towards committing slips and lapses in their routine life. Quite interestingly, employing the subscale methodology proposed by Meiran et al (1994), Flehmig and his colleagues found evidence for the existence of a specific relationship between neuroticism and cognitive failures; of the four subscales of the CFQ questionnaire (discussed later on) the unintended activation subscale was more strongly correlated with neuroticism than the other two (activation loss and failure to trigger subscales), with one of the subscales (false triggering subscale) not correlating at all. This specificity implies that high neuroticism impacts cognitive performance by means of internally generating distractions, from associative memory, rather than by means of stimuli inherent distractions. This somehow supports that Robinson and Tamir (2005) were correct in proposing the "mental-noise hypothesis".

Klockner and Hicks (2015) undertook a study to investigate the phenomenon of cognitive failures at work in relation to personality and mindfulness. They reported that the employees who were low on emotional stability, which is indicative of high neurotic tendencies, and low on mindfulness were subject to higher cognitive failures, (including those related to memory, distractibility, blunders, and names).

Konen and Karbach (2018) conducted two studies to explore the relationship between personality and cognitive failures. The strategy they employed was studying the association of the Big Five personality constructs with self-reported cognitive failures as well as the association of the subfacets of the two most relevant central personality constructs of the Big Five model, conscientiousness and neuroticism, which have been reported, recurrently, in literature, to influence the frequency of cognitive failures. In line with their expectations, the researchers found neuroticism to be positively linked with cognitive failures. Further, they found the sub-facets of neuroticism- self-consciousness, depression, and anxiety- to be linked with cognitive failures.

Sutina et al. (2020) investigated the impact of personality as well as depressed affect on cognitive factors and its four subtypes, proposed by Wallace et al. (2002), - memory, distractibility, blunders, and names. They too found a robust impact of neuroticism and its sub-facets- depression and anxiety, on cognitive failures' cumulative score as well as on its subscales, even when depressed affect was controlled for. Quite interestingly, the depression sub-facet of neuroticism was more strongly linked with the memory and blunder subscales of CFQ, than did the anxiety sub-facet.

As indicated by the studies above, researchers have been able to discover an association between the personality construct of neuroticism and subjective cognitive failures, using varied approaches. However, an indepth understanding of the nature of this relationship that has been exercised by Flehmig, Steinborn, Langner and Westhoff (2007) is particularly interesting as it is suggestive of a specificity about the neuroticism-cognitive failure relationship. Therefore the present research aims to embark on the same path as them to see if somewhat similar findings are encountered in this study as well. Conducting more and more studies of this nature would help to

concretely establish hypotheses regarding the mechanisms responsible for the vulnerability of this particular personality types to cognitive errors, and therafter test them.

2.2 Cognitive failures and Mindfulness

While cognitive failures denote minor slips of action or thought, of varying kinds, such as those related to attention, memory, distractability, or perception, etc that disrupt an otherwise smoothly occurring action, the concept of mindfulness, as employed by this study, implies the ability to sustain attention in the present moment. Needless to say, when the two variables, which evidently capture opposing situation, are studied in association, they would be found to be inversely related, as in the studies by klockner & Hicks (2014), and Gorbovskaya, Park, & Kim (2014). Similarly was reported by Herndon (2008), who additionally found a correlation between mindfulness and external coding, and external coding and cognitive failures; this perhaps indicates that those high on mindfulness pay more attention to the external environment which results in more accurate performance of actions in day to day life. Furthermore all subscales of mindfulness (observed, describe, act with awareness and accept without judgement) correlated well with all the elements cognitive failures (memory, distractability, names and blunders) in a study on the elderly population (Ahadi & Moradi, 2018).

While some studies have focused merely on the type of relationship cognitive failures and mindfulness share, others have also attempted to explore if mindfulness could act as a buffer against cognitive failures and could rather improve cognitive performance:-

Froeliger, Garland, and McClernon (2012) carried out a study to explore an association with respect to mindfulness practice, specifically employing Hatha yoga techniques, and the structure and neurocognitive functions of the brain, with an intertwined impact on propensity towards cognitive failures. As compared to the control group, who had no history of yoga/meditation/mindfulness practice, yoga meditation practitioners were found to have greater gray matter volume in certain

brain regions, which was significantly predicted by years of practising mindfulness. Furthermore, greater gray matter volume was found to predict fewer cognitive failures in this group. Thus, mindfulness practice seems to have some contribution, if not all, to the improved brain structure and functions, which the researchers attribute to the phenomenon of neural plasticity. Zanesco et al. (2018) explored via research if mindfulness training can lead to improvements in cognitive performance in elite military forces. The researchers studied the impact of a brief mindfulness training program, of 8 hours, specifically designed for military cohorts in this study. The military personal participating were included in either a 2-week program, 4-week program, or received no training at all. Pre and post assessment of sustained attention (task based), working memory (task based), and cognitive failures (self-reported) were undertaken, with an interval period of 8 weeks. The findings of the study indicated that the 4-week training group showed significant improvement in sustained attention and working memory, and also reported lower cognitive failures, than the other two groups. Therefore, it is apt to consider that mindfulness practices due enhance cognitive abilities of individuals.

Yet another study, conducted by Kearney et al. (2015) testifies to the miraculous benefits of mindfulness on cognitive failures, along with other symptoms, such as pain, fatigue, and depression. This particular study was conducted on a special group of people, Gulf War I veterans, who were suffering from certain post war symptoms, collectively termed as “Gulf War Illness. These individuals were randomly assigned to either normal treatment that they underwent or normal treatment in conjunction with mindfulness-based stress reduction. The latter group showed significant improvement in terms of symptom reduction during a 6-month follow up.

2.3 Mindfulness and Neuroticism

With respect to the two variables, it can be said that mindfulness and neuroticism are related to outcomes that stand antipodes to each other. While trait neuroticism entails a tendency towards worry, rumination, self-defeating cognitions, poor cognitive performance, and the like, mindfulness has been associated with improved cognition, reduced distress, enhanced psychological well being, and the like. Naturally,

mindfulness negatively correlates with neuroticism (klockner & Hicks, 2014). Brown and Ryan (2003), too reached the same conclusion in their study. Walsh et. (2009) found trait anxiety, which is an important component of neuroticism, to be negatively related to mindfulness, and additionally, found attentional control to be partially mediation this association. Menon, Doddoli, Singh, and Bhogal (2014) also found a negative association between neuroticism and mindfulness among a group of elderly Indian yoga students. The two variables, do not just function counter-actively, as indicated by studies above, but also, research has indicated that mindfulness, which has come to be seen as a disposition that can be developed with consistent practice, seems to act as a protective factor against the development of negative consequences associated with neuroticism, in individuals having high levels of both neuroticism as well as mindfulness:-

Barnhofer, Duggan, and Griffith (2011) carried out a study to explore if mindfulness moderated the relationship between trait neuroticism and depressive symptoms. They found that neuroticism significantly predicted depressive symptoms in individuals having low to medium levels of mindfulness, but not in individuals having higher levels of it. Furthermore, they found "the ability to describe inner experience" to be the most prominent skill of mindfulness relevant with respect to the impact of mindfulness in reducing the negative consequences associated with neuroticism, particularly in the context of emotional responses. Similarly, Feltman, Robinson and Ode (2009) set out to study if dispositional mindfulness moderates the association between neuroticism and its negative outcomes- trait anger and depressive symptoms; they hypothesized that neuroticism would share a stronger association with its outcomes in individual low on mindfulness. Firstly, the researchers found a negative correlation between neuroticism and mindfulness, and then found mindfulness to be playing a moderating role between neuroticism and depressive symptoms; individuals high on mindfulness did not show any association between neuroticism and depressive symptoms.

In an interesting study, Zabelina, Robinson, Ostafin, and Council (2011) set out to explore the relationship among neuroticism, creativity and mindfulness. They found that neuroticism was negatively related to both creativity and mindfulness, and mindfulness was positively related with creativity. Neuroticism entails a tendency to

be self-conscious, rather self-critical to be more precise, creativity involves novelty and risk taking behaviour which requires a fair sense of self-esteem, and mindfulness works by reducing self-conscious attitude. Therefore, mindfulness was manipulated by the researchers to see if it would make a difference to the neuroticism-creativity association. Interestingly, mindfulness was found to mediate this relationship, particularly at high levels of neuroticism, contributing to the ability to be creative in these individuals. Thus, this study is indicative of how mindfulness can foster positive consequences for individuals high on neuroticism.

The studies given above explain how mindfulness could be a target area to improve on to prevent the occurrence of varied negative consequences, which are estalished corelates of trait neuroticism. However, attempt has not been made to understand if low levels of mindfulness could be seen as a negative consequence itself, further leading to other negative consequences, as in the case of higher-order functioning. Therefore, the present study is being willing directed towards this unexplored alternative.

2.4 Mindfulness and mind-wandering

Mindfulness and mind-wandering seem to be the two different sides of the same coin, with the former related to the ability to sustain attention in the here-and-now, and the latter implying a temporary disengagement from the present, and a shift towards an internally generated stimulus. Essentially, research has also found the two to be negatively associated. However, studies in this domain have mainly attempted to find if mindfulness practice, which relates to state-mindfulness rather than trait, reduces mind-wandering. Drawing conclusions purely from this perspective makes more sense to treat mindfulness and mind-wandering as opposing phenomena; presence of one state entails absence of another

Mrazek, Smallwood and Schooler (2012) carried out two studies to explore if mindfulness and mind-wandering are converging concepts. The first study found a negative association to be existing between mindfulness (as measured by MAAS) and multiple measures of mind-wandering. The findings of the first study set ground for a

subsequent research wherein the impact of 8-minute long mindful breathing vs reading vs passive relaxation on a subsequent task performance, to measure mindfulness, was studied. None but mindful breathing had pronounced impact in reducing mind-wandering in task performance. Although this research, in its entirety, shows that mindfulness and mind-wandering are related, I believe, it is too early to say if the two constructs are opposite or can it be possible that one (mindfulness) precedes the other (mind-wandering), as proposed by the researchers.. Rahl et al. (2017) conducted a study to explore the impact of three-day mindfulness meditation training on mind-wandering. The researchers found that participants who received mindfulness meditation training to monitor attention as well as that oriented towards acceptance of intervening thoughts and sensations led to lesser incidents of mind-wandering during the task (Sustained Attention Response Task; the SART) than were exposed to either of the three types of training conditions- mindfulness with only monitoring attention, relaxation training condition, or the reading control condition. According to the researchers, because acceptance seems to be a crucial factor in mindfulness training, it is possible that mindfulness training banks on emotion regulation to minimize mindfulness.

Jha et al. (2015) studied the efficacy of mindfulness training in reducing mind-wandering-related attentional lapses in performance, among military cohorts. Because previous research findings suggest that involvement in extremely demanding situations overtime can magnify the tendency to mindwander, the researchers compared the mind-wandering tendencies between a civilian group and a group of military personals who received no mindfulness training; they found the assumption to be true- military group exhibited greater performance lapses than the civilian group. Further, comparisons were drawn between a military group that received training-focused mindfulness training (8 hours over 8 week), a military group that received didactic-focused mindfulness training relevant to stress and resilience, and a control group of military personal receiving no training. Training-focused mindfulness training was found to be most effective in reducing attentional lapses resulting from mind wandering.

Morrison et al. (2014) researched the effects of a short-term (7 week) mindfulness training on mind-wandering, in university students. The experimental group, after

receiving training, performed better than the control group, that received no training, on Sustained Attention Response Task (the SART), in terms of accuracy, and also reported lesser mind-wandering on the self-report measure.

Mrazek et al. (2013) investigated the efficacy of a 2-week long mindfulness training in improving performance on GRE relevant reading comprehension and working memory capacity, with a mediating role of mind-wandering. In order words, the researchers tried studying if mindfulness training will reduce mind-wandering and enhance performance in the aforementioned domains. The findings did suggest mindfulness training to be impactful in reducing mind-wandering and subsequently enhancing performance on reading comprehension and working memory capacity measure.

The aforementioned studies undoubtedly support the association of mindfulness and mind-wandering. However, a majority of studies have focused on mindfulness as a state; even if dispositional mindfulness measures have been used, the ulterior purpose had always been to take it as a measure of baseline mindfulness levels that could be manipulated through prolonged mindfulness training practices/programs. Froeliger, Garland, and McClernon (2012), for example, stated in the research paper as to how consistent practice of mindfulness can alter mindfulness as a disposition, and how these effects persist for as long as 6-months. Not much emphasis was laid on giving a narrative to the relationship between mindfulness (as a disposition) and mind-wandering. It was the work of Mrazek, Smallwood and Schooler (2012), who attempted to converge the two fields, otherwise treated separately. They have postulated that mindfulness (state) and mind-wandering could be seen as two opposite constructs. The present study aims to give another, basic proposition, that mindfulness (disposition) could be seen in terms of a trait that could preclude mind-wandering.

2.5 Neuroticism and mind-wandering

The manner in which the two variables operate, it goes without saying that it only makes sense to assume them to operate in the same direction. In fact, neuroticism, which is associated with scores of negative outcomes, with inconsistent cognitive

performance being one, must be contributing to mind-wandering directly. Research on these lines are rather interesting.

In a unique study, Marcusson-Clavertz, D. (2016) bifurcated mind-wandering into positive (related to constructive thoughts) and negative (related to guilt and/or fear), on the basis of the content of mind-wandering, and studied its relationship with mind-wandering, as one part of the comprehensive research on mind-wandering. The researcher found mind-wandering and neuroticism to be moderately associated on a "low-challenging signal-detection task". More so, neuroticism specifically predicted negative mind-wandering.

Kane et al. (2017) studied the propensity to mind-wandering with respect to cognitive abilities and personality traits, as occurring in laboratory settings and in everyday life. Significant differences in the way the different variables correlated were found across the two settings. Concerning neuroticism, the researchers found the personality trait to reliably predict mind-wandering only in the laboratory settings. According to the researchers, this discrepancy maybe stemming out of the fact that experimental conditions are perceived in a way that operates, negatively, on one's self-esteem; these settings may make an individual high on neuroticism question his abilities. While escape in an experiment is implausible, in day--to-day life conditions there is some sense of control in avoiding situations that are too challenging.

As far as correlational analyses are concerned, neuroticism has generally been found to be positively related to mind-wandering. However, structural analysis digs deeper into the exact nature of the relation:-

Robison, Gath, and Unsworth (2017) carried out a study to explore the relationship between neuroticism, executive control and mind wandering. Although statistical analysis showed these three variables to be related, structural equation modelling exhibited that neuroticism didn't directly predict mind-wandering, rather executive control seemed to be playing a mediating role. To sum up, they found that individuals who are high on neuroticism tend to have poor executive control, which in turn contributes to higher incidents of mind-wandering. In this way, the research findings align with the The Control Failure × Concerns model of mind-wandering, which

posits that an individual's tendency to mind-wander are dictated, collectively, by the predomination of personal concerns and the ability to overlook task irrelevant thoughts that compete with task relevant cognitions, for attention.

Ibaceta and Madrid (2021) carried out a research to study the association of personality, particularly neuroticism and openness, and mind-wandering, with a mediating role of meta-awareness. As expected by the researchers, confirmatory factor analysis indicated that these two personality had an indirect association with mind-wandering, through meta-awareness. To elaborate, these personality traits were positively associated with one's awareness of one's thoughts, which in turn was positively related to mind-wandering, specifically self-perception of mind-wandering.

CHAPTER III

RESEARCH GAPS, OBJECTIVES, CONCEPTUAL FRAMEWORK,RATIONALE, AND HYPOTHESES

3.1 RESEARCH GAP

Both cognition as well as personality impact the behavior of an individual, and have important occupational and health implications, which makes it imperative to explore such phenomenon (Markett, Montaga, Diekmanna & Reuter, 2014; Stanek, 2014). This fact has been acknowledged by the research fraternity as a consequence of which this research domain is gaining increasing impetus.

While the relationship between personality and cognitive failures has been explored quite well, there are scarce efforts to explore the role of mindfulness with respect to this association. The present study is not only contributing to the existing understanding of the personality (neuroticism to be more specific)-cognitive failures-mindfulness association but also endeavors to explore mindfulness as a mediating variable, which makes this study a novel initiative.

Parallelly, efforts have been exercised towards studying the relationship between neuroticism, mindfulness, and mind-wandering (which is, conceptually, a type of cognitive failure), again with a mediating role of mindfulness; such a study has not been attempted before, wherein mind-wandering has been aligned with cognitive failures. This specific research interest is also an attempt to provide a new perspective to the mindfulness-mind-wandering association. Rather than just viewing the two constructs as being opposite to each other, this study wishes to perceive it from the lens of one-dispositional mindfulness- precluding the other-mind-wandering.

3.2 OBJECTIVES

1. To explore the relationship between neuroticism, cognitive failures, and mindfulness.

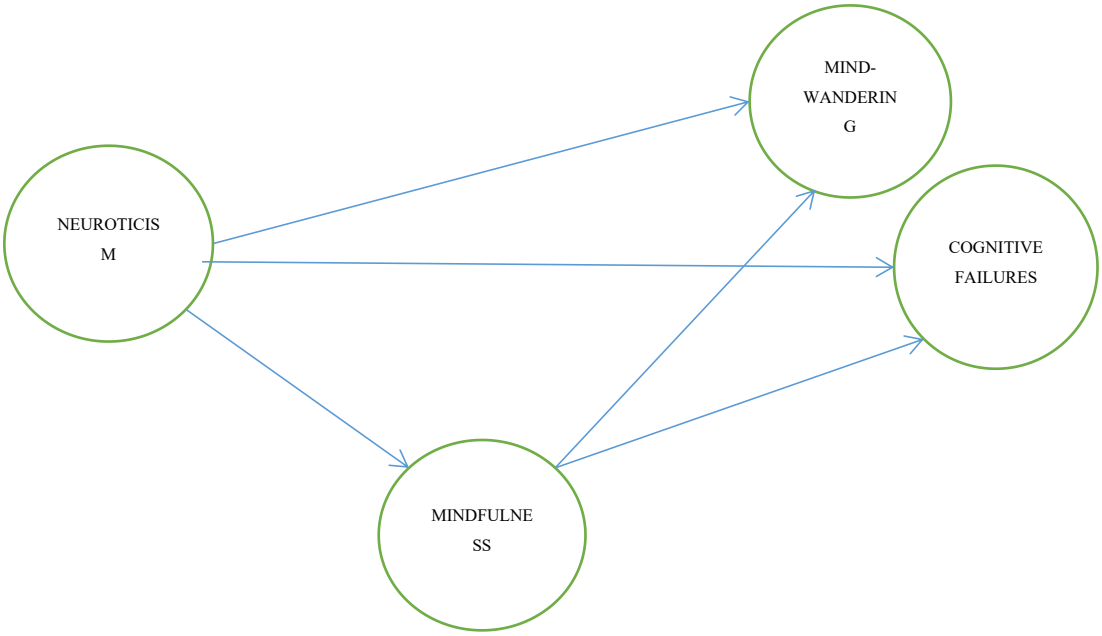
2. To explore the mediating role of mindfulness in the neuroticism-cognitive failures association.

3. To explore the relationship between neuroticism, min-wandering, and mindfulness.

4. To explore the mediating role of mindfulness in the neuroticism-mind-wandering association.

3.3 CONCEPTUAL FRAMEWORK

3.3.1 **Path model showing the relationship between Neuroticism and cognitive failures, with the mediating role of Mindfulness, and a parallel relationship between Neuroticism and Mind-wandering, with a mediating role of Mindfulness.**



In this study, a model has been proposed to posit that mindfulness could be mediating the association between neuroticism and cognitive failure, and simultaneously between neuroticism and mind-wandering (conceptually a sub-type of cognitive failure). The premise of proposing this model is to understand if there is an underlying mechanism related to the functioning of personality traits (particularly neuroticism here) for cognitive failures to occur; does neuroticism predicts cognitive failures as a whole and its sub-type mind-wandering, because it acts as a precursor to low levels of mindfulness?

3.4 RATIONALE AND HYPOTHESES

H_1 Neuroticism will be positively related to cognitive failures.

Neuroticism is a personality trait that is consistently associated with anxiety, worry, rumination, and scores of other negative consequences. Cognitive failures refer to minor slips, of varying nature, that disrupt otherwise smooth functioning actions. Naturally, when these two variables are to be studied in association to each other, one will expect them to be positively related, if at all, given that neuroticism entails inconsistent cognitive performance, as postulated by Robinson and Tamir's (2005) mental noise hypothesis. This is in fact in line with various studies conducted in this area, for example by Flehmig, Steinborn, Langner and Westhoff (2007), Klockner and Hicks (2015), and Konen and Karbach (2018).

H_2 Neuroticism will be negatively related to mindfulness.

Brown and Ryan (2003), in their paper, had commented on the opposing functionality of neuroticism and mindfulness; the fact that neuroticism implies excessive worry, anxiety, emotional instability, excessive rumination, negative affectivity, and the like, it might just be acting as an impediment as far as the state of being mindful is concerned, in a person, speaking in terms of the inability to get out of one's head- self-worry. Now, because these variables elicit opposing consequences, they must be negatively related too. Indeed this is what research indicates, as in the works of klockner and Hicks (2014), Walsh et. (2009), and Menon, Doddoli, Singh, and Bhogal (2014).

H_3 Mindfulness will be negatively related to cognitive failures.

An important characteristic of mindfulness is awareness of the present moment, which of course is absent in the case of cognitive failures, which disrupts the ongoing action. This is to say that the two variables operate in a way that they are naturally incompatible with each other. Indeed, people high on mindfulness trait have been generally found to commit lesser cognitive errors than others, as in the studies conducted by klockner and Hicks (2014), Gorbovskaya, Park, and Kim (2014), and Ahadi and Moradi (2018). Furthermore, Herndon (2008) found a correlation between mindfulness and

external coding, and external coding and cognitive failures; this perhaps indicates that those high on mindfulness pay more attention to the external environment which results in more accurate performance of actions in day to day life.

H_4 Neuroticism will be positively related to mind-wandering.

One of the defining features of trait neuroticism is the propensity towards rumination; individuals high on neuroticism tend to spend a great deal of time inside of their heads, thinking about various negative, anxiety-arousing scenarios, questioning their own abilities. It makes absolute sense to think that neuroticism will engender mind-wandering; in fact, this idea is captured by the Control Failure x Concerns model of mind wandering. Marcusson-Clavertz, D. (2016), Kane et al. (2017), and Robison, Gath, and Unsworth (2017) have found neuroticism and mind-wandering to be positively related.

H_5 Mindfulness will be negatively related to mind-wandering.

By definition, mindfulness refers to one's awareness of the present moment as it is being experienced. By contrast, mind-wandering is a temporary shift of attention from an ongoing task to an internal stimulus. Thus, conceptually, the two phenomena appear to be opposite constructs, and this is supported by a large body of empirical data. There are a myriad of studies that have documented that mindfulness and mind-wandering are negatively related to each other (Mrazek, Smallwood and Schooler, 2012; Rahl et al., 2017; Jha et al., 2015).

CHAPTER IV

METHODOLOGY

4.1 SAMPLE

A total of 122 (84 females and 38 males) individuals participated in the current study, between the age range of 18-27 years. The sample was collected through convenience sampling and snowballing, and therefore lacked homogeneity.

4.2 DESIGN

Correlational design, along with mediation model, was employed in this study.While neuroticism was the predictor variable in this study, cognitive failures and mind-wandering were the criterion variables, and mindfulness was the mediating variable.

4.3 TOOLS USED

- Neuroticism: The personality trait of neuroticism was measured using Eysenck's Personality Inventory (EPI). This inventory comprises of 57 items with dichotomous (Yes/No) responding, and is specifically designed to assess the personality traits of neuroticism and extraversion. This self-report measure is a reliable tool of measurement; the reliability estimates range from 0.81 to 0.97 for test–retest reliability and from 0.74 to 0.91 for split-half reliability (Bolding & Martin, 2011).

- Cognitive failures: The cognitive failures were measured using the self-report measure by Broadbent and his colleagues, which is the most prominent tool used to assess cognitive failures, with a test-retest reliability of 0.71 (Bridger, Johnsen & Brasher, 2013). The questionnaire comprises 25 questions in all that measure the respondent's susceptibility to committing errors related to perception, memory, and actions on an everyday basis, as experienced in the past 6 months of

his life. It employs a 5-point likert scale.Originally, the questionnaire yields a single score depicting a person's general propensity to committing cognitive errors. However, employing the same strategy as Flehmig, Steinborn, Langner & Westhoff (2007), we not only yielded the total score of each respondent but also yielded their scores on the four subscales employed by Flehmig and his colleagues in their study. Given below are the four subscales taken from the work done by Flehmig, Steinborn, Langner & Westhoff (2007, p. 347):-

> "CFQ-Al (Activation Loss subscale): Endogenously driven lapses of (prospective) memory; forgetting of task-relevant memory content"

> "CFQ-FT (False Triggering subscale): Exogenously driven slips triggered by environmental stimuli; stimulus features trigger inappropriate action"

> "CFQ-FTT (Failure to Trigger subscale): Exogenously driven lapses of attention; relevant stimulus features are not detected"

> "CFQ-UT (Unintended Activation subscale): Endogenously driven slips triggered by associative memory; intrusion of task-irrelevant cognition"

- Mindfulness: Dispositional mindfulness was measured using Mindfulness Attention Awareness Scale (MAAS). This self-report tool comprises of 15 items in total, and employs a 6-point scale, to indicate the frequency of experiences related to mindfulness, purely in terms of awareness. It is a reliable tool for assessment, with Cronbach's alpha's coefficient ranging between .89–.93 (Black, Sussman, Johnson & Milam, 2012).

- Mind-wandering: Mind-wandering was measured using Mind-Wandering Questionnaire. The self-report tool comprises of 5 items in all and employs a 6-point scale, to measure the frequency of mind-wandering on a daily basis. This tool has been found to yield a good reliability coefficient of 0.850 using Cronbach's alpha method (Mrazek et al., 2013) .

4.4 PROCEDURE

Informed consent was obtained from all the participants before starting the study; the participants were informed thoroughly about the research as well as the nature of participation in the same. The entire data was collected online via google forms, and the participants received the following instructions for the same:-

"I will be sending you a link after receiving your consent regarding your voluntary participation in the study. You will be led to a google form containing several sections, each enclosing some questions regarding the variables I wish to study. You simply have to read the statements carefully and answer spontaneously, without wasting a lot of time on each."

Additionally, the participants were encouraged to take up the surveys only when they are in a comfortable and peaceful environment, and were also informed that they needn't feel conscious of responding a certain way as there weren't any right/wrong responses, and that the research purported to study group patterns rather than that of an individual.

4.5 ANALYSIS

Data analysis was done with the help of SPSS for descriptive statistics (mean and standard deviation), and inferential statistics (Pearson correlation). Mediation analysis was done using partial least squares structural modeling (PLS-SEM), through SmartPLS3 software.

CHAPTER V

RESULTS

The present study employed a correlational design, and additionally used mediation model, to study the relationship between neuroticism, cognitive failures, and mindfulness, and simultaneously, the relationship between neuroticism, mind-wandering, and mindfulness. While neuroticism was the predictor variable, cognitive failures and mind-wandering were the criterion variables, and mindfulness the mediating variable. For data analysis, mean, standard deviation, and correlation were computed using SPSS 21.0, and SmartPLS3 software was used for Partial Least Squares Structural Equation Modeling, (PLS-SEM) for mediation.

5.1 Descriptive statistics

Table 1: Mean and Standard Deviation of Mind-wandering, Neuroticism, Mindfulness, and Cognitive failures and its sub-scales.

	Mean	Std. Deviation
Mind-wandering	15.24	4.61
Neuroticism	14.12	5.32
Cognitive falures Total	39.83	16.27
Activation loss sub-scale(CFQ-AL)	11.066	5.25
Failure to trigger sub-scale(CFQ-FTT)	16.64	7.42
Faulty triggering sub-scale(CFQ-FT)	6.13	2.96
Unintended activation sub-scale(CFQ-UA)	5.99	2.59
Mindfulness	62.68	12.56

The table above represents the mean and standard deviation indices obtained for each variable under study, for the sample of 122 participants. The mean score obtained for mind-wandering is 15.24, with a standard deviation of 4.61, for neuroticism is 14.12

and 5.32 respectively, for cognitive failures is 39.83 and 16.27 respectively, and for mindfulness 62.68 and 12.56 respectively. With respect to the sub-scales of cognitive failures, the mean and standard deviation for the activation loss sub-scale (CFQ-AL) is 11.066 and 5.25 respectively, for the failure to trigger sub-scale (CFQ-FTT) 16.64 and 7.42 respectively, for the faulty triggering sub-scale (CFQ-FT) 6.13 and 2.96 respectively, and for the unintended activation sub-scale (CFQ-UA) 5.99 and 2.59 respectively.

5.2 Inferential statistics

Table 2: Pearson correlation between Neuroticism, Cognitive failures and it's sub-scales, Mindfulness, and Mind-wandering.

	Mind-wandering	Neuroticism	Cognitive failures Total	CFQ-AL	CFQ-FTT	CFQ-FT	CFQ-UA	Mindfulness
Mind-wandering	1							
Neuroticism	.417**	1						
Cognitive failures Total	.580**	.582**	1					
CFQ-AL	.510**	.439**	.904**	1				
CFQ-FTT	.517**	.560**	.951**	.791**	1			
CFQ-FT	.481**	.489**	.855**	.697**	.768**	1		
CFQ-UA	.576**	.602**	.747**	.590**	.628**	.613**	1	
Mindfulness	-.580**	-.593**	-.836**	-.767**	-.782**	-.695**	-.666**	1

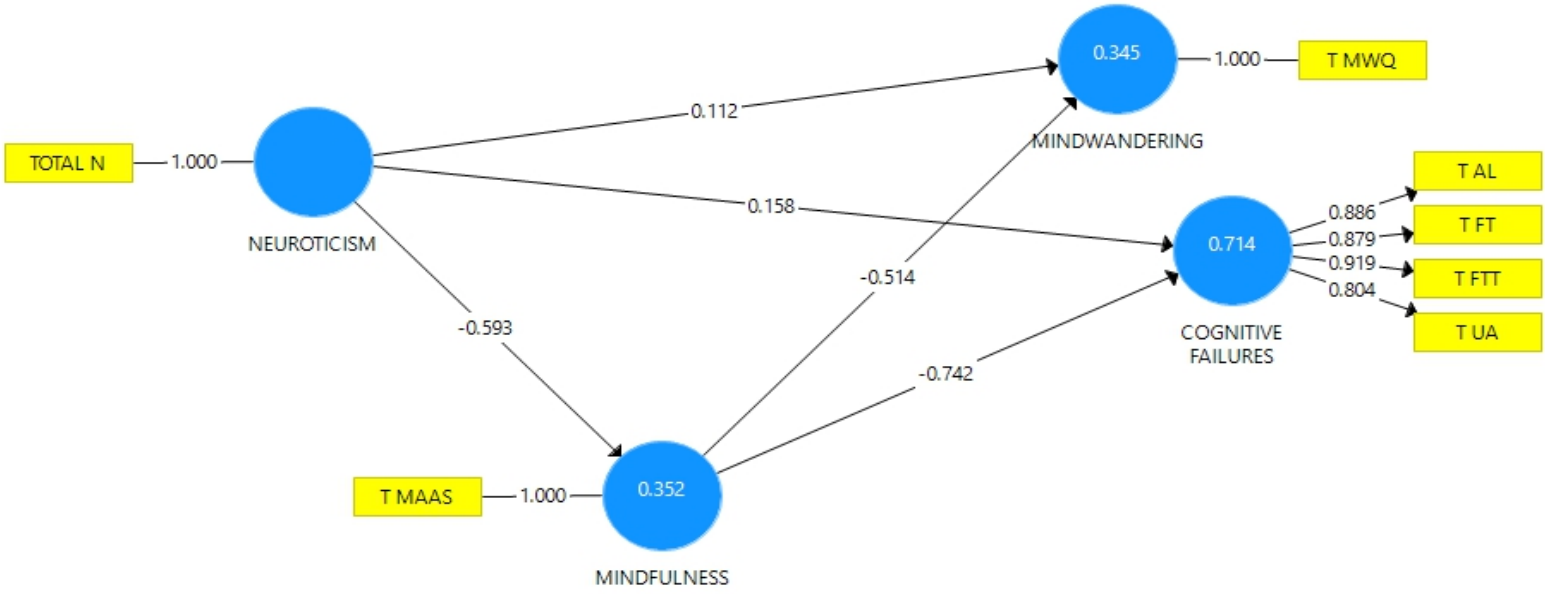
**. Correlation is significant at the 0.01 level (2-tailed).

The table indicated above represents the correlation coefficient computed between the variables under study. A quick glance at the table itself informs that all the relevant correlational analyses have been found to be highly significant. Neuroticism moderately, positively correlated with cognitive failures as a whole ($r = .582$, $p<0.00$)

as well as with all its sub-scales; activation loss sub scale (CFQ-AL) (r= .439, p< 0.00), failure to trigger subscale (CFQ-FTT)(r= .560, p< 0.00), faulty triggering subscale (CFQ-FT) (r= .489, p< 0.00), and unintended activation subscale (CFQ-UA)(r= .602, p< 0.00). Neuroticism moderately, negatively correlated with mindfulness (r= -.593, p< 0.00). A strong negative correlation has been indicated between mindfulness and cognitive failures (r= -.836, p< 0.00) along with its sub-scales ; CFQ-AL (r= -.767, p< 0.00), CFQ-FTT (r= -.782, p< 0.00), CFQ-FT (r= .695, p< 0.00), and CFQ-UA (r= -.666, p< 0.00). A moderate, positive correlation has been found between neuroticism and mind-wandering (r= .417, p< 0.00). Finally, a moderate, negative correlation has been indicated between mindfulness and mind-wandering (r= - .580, p< 0.00).

5.3 Mediation model

Figure 1: Mediation model for Neuroticism and Cognitive failures, and Neuroticism and Mind-wandering, through Mindfulness



The figure above represents a mediation model proposed in this study. The model constitutes of two parallel running, independent associations- Neuroticism and Cognitive failures, and Neuroticism and Mind-wandering- with one common factor- Mindfulness, which is contended to mediate the two associations.

Interpreting the figure, there are certain values indicated on the endogenous variables-mindfulness, cognitive failures, and mind-wandering. These values represent the obtained R squared values, which explain variance in a variable attributable to the model. Accordingly we come to interpret that 35% of variance in mindfulness is attributable to neuroticism, 71% of variance in cognitive failures is attributable to mindfulness and neuroticism collectively, and 34% of variance in mind-wandering is attributable to mindfulness and cognitive failures collectively.

Table 3: Path coefficients; Direct effects

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Mindfulness_ -> Cognitive failures	-0.782	-0.782	0.053	14.705	0.000
Mindfulness_ -> Mindwandering	-0.514	-0.515	0.096	5.362	0.000
Neuroticism_ -> Cognitive failures	0.166	0.164	0.068	2.456	0.014
Neuroticism_ -> Mindfulness_	-0.593	-0.590	0.061	9.648	0.000
Neuroticism_ -> Mindwandering	0.112	0.110	0.096	1.162	0.246

As is clearly indicated by the table above, significant direct association were found between all the variables, but between neuroticism and mind-wandering.

Reflecting on the neuroticism-mindfulness-cognitive failures association, all the three variables directly associated , however the size of the direct effects between neuroticism and cognitive failures ($t= 2.456$, $p<0.014$) is smaller than that between neuroticism and mindfulness ($t= 9.648$, $p< 0.00$), and that between mindfulness and cognitive failures ($t= 14.705$, $p< 0.00$). this may be an indicator of a possible mediating role of mindfulness in the neuroticism-cognitive failures association.

Table 4: Total Indirect Effects

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Mindfulness_ -> Cognitive failures					
Mindfulness_ -> Mindwandering					
Neuroticism_ -> Cognitive failures	0.464	0.462	0.062	7.477	0.000
Neuroticism_ -> Mindfulness_					
Neuroticism_ -> Mindwandering	0.305	0.305	0.070	4.377	0.000

As indicated by the table, highly significant indirect effects were found between both, neuroticism and cognitive failures (t= 7.477, p< 0.00), and neuroticism and mind-wandering (t= 4.377, p< 0.00). As far as the neuroticism - mindfulness - mind-wandering association is concerned, the absence of significant direct effects between neuroticism and mind-wandering renders full mediation via mindfulness. With respect to the neuroticism - mindfulness - cognitive failures association, the indirect effects between neuroticism and cognitive failures (t= 7.477, p< 0.00) are more pronounced than the direct effects between the two (t= 2.456, p<0.014), which means there is partial mediation via mindfulness. To summarize, mediation effects of mindfulness in the two parallely studied relationships have been established by the indices.

Table 5: Model Fit Summary

	Saturated Model	Estimated Model
SRMR	0.055	0.064
d_ULS	0.085	0.114
d_G	0.068	0.079
Chi-Square	47.082	51.792
NFI	0.920	0.912

As far as interpreting model fit indices is concerned, many researchers have indicated towards a need to develop a comprehensive understanding of the varied values obtained in SmartPLS. Nevertheless, the indices above, particularly with respect to SRMR and NFI, indicate the proposed model to be a good fit; SRMR value should be less than 0.10 and NFI value more than 0.9 to accept any model.

CHAPTER VI

DISCUSSION

In the present study, efforts were divided to explore two relationships simultaneously- the relationship between Neuroticism, Mindfulness and Cognitive Failures, and the relationship between Neuroticism, Mindfulness and Mind-wandering, with an attempt to unravel the mediating role of mindfulness in each of the two camaraderie, if any. Although the latter part of the study emerged out of the former, since mind-wandering is conceptually a sub-type of cognitive failure, an accompanying motive here was to give a new vantage point to perceive the mindfulness - mind-wandering association; as opposed to treating the two constructs as purely as opposites, an attempt was made to garner evidence for viewing mindfulness, as a disposition, precluding mind-wandering. The findings of the study have been discussed below:-

6.1 Neuroticism and Cognitive Failures

In beginning of this study, it was hypothesized that neuroticism and cognitive failures will be positively related to each other. The findings of the study are in line with the existing body of literature; correlational analysis indicated towards a moderate, positive correlation between the two variables, as found by many researchers in their works, for example Klockner and Hicks (2015), Konen and Karbach (2018), Sutina et al. (2020). Flehmig, Steinborn, Langner and Westhoff (2007) had also found neuroticism and cognitive failures to be positively associated. Additionally, the researchers had divided the CFQ (cognitive failure questionnaire) into four sub-scales- CFQ-AL, CFQ-FTT, CFQ-FT, CFQ-UA- to further explore the nature of prominent cognitive failures that people high on neuroticism experience; in their study all sub-scales except for the CFQ-FT (faulty triggering sub-scale) did not correlate with neuroticism. The present study replicated Flehmig, Steinborn, Langner and Westhoff (2007) in their use of CFQ sub-scales; however, neuroticism in the present study correlated with all the four subscales of CFQ, with not much difference in the size of the correlation. Trait neuroticism has been consistently found to predict poor cognitive performance (Sosnowska et al., 2019). Munoz et al. (2013) reported a

negative relationship between neuroticism and cognitive performance, and infact found intrusive thoughts to be mediating this link. Attention-demanding tasks seem to bear the most prominent negative influence of trait neuroticism (Munoz et al., 2013). Moutafi, Furnham and Paltiel (2005) found that neuroticism negatively predicted general intelligence, numerical ability, as well as abstract reasoning. However, the most interesting of these studies was the one conducted by Robinson and Tamir in 2005, in which they proposed a "mental-noise hypothesis" with respect to neuroticism; the researchers through experimental studies found that people high on neuroticism exhibited inconsistent cognitive performance, and thus proposed this to be arising out of neural noise that characterizes this personality trait.

To conclude, the first hypothesis has been accepted.

6.2 Neuroticism and Mindfulness

Based on the existing body of knowledge, neuroticism and mindfulness were hypothesized to be negatively related to each other, and indeed the findings of the study are in line with this assumption. A moderate, negative correlation was found between the two variables, as was the outcome in studies by Menon, Doddoli, Singh, and Bhogal (2014), klockner & Hicks, (2014), Walsh et. (2009). Not only this, some studies have even suggested high levels of mindfulness to prevent negative outcomes in individuals high on neuroticism, which are typically associated with this personality trait. Barnhofer, Duggan, and Griffith (2011) found that neuroticism significantly predicted depressive symptoms in individuals having low to medium levels of mindfulness, but not in individuals having higher levels of it. Feltman, Robinson and Ode (2009) reported similarly in their study. Zabelina, Robinson, Ostafin, and Council (2011) carried out a study which is indicative of how mindfulness can foster positive consequences for individuals high on neuroticism; they found that an increase in state mindfulness in individuals high in neuroticism led to an increase in creativity, specifically in this group, which was absent prior to manipulation of mindfulness.

Therefore, the second hypothesis has also been accepted.

6.3 Mindfulness and Cognitive Failures

Initially, guided by existing literature, it was hypothesized that mindfulness and cognitive failures will be negatively related to each other. Statistical analysis is in line with the assumption made. A strong, negative correlation was found between the two variables, as it was discovered in the studies conducted by klockner & Hicks (2014), Gorbovskaya, Park, & Kim (2014), (Ahadi & Moradi, 2018). Similarly was reported by Herndon (2008), who additionally found a correlation between mindfulness and external coding, and between external coding and cognitive failures, to suggest that those high on mindfulness pay more attention to the external environment which results in more accurate performance of actions in day to day life. Some other studies have additionally found that mindfulness could act as a buffer against cognitive failures and could rather improve cognitive performance. Froeliger, Garland, and McClernon (2012) carried out a study to explore an association with respect to mindfulness practice, specifically employing Hatha yoga techniques, and the structure and neurocognitive functions of the brain, with an intertwined impact on propensity towards cognitive failures. Mindfulness practice seemed to have some contribution, if not all, to the improved brain structure and functions, which the researchers attribute to the phenomenon of neural plasticity. Zanesco et al. (2018) explored via research if mindfulness training can lead to improvements in cognitive performance in elite military forces; 4-week of training elicited significant improvement in sustained attention and working memory, and also reduced cognitive failures. Yet another study, conducted by Kearney et al. (2015) testifies to the miraculous benefits of mindfulness on cognitive failures, along with other symptoms, such as pain, fatigue, and depression.

Thus, the third hypothesis has been accepted has well.

6.4 Neuroticism and Mind-wandering

The present study had hypothesized in the beginning that a positive relationship between neuroticism and mind-wandering will be discovered. The findings of the

study confirm this presumption; individuals high on neuroticism were more susceptible to mind-wandering than others. Marcusson-Clavertz, D. (2016) found mind-wandering and neuroticism to be moderately associated on a "low-challenging signal-detection task", and found neuroticism to specifically predict negative mind-wandering (related to guilt/fear). Kane et al. (2017) studied the propensity to mind-wandering with respect to cognitive abilities and personality traits, as occurring in laboratory settings and in everyday life, and found a significant positive association only with respect to laboratory settings. According to the researchers the lack of control with respect to experiment gives rise to negative cognitions in high neuroticism individuals, (that can be escaped somehow in real life) thus affecting their performance.

Hence, the fourth hypothesis has been accepted too.

6.5 Mindfulness and Mind-wandering

The research body dedicated to studying mindfulness - mind-wandering relationship have consistently found them to be negatively associated (Mrazek, Smallwood & Schooler, 2012, Deng, Li & Tang, 2014). Therefore, in the beginning of the study they were hypothesized to be negatively related, and the results obtained support this understanding. What is of greater significance here is that innumerable studies have documented a significant decrease in mind-wandering following mindfulness training/practices. Mrazek, Smallwood and Schooler (2012) studied the impact of 8-minute long mindful breathing vs reading vs passive relaxation on a subsequent task performance. They found none but mindful breathing to have pronounced impact in reducing mind-wandering in task performance. Rahl et al. (2017) conducted a study to explore the impact of three-day mindfulness meditation training on mind-wandering. The researchers found that participants who received mindfulness meditation training to monitor attention as well as that oriented towards acceptance of intervening thoughts and sensations led to lesser incidents of mind-wandering during the task (Sustained Attention Response Task; the SART) than those who were exposed to either of the three types of training conditions- mindfulness with only monitoring attention, relaxation training condition, or the reading control condition. Morrison et

al. (2014), Mrazek et al. (2013),and Jha et al. (2015) also studied the benefits of mindfulness training on mind-wandering, and found similar results as cited above.

To sum it all, the fifth hypothesis of the study has been accepted.

6.6 Neuroticism, Mindfulness, Cognitive Failures; the mediating role of Mindfulness

This study is of immense significance, firstly, because it is a novel attempt to propose a model to understand the relationship between neuroticism and cognitive failures through mindfulness, which has been contended to play a mediating role. There is already literature that has established the three variables to be associated with each other. Furthermore, various indirect evidences available contributed to the development of a theoretical framework, which further guided path modelling. It is important to state so because mediation in a way is used to establish causal relationships, which make sense only when there exists a theory to support the predictions and findings.

Moving on to the available evidence, Robinson and Tamir (2005) had proposed through their "mental-noise hypothesis" of neuroticism that dominant trait neuroticism engenders a neural noise that impedes cognitive performance. Flehmig, Steinborn, Langner and Westhoff (2007) in their study had found, by means of application of Norman's (1981) classification of cognitive failures, that the cognitive failures majorly involved internally generated disturbance, in high neuroticism individuals. Munoz et al. (2013) had also reported to have found intrusive thoughts to mediate the relationship between neuroticism and cognitive performance. The fact that neuroticism implies excessive worry, anxiety, emotional instability, excessive rumination, negative affectivity, and the like, it might just be acting as an impediment as far as the state of being mindful is concerned, in a person, speaking in terms of getting out of one's head- self-worry (Brown and Ryan, 2003). Taking from here, naturally a person who is absorbed by self-worry and excessive rumination is bound to be prone to slips and lapses in everyday activities. Also, there are many emerging studies that have shown mindfulness to enhance cognitive performance (Froeliger, Garland, & McClernon, 2012, Zanesco et al., 2018, and Kearney et al., 2015).

Finally, proceeding to the results of the study, significant direct effects, but larger, significant indirect effects were found between neuroticism and cognitive failures, indicating partial mediation through mindfulness. Thus, the mediation model, with respect to this path has been accepted.

6.7 Neuroticism, Mindfulness, Mind-wandering; the mediating role of Mindfulness

The second contribution that this study is making to the research arena is proposing a parallel path in conjunction with the aforementioned path; the study attempted to explore the relationship between neuroticism and mind-wandering through mindfulness, the mediating variable. This parallelly running, independent path has been inspired from the neuroticism-mindfulness-cognitive failures camaraderie. Mind-wandering, conceptually, seems to be a sub-type of cognitive failures, which is also confirmed by the correlation analysis ($r= .580$, $p< 0.00$); the moderate correlation is perhaps attributable to the distinct types of slips and lapses that CFQ assess collectively.

This is the first study to align mind-wandering with cognitive failures. Cheyne, Carriere and Smilek (2006), attempted something similar with attention related performance errors; they separated attentional errors from the broader taxonomy - cognitive failures- , formulated a questionnaire specifically to capture these errors, and additionally, successfully used mindfulness (MAAS) as a predictor of attention related performance errors. Put across in a condensed manner, if mindfulness can predict cognitive failures as a whole, and attentional errors independently, it should also be able to predict mind-wandering in a similar fashion. As far as the neuroticism - mind-wandering relationship is concerned, Marcusson-Clavertz, D. (2016), Kane et al. (2017), and Robison, Gath, and Unsworth (2017), have already found them to be positively related .

Many studies have already established a negative association between mindfulness and mind-wandering, and that mindfulness practice reduces mind-wandering, as already discussed previously. This empirical base not only supports our rationale

behind the path modeling, but additionally provides an opportunity to postulate a different perspective to treat mindfulness and mind-wandering. The objective here is to propose that if mindfulness mediates the neuroticism - mind-wandering relationship, then dispositional mindfulness could be seen as a condition that precludes mind-wandering. Such a contention comes in light of the new proposed perspective of Mrazek, Smallwood and Schooler (2012), who have treated mindfulness (specifically state mindfulness) and mind-wandering as opposite constructs.

Finally, as far as the results are concerned, this path of the mediation model has also been accepted; neuroticism and mind-wandering were found to have significant indirect effects, with no direct effects. Thus, neuroticism and mind-wandering are associated via mindfulness; mindfulness fully mediates this relationship. It must be mentioned here that although correlational analyses have found neuroticism and mind-wandering to be associated, studies employing structural equation modeling have generally found the two variables to exhibit indirect effects and no direct effects, for instance, as found by Robison, Gath, and Unsworth (2017), and Ibaceta and Madrid (2021).

To summarize, the mediation model proposed in this study has been accepted in holistic terms.

CHAPTER VII

CONCLUSION, IMPLICATIONS, LIMITATIONS, AND SCOPE FOR FUTURE RESEARCH

7.1 CONCLUSION

The present study was attempted with the intention to propose a mediation model, constituting two parallely running, yet independent relationships, one pertaining to neuroticism and cognitive failures, and the other to neuroticism and mind-wandering, with mindfulness contended to mediate both the associations, separately. The findings of the study extend support to this model, i.e., the mediation model has been accepted. Speaking of the neuroticism-mindfulness-cognitive failures camaraderie, the model indicates that trait neuroticism impacts the inherent mindfulness levels of an individual, which partially makes individuals high on neuroticism susceptible to committing cognitive errors. Operating on the same premise, the neuroticism-mindfulness- mind-wandering camaraderie, as is postulated by the model, influences the functioning of the individual in such a way that high neuroticism negatively impacts the inherent mindfulness levels in an individual which eventually results in a conducive situation for increasing incidences of mind-wandering. To conclude, trait neuroticism precludes mindfulness, which ultimately impacts the cognitive functioning of an individual, disposing them to experience cognitive failures and the like more readily.

Furthermore, because dispositional mindfulness has come out as a variable that impacts the frequency of mind-wandering, this study has given a new lens to view the two constructs, in addition, if not opposed, to the emerging trend of treating them as opposite constructs.

7.2 IMPLICATIONS

Smooth cognitive functioning greatly impacts an individual's actions, which are of extreme importance in day to day life, in general also, but specifically under crucial

conditions, such as driving, dealing with sophisticated tasks and instruments at work, dealing with critical patients in a surgery, or battling with enemies on the border, where it becomes extremely critical. And therefore, it becomes vital to understand factors that contribute to cognitive functioning/malfunctioning. The present study has, thus, contributed to the theoretical understanding of cognitive failures by proposing the mediation model, at one level. Furthermore, this theory could likely guide future research that could focus on how the interplay of variables could be put to use to the advantage of human beings; if neuroticism impacts mindfulness levels leading to cognitive failures, then perhaps changes at the level of mindfulness could be incorporated to bring about change in cognitive performance. Set against the backdrop of converging the two fields of mindfulness and mind-wandering, yet another way this study has contributed is by adding to the understanding of the association between the two variables; mindfulness as a disposition could now be seen from the vantage point of a trait that can potentially prevent/reduce mind-wandering.

7.3 LIMITATIONS

While generalizing the results of the study, it is important to know that there were some limitations involved with respect to various aspects. First and foremost, the sample size was small and was collected using non-parametric techniques (convenient and snowballing), as a consequence of which it lacked homogeneity. Owing to the pandemic, the data collection took place with the help of an online platform and thus, lacked the researcher-participant rapport. Additionally, no assumptions can be made regarding the environmental conditions as well as the mental state of the participants while filling the survey forms, which might or might not have contributed to the results. Finally, the entire study is based on typically self-report measures, and thus, efforts must be made to corroborate the results with some observational/experimental outcomes.

7.4 SCOPE FOR FUTURE RESEARCH

There is a vast scope for conducted research in the areas relevant to the present study. Primarily, there is a need to replicate this study with a larger sample size to establish

the reliability of the results. Further, behavioral measures/experimental tasks can be incorporated for a more objective understanding, and also to study the role of mindfulness from a new perspective, as a moderator between neuroticism and cognitive failures, and the like. Finally, while doing the literature review, a need was felt to define various types of cognitive failures, and alongside explore if there are common mechanisms underlying the same, and hence, research efforts could be dedicated to fill in this gap.

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APPENDIX A: The Cognitive Failures Questionnaire (Broadbent, Cooper, FitzGerald & Parkes, 1982)

The following questions are about minor mistakes which everyone makes from time to time, but some of which happen more often than others. We want to know how often these things have happened to your in the past 6 months. Please circle the appropriate number.

	Very often	Quite often	Occasionally	Very rarely	Never
1. Do you read something and find you haven't been thinking about it and must read it again?	4	3	2	1	0
2. Do you find you forget why you went from one part of the house to the other?	4	3	2	1	0
3. Do you fail to notice signposts on the road?	4	3	2	1	0
4. Do you find you confuse right and left when giving directions?	4	3	2	1	0
5. Do you bump into people?	4	3	2	1	0
6. Do you find you forget whether you've turned off a light or a fire or locked the door?	4	3	2	1	0
7. Do you fail to listen to people's names when you are meeting them?	4	3	2	1	0
8. Do you say something and realize afterwards that it might be taken as insulting?	4	3	2	1	0
9. Do you fail to hear people speaking to you when you are doing something else?	4	3	2	1	0
10. Do you lose your temper and	4	3	2	1	0

regret it?					
11. Do you leave important letters unanswered for days?	4	3	2	1	0
12. Do you find you forget which way to turn on a road you know well but rarely use?	4	3	2	1	0
13. Do you fail to see what you want in a supermarket (although it's there)?	4	3	2	1	0
14. Do you find yourself suddenly wondering whether you've used a word correctly?	4	3	2	1	0
15. Do you have trouble making up your mind?	4	3	2	1	0
16. Do you find you forget appointments?	4	3	2	1	0
17. Do you forget where you put something like a newspaper or a book?	4	3	2	1	0
18. Do you find you accidentally throw away the thing you want and keep what you meant to throw away – as in the example of throwing away the matchbox and putting the used match in your pocket?	4	3	2	1	0
19. Do you daydream when you ought to be listening to something?	4	3	2	1	0
20. Do you find you forget people's names?	4	3	2	1	0
21. Do you start doing one thing at home and get distracted into doing something else (unintentionally)?	4	3	2	1	0
22. Do you find you can't quite	4	3	2	1	0

remember something although it's "on the tip of your tongue"?					
23. Do you find you forget what you came to the shops to buy?	4	3	2	1	0
24. Do you drop things?	4	3	2	1	0
25. Do you find you can't think of anything to say?	4	3	2	1	0

APPENDIX B: Eysenck's Personality Inventory (EPI)

The E P I Instructions

Here are some questions regarding the way you behave, feel and act. After each question is a space for answering YES or NO.

Try to decide whether YES or NO represents your usual way of acting or feeling. Then put a tick in the box under the column headed YES or NO. Work quickly, and don't spend too much time over any question, we want your first reaction, not a long drawn-out thought process. The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions.

Start now, work quickly and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence or ability, but simply a measure of the way you behave.

YES NO

1 Do you often long for excitement?

2 Do you often need understanding friends to cheer you up?

3 Are you usually carefree?

4 Do you find it very hard to take no for an answer?

5 Do you stop and think things over before doing anything?

6 If you say you will do something do you always keep your promise, no matter how inconvenient it might be to do so?

7 Do your moods go up and down?

8 Do you generally do and say things quickly without stopping to think?

9 Do you ever feel 'just miserable' for no good reason?

10 Would you do almost anything for a dare?

11 Do you suddenly feel shy when you want to talk to an attractive stranger?

12 Once in a while do you lose your temper and get angry?

13 Do you often do things on the spur of the moment? 14 Do you often worry about things you should have done or said?

15 Generally do you prefer reading to meeting people?

16 Are your feelings rather easily hurt?

17 Do you like going out a lot?

18 Do you occasionally have thoughts and ideas that you would not like other people to know about? 19 Are you sometimes bubbling over with energy and sometimes very sluggish?

20 Do you prefer to have few but special friends?

21 Do you daydream a lot?

22 When people shout at you do you shout back?

23 Are you often troubled about feelings of guilt?

24 Are all your habits good and desirable ones?

25 Can you usually let yourself go and enjoy yourself a lot at a lively party?

26 Would you call yourself tense or ‘highly strung’?

27 Do other people think of you as being very lively?

28 After you have done something important, do you come away feeling you could have done better? 29 Are you mostly quiet when you are with other people?

30 Do you sometimes gossip?

31 Do ideas run through your head so that you cannot sleep?

32 If there is something you want to know about, would you rather look it up in a book than talk to someone about it?

33 Do you get palpitations or thumping in your hear?

34 Do you like the kind of work that you need to pay close attention to?

35 Do you get attacks of shaking or trembling?

36 Would you always declare everything at customs, even if you knew you could never be found out? 37 Do you hate being with a crowd who play jokes on one another?

38 Are you an irritable person?

39 Do you like doing things in which you have to act quickly?

40 Do you worry about awful things that might happen?

41 Are you slow and unhurried in the way you move?

42 Have you ever been late for an appointment or work?

43 Do you have many nightmares?

44 Do you like talking to people so much that you never miss a chance of talking to a stranger?

45 Are you troubled by aches and pains?

46 Would you be very unhappy if you could not see lots of people most of the time?

47 Would you call yourself a nervous person?

48 Of all the people you know, are there some whom you definitely do not like?

49 Would you say that you were fairly self-confident?

50 Are you easily hurt when people find fault with you or your work?

51 Do you find it hard to really enjoy yourself at a lively party?

52 Are you troubled by feelings of inferiority?

53 Can you easily get some life into a dull party?

54 Do you sometimes talk about things you know nothing about?

55 Do you worry about your health?

56 Do you like playing pranks on others?

57 Do you suffer from sleeplessness?

APPENDIX C: Mind-Wandering Questionnaire (MWQ)

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost Never	Very Infrequently	Somewhat infrequently	Somewhat Frequently	Very Frequently	Almost Always

1. I have difficulty maintaining focus on simple or repetitive work.

1 2 3 4 5 6

2. While reading, I find I haven't been thinking about the text and must therefore read it again.

1 2 3 4 5 6

3. I do things without paying full attention.

1 2 3 4 5 6

4. I find myself listening with one ear, thinking about something else at the same time.

1 2 3 4 5 6

5. I mind-wander during lectures or presentations.

1 2 3 4 5 6

APPENDIX D: The Mindful Attention Awareness Scale(MAAS)

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

_____ 1. I could be experiencing some emotion and not be conscious of it until some time later.

_____ 2. I break or spill things because of carelessness, not paying attention, or thinking of something else.

_____ 3. I find it difficult to stay focused on what's happening in the present.

_____ 4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.

_____ 5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.

_____ 6. I forget a person's name almost as soon as I've been told it for the first time.

_____ 7. It seems I am "running on automatic," without much awareness of what I'm doing.

_____ 8. I rush through activities without being really attentive to them.

_____ 9. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.

_____ 10. I do jobs or tasks automatically, without being aware of what I'm doing.

_____ 11. I find myself listening to someone with one ear, doing something else at the same time.

_____ 12. I drive places on 'automatic pilot' and then wonder why I went there.

_____ 13. I find myself preoccupied with the future or the past.

_____ 14. I find myself doing things without paying attention.

_____ 15. I snack without being aware that I'm eating.