Rumination as Interplay between Dispositional Antecedents and Situational Processing: Exploring Self-Regulatory Executive Function (S-REF) Model

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NATIONAL INSTITUTE OF PSYCHOLOGY

Center of Excellence

Quaid-i-Azam University, Islamabad,

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BY

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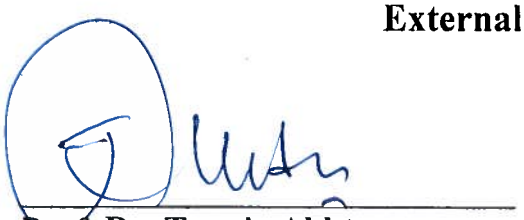

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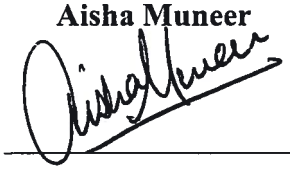
Signature 

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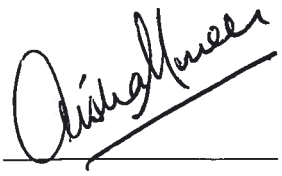
Student / Author's Signature: 

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Abstract

The current study aimed to investigate the longitudinal trajectory of Self-Regulatory Executive Function Model in terms of metacognitive processing. The present study consisted of 4-timewaves measurement with an approximate time interval of four-months. The total participants were N= 514 at Time-1, N= 390 at Time-2, N= 280 at Time-3 and N=230 Time-4, selected purposively. Following the ethical guidelines, the informed consent was obtained, and participants completed a booklet of self-report inventories at each time-wave. The results showed adequate internal consistency coefficient for all measures from Time-1 to Time-4. The correlations on cross-sectional data represented significant associations between study variables that were parallel with previous findings. The Time-2 results indicated differences across demographics and between correlation across Time-1 and Time-2. Whereas linear multiple regression with Time-1 predictors and Time-2 outcome variables suggested significant positive predictive relationship between Control of Intrusive Thoughts (Time-1) and Emotion Oriented Coping (Time-2); Cognitive Self-consciousness, Punishment (time-1) and on Threat (Time-2) and Cognitive Self-consciousness (Time-1) and Loss (Time-2). The Time-3 represented inquiry using repeated measure analysis of variance (RM-ANOVA) majority of the comparisons showed statistically significant differences in cognitive mechanisms within 12-months period e.g., Positive Beliefs about Worry, Negative Beliefs about Worry, Cognitive Confidence, , Control of Intrusive Thoughts, Cognitive Self-consciousness, Positive Beliefs about Rumination, Worry, Punishment, Reappraisal, Emotion Oriented Coping, Avoidance Oriented Coping and Metaworry with medium effects sizes for Negative Beliefs about Worry and Negative Beliefs about Rumination while small but significant effects for the remaining metacognitive variables. The Time-4 results were based on the latent growth curve model

(LGCM) that further explained the previous time-waves results through piecewise and quadratic growth models. LGCM for piecewise reflected phases of growth that depicted different slopes of growth factor within all time-waves results. The Metacognitive variables, Positive and Negative Beliefs about Rumination, Emotion and Avoidance oriented coping showed significant random variations from Time-1 to 2 with initial escalating trends for slopes in metacognitive self-regulation and in Time-3 to Time-4 a nonsignificant trend was observed. This suggested that individuals with greater values at time-3 tend to have lower scores or decline in time-4. Situational appraisal variables e.g., Threat, Loss and Anxious thoughts (Metaworry) showed nonsignificant variances depicting stability of cognitive challenges across time. The findings reflect meaningful metacognitive, thought control and beliefs about rumination inconsistencies across time, while consistent pattern of cognitive challenges in form of threat, loss and metaworry suggesting evidence for self-regulation processing with executive cognitive functioning.

Chapter 1

INTRODUCTION

Daily experiences contribute to cognitive impressions that often hold potential challenges for mental and physical wellbeing. Compared to major negative events, continuously stressful or demanding life situations are negatively associated with wellbeing (Armstrong, Galligan, & Critchley, 2011). Empirical research investigations have shown that an accumulation of unresolved daily problems may result in adverse effects to cognitive functioning (Armstrong, Galligan, & Critchley, 2011; Wells & Matthews, 1996). Stress cannot be eliminated completely (Selye, 2013) therefore psychological consequences are likely. Some extensively studied outcomes of everyday life stress include psychological e.g., depression, anxiety (Patki, Solanki, Atrooz, Allam, & Salim, 2013) and cognitive disruptions e.g., intrusive thoughts and rumination.

The cognitive disruptions are generally attributed to self-regulatory issues. Previous research inquiry has drawn common themes, marking off distinct areas in conjunction with psychological disorders due to self-regulatory failures. Some of these findings emerged as cognitive vulnerabilities, while others focused on the processes engaged in intensifying or maintaining dysfunctional episodes with added emphasis on psychological disorders (Patki et al., 2013). These attempts were suggestive of self-regulation in maintaining cognitive-emotion nexus for emotional homeostasis.

Rumination as a Paradigm

Commonly, all humans tend to mentally-rehearse or ruminate events of the past. Additionally, these thoughts have a tendency to turn more negative and brooding

taking the form of rumination (Schoofs, Hermans, & Raes, 2010). Rumination in general and brooding in particular are linked with less proactive behaviors and supplement negative affect. A lack of action oriented approach in times of challenge may lead to emotional coping (Latha & Hanumanth, 2006). Thinking repeatedly about the same experience from different perspectives indicates a cognitive self-regulatory attempt, pondering what should and could be done under the circumstances. An absence of corresponding action is likely to shape the episode with more stress and psychological outcomes e.g., negative mental set, self-sabotage and hypertension etc., (Latha & Hanumanth, 2006). Shechner et al. (2012) have depicted these associations with the symptoms of depression and anxiety in both adolescents and adults. These are further suggestive of disruptions in cognitive-emotion self-regulation. Thus, rumination must be addressed from self-regulatory viewpoint to enable better understanding of cognitive-emotional self-regulation.

Theoretical Models of Rumination

Despite literature supporting rumination vigorously, there is no unified definition of rumination, for measuring the construct. The conceptualization of rumination in all the theoretical models proposed, have different contextual relevance indicating that rumination involves environmental relevance for cognitive processing.

In a broader sense, Verkuil et al (2011) aptly explains rumination as a type of preservative cognition that includes psychological processes such as worry. Likewise, Watkins (2009) stated that rumination may either be detrimental or beneficial psychological process at times when it is specific, concrete, and process-focused. In addition, Sullivan et al., (2005) explains that rumination may be a distinct dimension of catastrophic thinking and uniquely described it as a process of impaired

disengagement. Which signifies that, prolonged processing of self-referent material is due to an impairment in the ability to disengage one's attention (Koster, De Lissnyder, Derakshan, & De Raedt, 2011). Finally, rumination has been shown to exist as a trait or state psychological feature (Watkins, 2009). An overview of different models of rumination is provided with respect to several important dimensions that will indicate the ruminative context (Smith & Alloy, 2009).

Model	**Context**	**Conceptualization**
Rumination on Sadness (Conway, Csank, Holm, & Blake, 2000)	Cognitive Vulnerability to Depression	Repetitive thinking concerning present distress and the settings surrounding the sadness
Stress Reactive Rumination (Alloy et al., 2000)	Cognitive Vulnerability to Depression	Rumination on negative implications associated with stressful life events
Post-Event Rumination (Clark & Wells, 1995)	Cognitive Models of Social Phobia	Continued processing of (a "postmortem"), or brooding about, a social interaction
Goal-Progress (Martin & Tesser, 1996)	Self-Regulation	Repetitive thoughts about goal discrepancy
Self-Regulatory Executive Function Model (Wells & Matthews, 1996)	Self-Regulation	A generic process in response to a incongruity between actual and desired status, a subset of worry

Model	Context	Conceptualization
Conceptual-evaluative & Experiential (E. Watkins, 2004)	Self-focus, Teasdale's Interacting Cognitive Subsystems framework	Evaluative Self-focus (analytical, evaluative, thinking about self, focusing on discrepancies between current and desired outcomes)
Multi-dimensional (Fritz, 1999)	Trauma, health psychology	3 subtypes of rumination following trauma: (1) instrumental (2) emotion-focused and (3) searching for meaning
Rumination & Self-Regulation (Kelley, Beckman, & Fischer, 1967)	Self-Regulation & stress	Rumination as volitional component that interferes with successful self-regulation in response to stress
Cognitive Emotion Regulation Questionnaire (Garnefski, Kraaij, & Spinhoven, 2001)	Cognitive Emotion Regulation	Rumination is a coping strategy used to regulate emotions in response to stressors

Adapted from Smith and Alloy (2009).

The most worked upon theory of rumination is that of Response Style Theory (RST) by Nolen-Hoeksema (1991). The RST rumination is signified by a pattern of repeated thinking about the causes, effects and symptoms of ones' negative affect. This is the most widely used and empirically reinforced conceptual model of rumination, some aspects such as the distraction component have received varied

support (Nolen-Hoeksema & Morrow, 1991; Smith & Alloy, 2009). One area of criticism for RST is its' commonality with the Beck Depression Inventory, worry, and overlap with positive forms of repetitive thought as a reflection. The RST also lacks in addressing or reporting how rumination fits in with other biological or cognitive processes like attention or metacognitive beliefs.

Another model that expresses rumination as repetitive thinking about the sadness, and the conditions of ones' sadness (Conway et al., 2000). This model is useful since the construct of rumination is self-contained and parsimonious in predicting sadness. Nevertheless, it is unclear how well it specifies rumination just in response to sadness and whether it is suitable in the prediction of depression or another psychopathology.

Stress Reactive model is considered as a useful adjunct to the RST rumination because of its' consideration of negative, event-related inferences that occur after the experience of a stressful event (Alloy et al., 2000). An important variance between the stress reactive model and RST is that, despite being highly parallel the stress reactive model captures ruminative phenomena before the presence of negative affect (Skitch & Abela, 2008). Post- event model arose from the literature of social phobia and proposes that rumination arises in response to social interactions. Though it provides an understanding of the processes underlying the social anxiety yet it is unclear if it is specific to social phobia, or it may help in evaluating some of the overlap in thought processes characterized by both anxiety and depression. Consequently, the measure of post event processing requires continued testing to determine their relative utility in assessing this construct (Smith & Alloy, 2009).

Martin, Tesser, and McIntosh (1993) presented a distinctive view of observing rumination e.g., response to failure to progress satisfactorily towards a goal. The goal

progress theory proposes that rumination and depression are both propelled by the failure experiences. However, studies have demonstrated the stable presence of rumination in the absence of current or perceived failure (Nolen-Hoeksema & Morrow, 1991; Spasojević & Alloy, 2001). The measure of rumination in this model presents aspects of cognition, metacognitions about rumination (is it distracting or distressing), and motivation.

The present study employs altruistic definition of the rumination process and extend it as a universal process rather than a confined practice of a specific population. We have therefore, used a combination of approaches to explain how rumination cycles affects the self-regulation. Martin and Tesser (1996) definition for rumination where rumination results due to a discrepancy between desired and actual status is an optimum match for the intended objectives of the present study. "Rumination revolves around a common instrumental theme that recur in the absence of immediate environmental demands requiring the thoughts (Martin & Tesser, 1996)". The essence of this model lies in the activation of rumination when goal progress rate does not match to what was intended or expected by the individual. Consequently, taking the above understanding and fitting it in the self-regulatory executive function (S-REF) model we assume the rumination cycle to follow a goal-oriented scope.

Antecedents of Rumination. Previously, the main focus of researches in rumination has been on the antecedents, meaning and outcomes. Literature indicates evidences of gender differences in one of the outcomes of rumination e.g., depression. According to Nolen-Hoeksema (1991), it is in terms of the genders' typical way of responding to demanding situations. . The ruminative response style has been shown to impact adversely on severity and recurrence of depressive episodes, regardless of

the cause of depression. According to the Response Style Theory (RST) approach to rumination, Nolen-Hoeksema (1991) emphasizes its passive nature that makes an individual indulge into an emotion focused percept, divorcing from active problem solving mode. The author further conceptualized rumination as a stable characteristic, in terms of response style suggesting women to be more active participants of this process. This attribute may be the cause for the inflated rate of depression in women (Johnson & Whisman, 2013; Nolen-Hoeksema, Larson, & Grayson, 1999; Ussher, 2010). Empirical confirmations also have supported RST's link with the duration and severity of depression symptoms (Andersen & Limpert, 2001). Some common characteristics of ruminators include resistance to *activation oriented rationales* (Addis & Carpenter, 1999). They are found to be indulged in self-concentrated attention and negative affect (Mor & Winquist, 2002). These characteristics are based on a combination of factors for example, worry, fixation and threat hence assuming a high relativity with negative thoughts.

Rumination in Normal Individuals

A noticeable cavity in rumination research literature is the lack of inquiry on S-REF rumination model. To the best of the authors' knowledge scarce research attempts have explored the S-REF rumination in nonclinical population longitudinally. Based on the self-regulatory executive function model, we argue that rumination is universally practiced and is a vulnerability to depression and/or anxiety, while being a contributor to the maintenance and duration therefore, a thorough examination is an absolute necessity (Teasdale & Green, 2004; Thayer, Rossy, Ruiz-Padial, & Johnsen, 2003; Vickers & Vogeltanz-Holm, 2003). This will help in

delineating how this vulnerability affects the healthy minds as well as the cognitive processing in interaction with natural occurrences of challenging situations.

Wells and Papageorgiou (1995) conducted an examination of anxious and depressive thoughts on college sample (19 men and 35 women). The participants were asked to note their thoughts for two weeks on a diary specially designed for recording duration and content of thoughts. The subsequent findings showed that all participants had at least one depressive and anxious thought in the given period while 83.3% showed more than one thought. It may be extravagant to infer entirely based on these results, but these findings do suggest directions about rumination being a universal phenomenon.

A more recent exploration of rumination was carried out (Pearson, Brewin, Rhodes, & McCarron, 2008) on a clinical sample (6 men, and 16 women) receiving or waiting treatment at community mental health clinic. The results showed that 21 out of 22 participants reported to be ruminating at least once or twice daily suggestive of frequency differences between normal and clinical sample though these may not be a definite measure of the frequency comparison, the same study can be compared in terms of the duration of a ruminative episode.

Severity and controllability. The content of rumination oscillates between the themes of the past, personal loss and or failure. The depressive content is found to be less verbal however both anxious and depressive thoughts lack significant differences with respect to present and future orientation (Papageorgiou & Wells, 1999). The extent to which a goal or desired state is blocked, the appraisals or the affects (positive beliefs) during the movement towards goal and the threats or negative beliefs when being hindered from the goal attainment also play key determinants of the content of ruminative cycle (Martin & Tesser, 1996). The authors

suggest ruminative thoughts to be “unintended and difficult to eliminate”, (p.1). In the study above, the students reported a considerable ease in letting go the depressive thoughts through distraction than an anxious one, however statistically this was not significant (Martin & Tesser, 1996). The severity and the controllability of ruminative thoughts is more a matter of how the individuals characterize the process for example, as a self-characteristic or an ego- dystonic, invasive cognitive process.

Rumination and Associated Cognitive Traits

Rumination operates on cognitive processes within the multilevel architecture of the S-REF model. The activation of lower levels- where most functioning works on voluntary attention, lends to provoke the cognitive attentional bias. This is a voluntary control of cognition that engages knowledge and self-beliefs while fetching emotional contents through retrieved thoughts. The total cycle is a complex cognitive activity that involves reflexively driven cognitive processes. Given below are some of the utmost significant cognitive traits associated with rumination.

Negative thinking. Researchers have identified rumination to be a stable characteristic (Bagby, Rector, Bacchiochi, & McBride, 2004) strongly associated with increased negative thinking. Negative thoughts explored in researches that have been found to be correlating with rumination include “negative inferential or attribution styles (Lyubomirsky & Nolen-Hoeksema, 1995), hopelessness (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008), neuroticism (Hervas & Vazquez, 2011), dysfunctional attitudes, neediness, dependency, sociotropy, low mastery, self- criticism and pessimism”, (Nolan- Hoeksema & Lyumbomirsky, 2008). Experimental studies have shown that clinical and dysphoric tendencies in rumination exhibit an amplified version of negative thoughts involving themes from the past, current and future events

(Nolen-Hoeksema et al., 2008). Lyubomirsky, Tucker, Caldwell, and Berg (1999) also found that dysphoric ruminators showed increased negativity, self- criticism and self- blame. They also show less confidence in problem solving abilities, diminished perception of successes and over generalizing features of failures. The cognitive distortions further lower the expected prospects of positive events (Lyubomirsky & Nolen-Hoeksema, 1995) and even less involvement in fun.

Attention bias. Attentional bias occurs when the focus of cognitive function revolves around single theme of thought. The attention, and other executive functions restrict their processing in finding cues to support the bias, selectively ignoring additional information associated with the theme. Attentional bias encourages devoting all cognitive executive functions to those specific details we attribute as to be planning a contributory role in the reasons for distance between us and a desired goal (we will use metacognitive processing or goal interchangeably to depict the state of stress due to discrepancy between desired and actual state). According to research findings (Wenzlaff, Rude, Taylor, Stultz, & Sweatt, 2001) when dysphoric and nondysphoric patients were asked to identify words, out of a letter grid which held both “positive, negative and neutral” words in equal numbers. The dysphoric participants identified more negative words and before they identified the positive ones as compared to the nondysphoric participants, which lend support to the attention bias in the context of depression. In clinical samples, attention bias has been found to magnify failure importance, diminish sense of achievement and greater negative information recall. At this juncture, certain aspects form the foundations for the present study. For example, how cognitive mechanisms function in nonclinical population facing stress or goal discrepancy. Additionally, whether these mechanisms

bias the executive functions and or their operations or are enough to push them into any limits of emotional dysfunctional.

Cognitive inflexibility. Cognitive inflexibility refers to the focus of cognitive processes on specific themes of information in the environment relevant to the stressors or challenges at hand. The cognitive functions are regulated to attend to those narrowed details that serve to fit the subjective puzzle of the subjective goals. Ruminators are found to be low in cognitive flexibility and find it difficult with set shifting (Lyubomirsky & Tkach, 2004). Rumination follows a dysphoric trend where cognitive inflexibility can be seen in terms of self-focus cognitive discrimination that may result into poor performance (Daches, Mor, & Hertel, 2015), concentration power deficits on academic tasks and planning deficits (Kertz, Belden, Tillman, & Luby, 2016).

According to the S-REF model for clinical disorders (Wells & Matthews, 1996) and the metacognitive model of PTSD (Wells, Walton, Lovell, & Proctor, 2015), an effective processing of emotional trauma can only be accomplished by revising and replacing the maladaptive self-knowledge and inappropriate strategies of thought control. This highlights the constricted attention-play, in exploring all associated aspects with an emotional challenge. Normally this process is triggered by invasive symptoms of stress, which in the present study is conceptualized as goal discrepancy. The symptoms are automatically activated and end with the development of an adaptation plan that pilots cognition and action in future meetings with threats. Due to its spontaneous and automatic nature, it is called reflexive process of adjustment (RAP).

Cognitive Avoidance. The concept of cognitive avoidance was extended to rumination by Watkins and Moulds (2013) – a construct of rumination that enables

ruminators to present a more abstract explanation of problems than non- ruminators. In a comparative study between depressive and never depressed controlled, cognitive avoidance signifies a lack in concreteness and self- focus on problems, subsequently serving a cognitive avoidance function. In another investigation (Moulds, Kandris, Starr, & Wong, 2007) among rumination and avoidance, significant positive association were found among rumination, avoidance and depression even after controlling for anxiety.

Intolerance of uncertainty. Several researches have allied the relationship of excessive worry with intolerance of uncertainty in both clinical and non-clinical samples (Shechner et al., 2012; Hervas & Vazquez, 2011; Dugas, Buhr, & Ladouceur, 2004). The authors maintain that increased fear of anxiety in combination with an intolerance for uncertainty led to the highest levels of worry, proposing that these constructs have an additive effect on worry. Other findings indicate intolerance of uncertainty to associate with the tendency to make threatening interpretations of ambiguous situations. This was found to be highly related to intolerance of uncertainty compared to worry, anxiety, or depression. These results also advocate that intolerance of uncertainty is associated with information processing biases that may be involved in the etiology of excessive worry and GAD (Dugas, 2005).

Positive beliefs about worry. Positive beliefs about worry are more of a coping strategy employed by the ruminators. The beliefs are positive in valence such that rumination is seemed as a practice that helps in delineating problems, gaining insights, and aids in preventing future mistakes (Papageorgiou & Wells, 2001). The underlying perception in positive beliefs about worry is to avoid mistakes in future and prioritize task on their importance level.

Negative beliefs about worry. The main theme behind negative beliefs about worry can be highlighted by the uncontrollability of thoughts on impending harm, interpersonal and social aftermaths (Papageorgiou & Wells, 2001). Some studies have shown the problematic nature of negative beliefs about worry through elevated feelings of depression and negativity, being less constructive and waste time, an increase in unrealistic and negative thinking as well as elevated social withdrawal (Watkins & Baracaia, 2001).

Self-Regulation

Since 1980s, a large body of research has been dedicated to self-regulation. The research endeavors on self-regulation were mainly in the domain of personality and social psychology. A decade later the concept extended including self-management, self-regulated learning and self-control. This furthered publications with related yet different labels in various areas of psychology. As humans our most distinct feature is our metacognitive capacity to regulate ourselves.

Definition. Self-regulation is the ability to monitor and modulate cognition, emotion and behavior, to accomplish goals and or to adapt to the cognitive and social demands of situations (Aldao, Sheppes, & Gross, 2015). Self-regulation is a triadic interaction between person (Bandura, 1986), behavior and environment. It involves behavioral expertise in self-managing ecological contingencies and the awareness of executing behaviors in their relevant contexts. The definition of self-regulation varies with respect to it's setting however, the cyclic nature of the process may be universal in one's struggle towards goal attainment (Hofmann, Schmeichel, & Baddeley, 2012). Accordingly, the beliefs, motives or covert processes interacting with the action or overt responses represent the totality of self-regulatory mechanism. Some important

aspects to consider in self-regulation are self-beliefs and affective responses. For example, one's perceived self-efficacy explains the diversity in individual motivation (Tabernero & Hernández, 2011) in self-regulating performances.

The cyclic nature of self-regulation is attributed to prior experiences of similar occurrences that help in adjusting the present efforts. The adjustment and updated feedbacks are essential in adapting to the ever-changing world around us. Self-regulation occurs as a function of three major domains using three types of self-oriented monitoring. The covert self-regulation processes examines and adapts affective and cognitive states (Vohs & Baumeister, 2016) parallel to that, behavioral self-regulation involves a strategic adjustment of performance or goal specific behavior and finally, environmental adjustments in terms of conditions and outcome signifies environmental self-regulation.

Self-Regulatory system configurations. Research evidences (Winne, 2014) show that self-regulation is a universal practice by all individuals in an attempt to reach goals and gain self-control. The individual difference lies in the magnitude and quality of self-regulatory processes. More recently, research inquiry has been with reference to self-regulatory dysfunctions (Pychyl & Flett, 2012), self-control in demanding task performances (Heatherton & Wagner, 2011). A scarcity of research prevails in identifying structural interrelation and how this cyclical process is sustained. Self-regulative approaches are purposive, private processes (Carver & Scheier, 2012a) and these measures are directed at goal targets (Wrosch, 2011). Self-regulatory attempts are vital for survival, the complex self-regulatory mechanics enable individuals by providing to cognitive resources, managing emotions to make choices of coping strategies (Sheppes, Scheibe, Suri, & Gross, 2011) and monitor their progress and alter when the goals are not met.

The choice of coping strategies is dependent on a feedback loop between self-knowledge/beliefs and current situational processing (Wells, 2002). Similarly, self-regulation works as a function of changes in behavioral, personal and environmental shifts. Self-regulatory strategy requires situation-monitoring to identify the need in changing plan of coping when the need arises. No single self-regulatory approach does well for all individuals; few, if any, self-regulatory plans will work best on all tasks or instances.

There is a diversity of consequences associate with failures in self-regulation, lower self-regulatory proficiency give rise to a variety of personal problems (Vohs & Baumeister, 2016). For example, poor or improper diet and failure to comply with drug regime can severely affect lives. According to Zimmerman, Bonner, Evans, and Mellins (1999) low levels of self-regulation in chronic asthma present higher levels of indication of disease, poorer quality of life, and more frequency of hospitalization. A pertinent cause of bulimia, binge eating and anorexia is also explained in terms of failures of weight self-regulation, most commonly found in girls (Johnson, Pratt, & Wardle, 2012).

Similarly, a major reason of injury, sickness, and death among young is their dysfunctional self-regulation imposing a range of dangerous behaviors e.g., drugs, drinking alcohol and driving with excessive speed. Lower impulse control and detached moral self-regulatory values have been found to associate with aggression, misbehavior incidents and crime (Shelton, Barta, & Anderson, 2016). The self-regulatory harms stem from ingrained self-beliefs, behavior, and lifestyles (Prochaska, DiClemente, & Norcross, 1992).

Dysfunctional Self-Regulation

A social cognitive explanation of dysfunctional self-regulation indicates ineffective planning and control of behaviors (Bandura, 1991). Typically, poor self-regulation depends on reactive techniques of coping with unsuccessful consequences of events. They potentially indicate a lack in goal configuration, strategic preparation, and sense of personal agency for consistent progress. For example, individuals with depression display a misperception of personal accomplishments, or a distorted memoires of achievements and self-defeating bias (Bandura, 1991). On the other hand nondepressed individuals recall less failure (Nolen-Hoeksema & Morrow, 1993) than actually experienced and are more vigilant to their successes. Thus cognitive, emotional, and motivational antecedents may lead to a range of self-regulatory dysfunctions.

Behavior as Goal Directed and Feedback Controlled

The goal directed behavior is dependent on feedback loop between cognitive processing elements and situation appraisals. Consequent upon this feedback, it performs further functions of monitoring and altering existing behaviors in pursuit of goal. The feedback loop is a component of cybernetic control, consisting of a scheme of elements (Scheier & Carver, 2014). This scheme of elements comprises of an input or sensor function e.g., perception; a significant reference e.g., goal; and a comparator e.g., a mechanism that compares the input and reference value.

The comparison may yield two outcomes, either the estimated versus real efforts for goal are discrepant for it's achievement or they may be adequate efforts. Subsequently, after goal discrepancy evaluation, an output function is performed in form of behavior that can be implicit or explicit. In discrepancy-reduction times feedback loop consequent functions to minimize the detected inconsistencies between

sensory input and goal reference-value to yield conformity. The behavior occurs as a service to create the conformity of input to significant reference; sometimes external changes may create conformity without behavioral advances.

Another condition where a positive or discrepancy-enlarging loop is active i.e., a situation where discrepancy is in terms of *beyond personal resources*. The significant reaction is not to advance, but to avoid the occurrence as anti-goal. For example, avoiding traffic tickets, public embarrassment, and being fired from job. A positive loop reasons current conditions, evaluates them to be anti-goal, and strives to magnify the discrepancy. Thus, the goal now becomes one of avoidance. An avoidance loop generates pressure to enlarge distance from anti-goal. The progression away from anti-goal occurs till the tendency to shift is empowered by an approach loop.

Feedback Loop and Affect

Emotions are an eminent facet of self-regulation, occurring as an output of a feedback process (Carver & Scheier, 2012b). The affect guides behavior for reaching goals or reducing discrepancies. The information received for feedback loop is an account of the pace of discrepancy decline in action behavior scheme over time. A reference of goal is set as a standard that serves as a check for evaluation of divergence from the standards for feedback loops. If a deviation from standard is identified, the consequent behavior function alters to approximate towards goal progress.

An excessively slow approach towards the goal often raises negative affect, consequently self-regulation system responds upon identifying this deficiency in progress and responds by adding extra efforts in action behaviors. Similarly, if the

goal oriented approach is faster than required, this causes the self-regulatory system to signal a slowdown in order to match a perfect set point. Melton (1995) found that in good mood people performed worse concluding that in good moods people spent less efforts. In the context of emotional self-regulation positive affect results once a behavioral system is making brisk progress in doing what it was organized for, i.e., to diminish discrepancies. Likewise, the same applies when the goal is to enlarge the discrepancy, however if the system is unable to meet the desired purpose the outcome is expected to be negative affect.

Self- Regulation in Cognitive-Social Framework

Self-regulation architecture includes processes that contribute to various psychological syndromes e.g., cognitive attentional bias (Cisler & Koster, 2010). During an encounter with a demanding situation the situational appraisal activate for immediate behavior reaction search and choice of coping (Folkman, 2013). The appraisal involves a primary and secondary function. Initially, relevance between external event and self is evaluated. Next, the personal competence is weighed and lastly, thoughts (metacognitive thoughts) and emotions are attached to give value to the experience. The resulting coping on the other hand, may be explicit or implicit. The implicit coping reflects an internalized emotion-focused response, while explicit coping is more task-oriented in nature.

According to the self-regulatory executive function model, psychological syndrome of worry unites a unique combination of appraisal and coping. The worry state initiates a self-regulation process that triggers the metacognitive mechanism and appraisal of negative intrusive thoughts coping implicitly with perseverative rumination (Wells & Matthews, 1996).

Cognitive Traits and Self-Regulation

Underlying knowledge or beliefs play an important role in explaining cognitive-social model of personality. In the perspective of coping, the coping strategy itself depicts an individual underneath personal competency in dealing with the problem at hand (Maddux & Kleiman, 2012). Previously, literature emphasized more on two types of coping strategies, namely task focused and emotion focused coping. Endler and Parker (1994) proposed a third type i.e. avoidance oriented coping to highlight the type of coping that prevents psychological damage by evading the cause of stressor. The avoidance coping strategy is mostly active when goal discrepancy is defined by a sheer lack of resources for a situational intervention.

According to Endler and Parker (1994) avoidance oriented coping relates to wishful thinking and self-criticism. The self-regulatory theory suggests that palliative coping gives temporary relief from stress ruminative self-criticism and self-reflection, modifying self-knowledge due to its repetitive nature. Further, a self-destruction strategy is employed whereby engaging in other activities one attempts to distract stress or remains in stress symptom denial. The ruminators may often get engage in repetitive thought process about goal discrepant situation believing that it helps them cope and provide solutions; however, the research evidences show divergent results (Wells & Matthews, 2014). Moreover, the course of rumination serves as a block in accessing the self-knowledge or objects and reaching self-transformation (Bahrami, Kasaei, & Zamani, 2012).

Self- Regulatory Executive Function (S-REF) Model

The current research explores the longitudinal trajectory of self-regulatory executive function model of rumination in terms of metacognitive processing. The self-regulatory executive function (S-REF) model, originally proposed by Wells and Mathews (1996) explains emotional dysfunction via ruminative coping by describing it precisely within a multilevel model of self-regulation. More specifically, the S-REF model defines rumination as monotonous thoughts produced by efforts to cope with self-discrepancy that are focused primarily toward processing the content of self-referent information and not toward immediate goal-directed action (Matthews & Wells, 2004). That is, ruminators tend to focus on their emotions as opposed to problem solving.

Metacognition is an imperative part of the S-REF model and aids to explain the link between rumination and depression (Papageorgiou & Wells, 2004). Precisely, those who carry positive metacognitive beliefs about the benefits of rumination (e.g., "I need to ruminate about the bad things that have happened in the past to make sense of them (Papageorgiou & Wells, 2001)", are perhaps driven to engage perseveratively in rumination. Once engagement in rumination occurs, the negative metacognitive beliefs about rumination are likely to be stimulated (Papageorgiou & Wells, 2003). The ruminators often perceive it as uncontrollable, (e.g., "Ruminating means I'm out of control"), unpleasant and socially damaging (Papageorgiou & Wells, 2001). The negative metacognitive beliefs then contribute to the development and conservation of depression (Papageorgiou & Wells, 2003).

Extensive empirical research on the effects of rumination, or the predisposition to self-reflect, shows that negative form of rumination e.g., that is connected with dysphoria, interferes with the ability to focus on solving problem and

results in brooding on negative thoughts about past failures (Lyubomirsky, Kasri, & Zehm, 2003). Indication from studies advocates that the negative consequences of rumination are due to cognitive biases e.g., memory and attentional biases, that predispose ruminators to selective attention towards negative stimuli (Joormann, Dkane & Gotlib, 2006).

The inclination to ruminate negatively is stable over time and serves as significant risk factor for clinical depression. Not only are habitual ruminators more likely to become depressed, but experimental studies have demonstrated that people who are induced to ruminate experience greater depressed mood (Nolen-Hoeksema & Morrow, 1993) There is also evidence that rumination is linked to general anxiety, post traumatic stress, binge drinking, eating disorders, and self-injurious behavior (Nolen-Hoeksema, Wisco & Lyubomirsky, 2008). Ruminating about problems was assumed to be a type of *memory rehearsal* which was believed to actually lengthen the depression. The recent evidence suggests that although rumination lends to depression, it is not essentially associated with the length of symptoms (Nolen-Hoeksema, Wisco & Lyubomirsky, 2008).

The S-REF, theory of rumination rests on multi-architecture of three levels i.e., lower level processing networks, supervisory executive function and self-knowledge (Wells & Matthews, 1996). All levels support an information processing function gathered from incoming stimuli. Some of these levels are operating automatically while others happen to be dependent upon the conclusion drawn at a previous level. Nevertheless, all end up contributing to the larger process of rumination. The lower level networks activate automatically upon receiving a triggering stimulus. This stimulus is based on several information like, *coding of stimuli, internal cognitive state and or of somatic states*. The processing that takes

place at lower levels has a somatic and associative nature. Thus generating positive automatic thoughts as interpretations of incoming information and responsible for interfering into the conscious levels for no apparent cause (Beck, Emery, & Greenberg, 1985). We also argue that positive nature of the thoughts may also be responsible for rumination giving an inclined direction to the thinking process, yet initiating rumination with a different valence of content of thoughts.

Once significantly triggering stimuli are encoded and appraised, their intrusion is identified and the supervisory executive functions are activated- which aims at reducing the discrepancy between the current and desired status. According to Wells and Matthews (2014) the discrepancy computed by the executive functions is responsible for a search for coping provision. Based on situational needs a strategy is employed, implemented and monitored. Until when the episode of discrepancy is resolved the level of control shifts dynamically between the executive functions and lower level networks. The biasing of lower level network while modifying the internal representation precedes this dynamic exchange of control. The feedback that emerges is emotion focused in nature and it also modifies the internal representation.

In case of a problem focused feedback the coping strategy that is initiated is directed to alter the external causes (Wells & Matthews, 1996). The appraisals of invoking events and coping processes tend to generate emotions that gives a meaning to the encounter and the individual. The third level comes into play at this point as the above processing depends on the self-knowledge level, the self-referent knowledge provides a frame of reference for compiling current target status. The self-knowledge is additionally linked with the main action frame of rumination by a feedback loop. This loop suggests that information travels back and forth between the supervisory executive functions to the self-knowledge levels. Further, it provides the knowledge

of beliefs and plans which are updated by the SE and SR, until an appropriate strategy for coping with the discrepancy at hand is chosen.

Given an experience is appraised as discomforting or stressful, the lower level automatic sensory information processing initiates its functions and a mental processing machinery initiates such that, the event related information is processed and forwarded to the executive mental faculties i.e., supervisory executive. The supervisory executive functions appraise the external event and internal symptoms caused by the cognitive processing. The executive mental functions begin operating and activate the metacognitions to produce a cognitive attentional state. The cognitive attentional state is a condition where the mental processes approximate intricate attentional focus onto the threat or dejection provoking aspects of the events. This over emphasized attention directed to specific clues within the events promote a bias in the attention process called attention bias. Each time a new clue, relevant to the challenging event is identified, a recurring thought processes strike and a reminder triggers a mental repetition of the situation coupled with positive or negative beliefs. In case of positive beliefs, the individual is likely to promote the above cycle as helpful and insightful to the challenge at hand.

The negative beliefs signify the uncontrollability of the harm for the particular challenging situation. Therefore, the components of threat and metacognition interact with dispositions of the individual enabling the decision about coping strategy. Currently it is presumed, as the literature indicates that in nonclinical sample the emotion-focused coping is most likely to be positively associated with positive beliefs about rumination. Also, in line with the literature the situational processing is likely to be inflated in terms of emotion focused coping in case of a situational discrepancy depicted operationally by the threat appraisal and emotion focused coping which is

likely to predict and adverse effect on well-being. The probability and type of coping selected depends on keeping in view the nature of events, personal factors, locus of control, past experiences etc.

Of importance at this point is the role of metacognition in executive control. According to Wells (2002), after the activation of self-regulatory executive functions by internally generated intrusions, the approvals or coping are influenced by metacognitive beliefs that specify personal significance and coping implication of thoughts and regulation (Brown, Bransford, Ferrara, & Campione, 1983). The self-knowledge is the key in shaping and controlling the metacognitive beliefs, whereas metacognitive beliefs specify rumination as a coping and self-regulation strategy.

Metacognitive beliefs act both on the implicit level- where they guide and regulate the processing of self and on explicit level- where they (metacognitive beliefs) can be expressed in terms of verbal report e.g., “ruminating about the past helps me to prevent future mistakes and failures”, (Papageorgiou & Wells, 2001). It must be mentioned, however that rumination in SREF is not always initiated volitionally but the lower levels may also provide initial impetus by a detection of discrepancy between self and goal, which refreshes continuous processing need. The selection of an emotion focused coping as compared to more practically healthy and problem focused choice is due to the SK providing information which is based on one’s implicit cognition frame of events. The metacognitive beliefs tend to exaggerate the implications of information at hand thus biasing the control strategies that serve to last the maladaptive cognitions (Wells & Matthews, 1996).

Metacognitions

Flavell (1976) used the word "metacognition", describing in these words, Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the learning-relevant properties of information or data. For example, I am engaging in metacognition if I notice that I am having more trouble learning A than B or if it strikes me that I should double check C before accepting it as fact.

Metacognitions (Flavell, 1979) develop early in life, following an extended development over time becoming more explicit, more intense and efficient as it operates more and more under ones' conscious control. It is seen to reflect in the progression of development from mental functions into complex meta- knowing capabilities. Over sometime research on children's understanding of mind has highlighted important information regarding early forms of metacognitions. As research indicates, children gain some levels of awareness of selves and others by the age three. As knowers they are able to differentiate between perception of an object and thinking about it using verbs like "think" and "know" (Flavell, 1999). Further next came to understand that other behaviors may be guided by beliefs and desires which can be different from their own. This serves as a milestone as it connects assertions and their source of generation in the knower.

There are some early metacognitive foundations leading to higher order thinking, which emerges later. The understanding knowledge, as a result of thinking is a critical step in developing an epistemological thinking i.e., since metacognition is an implicit theory of how things are familiarized with and known (Hofer & Pintrich, 1997). The scientific thinking is also another kind of higher order thinking the roots of which lie in the early metacognitions achievements (Kragler & Martin, 2009) when

already existing knowledge is coordinated with new findings and evidences, new knowledge is acquired in high deliberation, governed by rules and thus metacognitive control process.

Another important aspect of metacognition that must be considered is the question whether there are types of metacognitions? That can be addressed in terms of declarative, procedural and conditional knowledge. If these knowing are distinct so can the meta-level operations on them be. Declarative knowledge signifies what one knows as about one's self and what effects their performance. This indicates involvement of memory, since knowledge is stored in memory for later references as well as for retrieval in case of any situational demands.

Procedural knowledge refers to knowing the ways in which any task or skill may be executed, according to Stanovich (1990) a high degree of this knowledge is indicative of more automatic use of skills, strategically effective sequencing (Pressley, Borkwski, & Schneider, 1989) and use of diverse strategies qualitatively towards problem solving. The "when" and "where" to applying cognitive actions is the "conditional knowledge", as part of the procedural knowledge which signifies the utility of cognitive procedures.

Cognitions Applied to Cognitive Regulation

Metacognitive approach is focused on those mental processes, which includes thinking, attention as well as controlling cognition (selective attention). Thus, it refers to the ways in which thoughts are experienced and regulated rather just an ordinary knowledge. The "when and "where" to applying cognitive actions are conditional knowledge, mostly considered as part of the utility of cognitive procedures.

Some studies suggest that conditional knowledge keeps developing till middle childhood (Lawless, Brown, Mills, & Mayall, 2003). In the same study the authors showed that students of kindergarten displayed conditional knowledge less than older children though they had knowledge about personal learning. Subsequently, older children allocate their attention selectively, move accurately than the younger ones with reference to the task. Thus concluding, studies have supported that declarative, procedural and skill learners which when used leads to performance improvement possess conditional knowledge about cognition.

The metacognition knowledge emerges early and progresses at least through adolescence (Flavell, 1979) that is why the adolescents have more knowledge compared to young children. This knowledge cognition (metacognition) may not be statable since children may display the use of their knowledge without being able to express "what kind" of knowledge (Karmiloff-Smith, 1997) they are articulating.

Metacognitions and Rumination

Many years of research attempts have converged into certain common themes, marking off distinct areas in conjunction with psychological disorders. Some research findings emerged out as cognitive vulnerabilities, responsible as the antecedents of anxiety disorders while the other lines centered the processes engaged in intensifying or maintaining depression or depressive episodes. Nevertheless, time and again the researches attempted at examining repetitive/ intrusive thought processes with added focus on psychological disorders.

But unfortunately the story does not begin here; according to Wells and Matthews (1996) it is the beliefs about thoughts- metacognitive beliefs that take it a long way to psychological displacement. The construct of worry and rumination has

been often debated upon since they both possess a universal functionality in human beings. Researchers have demonstrated that rumination is very much a function of normal human mental process in terms of conceptual likeness- both engage in repeated, recurring thought processes (Lyubomirsky & Nolen-Hoeksema, 1995; Nolen-Hoeksema, 1991) especially when the demand exceeds ones capacities (Martin & Tesser, 1996; Mathews, 1990), however may lead to serve adaptive functions (Papageorgiou & Wells, 2001).

Despite many overlaps between rumination and worry the researches have highlighted both retaining unique, distinct features (Papageorgiou & Wells, 2001; Watkins & Baracaia, 2001). Studies have indicated support for metacognitive model of rumination with respect to clinical populations (Papageorgiou & Wells, 2001) conversely, the present study focuses on the rumination as a universal process performed by all. We found research evidences indicating reasons to maintain its existence in nonclinical sample. For example, some research studies have shown that Positive Beliefs about Rumination (PBR) is significantly and positively associated with rumination as well as depression in non-clinical population (Papageorgiou & Wells, 2001, 2003). The same study also highlighted that the subtypes of Negative Beliefs about Rumination (NBR) i.e., beliefs concerning uncontrollability of harm, interpersonal and social outcomes were also positively correlated with rumination as well as depression.

In another study, Papageorgiou and Wells (2001) examined the causal relationship between rumination, NBR and depression in non-clinical sample. It was found that after controlling statistically for the initial levels of depression and rumination, the negative metacognitive beliefs about uncontrollability and harm associated with rumination significantly predicted depression. In conclusion, a good

structural equation model fit was found for both clinical metacognitive models in depressed sample (Papageorgiou & Wells, 2003) as well as in a non-clinical sample (Roelofs et al., 2007).

Conceptualization of S-REF Rumination

The conceptual model of S-REF rumination indicates a definition of rumination as, repetitive thoughts generated by attempts to cope with self-discrepancy. This includes processing of self-referent information rather than a problem solving- oriented action. In case of any situational demand- an emotionally taxing situation, rumination is most likely to direct the individual towards repeated thought drills to seek answers to such questions as, "how one feels about the event?", how disturbing "thoughts and feelings can be avoided in future", or "how these thoughts and feeling can be changed". These interrogative questions may show an overlap between rumination and worry, but worry is more action oriented in a distressing situation. Rumination on the other hand may be more focused on emotional valance and usually the time frame is in the past.

Presently, the SREF model, rumination is viewed as a goal directed response in-line with Martin and Tesser (1996) model. The conceptual model of rumination is extended by linking to an "explicit cognitive architecture", rumination functions both on automatic and control mode, as both types of processing is involved in cooperation. Thus, at one end rumination is driven by metacognitive beliefs that are self-reflective and emotion focused- employed as a coping strategy, while on the other end executive functions initiate thought control that gives birth to bias in the lower level networks, this is mostly an automatic processing arising intrusive thoughts autonomously. Therefore, a cyclic process begins which includes interlocked cyclic appraisals and emotion focused coping signifying processes that are controlled. The

ruminating individual may believe it as an attempt to solve problems, but reality is that it is interfering with task-oriented action.

This signifies the emotion focused coping masquerading as problem focused moreover the executive function may also give life to sequential automatic processing- which if appraised as threatening or damaging will continue towards coping through thought control. Human and their environment exists as an integrated system, while rumination is maintaining a ruminative state via thought control and attentional bias, events and environmental stimuli are evaluated within a ruminative cognition-frame of reference. Rumination theories differ considerably in scope of thought content considered ruminative. The SREF model diversifies in ruminative thought content if it is related to a self-discrepancy, even if indirectly e.g., self-worth and self-efficacy pattern of coping responses if its more internally directed rather than external.

In a nutshell, SREF rumination is narrower than the view presented by Martin and Tesser (1996) as it excludes the positive valance reflection and problem solving instrumental efforts, yet the S-REF rumination is broader than Nolen-Hoeksema (2000) in that it doesn't restrict to depressive symptoms only but has been found equally prominent across obsessive compulsive disorder, anxiety and has been studied in connection with various vulnerabilities and populations. However, rumination should not be viewed as a freely existing phenomenon rather it is undoubtedly a by-product of an interaction between person- environments. The environment plays an actively prominent role in triggering the occurrence of a self-discrepancy. Thus, needful to add, that the commencing and offset of rumination depends largely on both the individual and environmental or situational factors. Therefore, one strategy commonly employed is to control rumination by avoiding situations that cause it.

S-REF Conceptual Model of Rumination

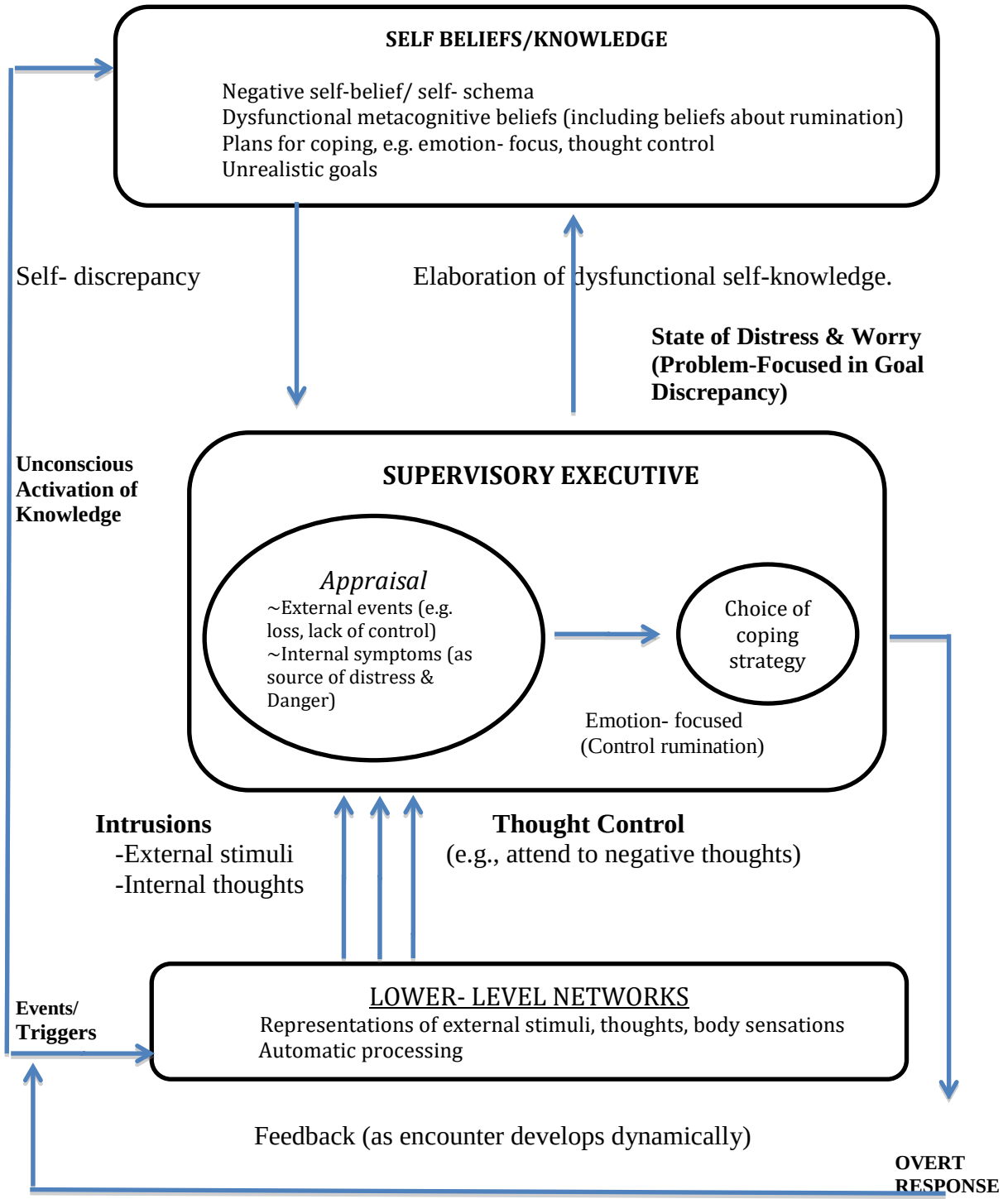

Figure 1. The S- REF Model applied to Rumination & Depression (Mathews & Well, 1996)

Outcomes of S- REF Activation

The activation of S-REF responses is produced at cognition and behavior level and generated for varied consequences. One of the most profound outcomes of which, is the choice of coping strategies that tends to intervene with the lower levels network operations and consequently behavior. It is needful to mention that strategies may not always function as planned. Along with the S-REF that are engaged in the demand of resources that has been ignited may attract attention from other aspects of functioning. If the discrepancy is resolved successfully the S-REF activation is most likely to terminate, however if coping fails and the discrepancy remains a pattern of unproductive rumination process will become which will intensify with prolongation of time.

According to Matthews and Wells (2000), there are certain factors that perpetuate S-REF activation and worry. Sometimes when the coping strategies may backfire and end up maintaining self-beliefs, furthering and giving way to self-referent processing that heightens self-focus of attention, thus leading to vigilant awareness of discrepancy creating sensitivity to threat in vulnerable individuals. As a trait, the vulnerability yields ground for ruminative tendencies, that promotes the reception of negative self-knowledge by negative associations to different concepts and event. Here, the apprehended lot will make use of thought control strategies (the metacognitive strategy which is responsible for controlling the thought content) increasing the flow of negative pattern in thoughts. Frequently, a common coping strategy to deal with negative metacognitions includes suppression of (disturbing) thoughts.

Suppression of unwanted thoughts may cause a rebound of the distressing thoughts (Wenzlaff & Wegner, 2000). The continued views of rumination lead to a

range of problems, such as incubation of intrusions following stress (Wells & Papageorgiou, 1995) mood disturbances (Nolen-Hoeksema, 2000), this forms a disposition to negative beliefs about emotional and thinking processes. According to S-REF model, these are known as the, "secondary emotion and prerequisite to emotional imbalance (Wells & Matthews, 1996). The activity resulted by S-REF, also produces maladaptive interaction with external world, which is mediated by the type coping strategy employed (Wells & Matthews, 1996). Sometimes these strategies may hinder in acquiring task focus skills, required for managing troubling situation hence producing a sense of powerlessness towards behaviors that promote self- criticism, self-consciousness and maintain awareness of self-discrepancies, therefore the cognitive error remains unchallenged.

Emotions and Metacognitive monitoring

Emotions constitute internal data, they signal motivation and influence various cognitive processes (Wells & Matthews, 1996) like decision making and judgements (Clore & Parrott, 1994). Emotions are induced in association with goals success (Bagozzi & Pieters, 1998) or failures to maintain the desired progress. For example, threating situations produce anxiety that aids in further planning accordingly i.e., to fight or avoid the cause. The cognitive functions are attuned to emotions so that signals are corresponding to goal achievement efforts. Hence, emotions signal self-dysregulations by introducing predisposition towards certain aspects of the experience and stimulate continuous self-processing. More precisely, emotions are responsible for biasing cognitions and influencing metacognitive judgements. According to the S-REF model the online processing of information from lower stimulus driven networks is dependent on the self-beliefs. The implicit emotional experiences stored in the form of schematic representation or as self-knowledge in memory are accessed when

relevant challenges arise. Frequently, the accessibility of beliefs directly influencing the lower level somatic appraisals gives rise to automatic thoughts as the mechanism is restricted by the partial exclusion of executive function involvement.

Under typical circumstances the S-REF activity ends after deciding a choice of coping strategy that may be task-focused, emotion oriented or avoidance or in other case modifies the beliefs. This is an example of a successful self-regulation for information process however in clinical sample it has been observed that self-regulation is disrupted by unrealistic and unachievable goals. The failure in meeting these goals results in automatic negative beliefs. The negative automatic beliefs are associated with prolonged activation of executive function allocating all cognitive resources on the goal discrepancy until successful resolution. Generally, the goals that may seem impossible to attain are replaced by secondary sub-goals for example, a patient suffering from terminal illness may not achieve complete health goals but by setting sub-goals like pain management and handling day to day life, moderates adverse emotional out bursts. Therefore, if goals are not set flexibly the self-regulation may not succeed. Self-regulation processing is inclusive of regulating emotions in that it systemizes the online mental processing by updating of current requirements for goal achievement i.e. planning or monitoring situational processing for any modification of strategies and allocates executive resources to needful situations.

Self-Knowledge (Beliefs)

According to Wells and Mathews (1994) self-knowledge may be declarative and or metacognitive stored in form of various beliefs. They are useful in providing general plans for coping and processing information from the situation. These beliefs

work to guide executive cognitive functions e.g. memory, attention, information searching, appraisal and behaviors.

The declarative knowledge is found in regular cognitive processing that consist of objective information. However, in metacognitive processing based on information outside conscious awareness but a dynamic interplay between executive functioning and beliefs generates the foundation for cognitive dysregulation. Such metacognitive information serves two functions (i) understanding meaning of the thought; (ii) provides direction and shapes the cognitions.

This information enables dealing with physical and social world. The metacognitive beliefs are plans (implicit and explicit) based on various schematic representation that guide cognitive processing activities. They are oriented towards self-regulation goals by assimilating new information (knowledge) to existing beliefs or vice versa. This is a complex activity as it engages higher order processing to produce meaning and is also the cause of variability in ratings observed in individuals due to differences in beliefs.

In S-REF activation a threat is appraisal from internal or external sources. The internal sources constitute the negative thoughts processing whereas external sources can be any threat appraised within physical or social contexts. Following the threat appraisal, long-term memory is scrutinized for relevance and selection of coping strategy. The system follows a reciprocal online processing mechanism at this point, between beliefs and coping providing feedback about the success or failure of the coping strategy. The normal processing condition is amenable to modification of knowledge or beliefs and coping response flexibility as illustrated in the feedback loop (in figure1). The S-REF is capable of altering the self-knowledge grounded on the online information in the feedback, this is however dependent on healthy self-

regulation procedures. In some scenarios, the effects of choice of coping impede change in beliefs e.g. avoidance strategy may halt the inflow of data that challenges and disconfirms preexisting beliefs. Henceforward, explaining how phobias or anxiety patients remain in a state of cognitive bias.

The cognitive processing is somewhat controlled by contents of plans in coping with negative information, such that plans stipulating monitoring for explicit coercions and worry about personal deficits and change. In non-clinical S-REF activity is short and fleeting. In clinical population several threat-monitoring strategies predispose the S-REF activity and prolong it for indefinite period of time. For example, the thought monitoring strategies monitors the events and select beliefs-congruent facts from environment. The lack of cognitive confidence on cognitive capacities invests additional attentional and executive resources on performance in stressful situations (Edwards, 2015). According to appraisal-beliefs model (Salkovskis, 1989) when intrusive negative thoughts increase in occurrence and concentration they further activate the dysfunctional beliefs. The S-REF activation gives access to beliefs that thinking about worry content will help the worrier cope well (positive beliefs about rumination), and also once worrying initiate it become uncontrollable and intensifies concerns about dangers (indicating negative beliefs about worry). Consequently, cognitive self-regulatory mechanism utilizes the cognitive self-consciousness and control on intrusive thoughts to keep monitoring and access to selective (Janeck, Calamari, Riemann, & Heffelfinger, 2003) thoughts that serve personal significance.

S-REF and Thought Control Strategies

As part of metacognitive activity thought control is associated with a tendency of pathological processing. Thought control refers to restricting ideas or creating intentional censorship for thoughts in order to suppress them from coming at conscious level. These thoughts are usually unpleasant and displeasing to the thinker. According to Wells and Davies (1994) different strategies are employed to present unwanted thought occurrence e.g. distraction, appraisal, punishment, social control and worry. The previous research on thought control was initiated by Wegner, Schneider, Carter, and White (1987). The authors showed that subjects were unable to suppress the target thoughts. Later, Merckelbach, Muris, Van den Hout, and de Jong (1991), and Purdon and Clark (2000) investigated the contradictory effects however reached inconsistent findings. Additional attempts inclusive of stress reactions were also explored that indicated rebound effects of thought suppression practices, in clinical and non-clinical samples (Davies & Clark, 1998).

The S-REF model indicates some thoughts control strategies to be more successful compared to others. The use of thought control is capable of impacting on emotional wellbeing as a function of context and purpose for which thought control strategy serves. It has been observed in patients with generalized anxiety disorder that worrying is particularly used to distract from distressing images (Borkovec & Inz, 1990) and coping with threat. Wells and Papageorgiou (1995) showed that an increase in intrusive thoughts was observed after short exposure to stress under specific experimental conditions. The results were indicating of deleterious effects of thoughts control for emotional and mental self-control.

Reynolds and Wells (1999) have shown that worry and punishment are particularly associated positively with pathological tendency to worry, neuroticism as

well as introversion. Contrarily reappraisal, distraction and social-control depicted a negative association with vulnerability to stress. Wells and Davies (1994) further established that these strategies and their negative association are suggestive of psychological health markers that provide to moderate emotional vulnerabilities under some situations. Additionally, Warda and Bryant (1998) investigated thoughts control strategies in motor car accidents survivors and control group and found the survivors with acute stress disorder (ASD) group use more worry and punishment strategies compared to control group. Additionally, significant positive associations were observed with scores on Beck anxiety inventory while distraction strategy was found to correlate negatively with measures of psychopathology.

The S-REF model posits that beliefs, thought control and choice of coping have important effects on self-regulation (Wells, 2002). The intrusive thoughts especially when coupled with thought control strategies e.g. worry or punishment generate negative interpretations significance and consequences. These provide to the reality of intrusive thoughts that lead to behavioral strategies to cope with perceived challenges. This is rather thought focused attempt to control intrusions consequently resulting in higher degree of distress (Belloch, Morillo & Garcia-Soriano, 2009; Ree, 2010). The role of attentional resources and other executive functions also come into play through the feedback loop. The previous beliefs allow for the allocation of attention to coping that provides successful adjustment, at this point dysfunctional strategies lead to dysregulated self-control and may result in various psychopathological problems e.g. OCD (Clark & Pardon, 1994).

Likewise, particular thought control strategies were found to elevate and associate with various clinical disorders e.g. anxiety and depression in patients and in recovery groups (Reynolds & Wells, 1999). Especially, worry and punishment were

found elevated in samples with psychopathological vulnerabilities. The other control strategies (e.g. distraction and reappraisal) provide a margin of flexibility to cognitive processing, worry and punishment may create cognitive self-dysregulation due to biased cognitive processing. This bias is an activation of maladaptive beliefs that distracts the inflow of new or neutralizing information capable of altering maladaptive beliefs. Wells and Papageorgiou (1995) demonstrated that worrying has an incubation effect and tags negative thinking, in the form of elaborative processing on the stressors. Furthermore, memory accesses material that serves as cues for stress-related intrusive thoughts.

In summary, the research indicates deleterious effects of metacognitive or ruminative coping on self-regulation that prolongs negative thinking and adversely affects self-regulatory functions as proposed by the S-REF model. An important feature that contributes to such perseverative processing and cognitive dysregulation are coping styles that are discussed further to provide an entirety of the S-REF mechanism.

Coping of Situations

Coping refers to particular efforts, psychological and behavioral, that people engage to tolerate, master and minimize stressful occasions. Broadly, two types of coping have been widely distinguished namely problem-oriented and emotion oriented however authors also maintain the role of avoidance oriented coping to be specifically linked with various psychological issues (Endler & Parker, 1998).The problem-oriented coping is an effort to take some instrumental and active measure to relieve from stressful situations, whereas emotion oriented coping involves efforts in regulating the emotional outcomes of potentially stressful events. The avoidance

oriented coping signifies drawing away from the stressful conditions without any efforts to intervene or change the prevailing conditions. Prior research shows that problem and emotion oriented coping are used to battle most stressful situations (Folkman & Lazarus, 1980).The dominance of a strategy over another is dependent on various factors e.g., personality and life events. Typically, problem-oriented coping is employed where individuals perceive certain levels of control over stress provoking causes or situations while in uncontrollable circumstances usually emotion or avoidance oriented stance is exhibited.

Additionally, distinction between problem and avoidant-oriented coping strategies exist in terms of behavioral or psychological reactions for example, problem-oriented strategies are intended to alter the nature of stressor or in ways one perceives it, whereas avoidant strategies lead into or creates mental states of e.g., withdrawal that keep from directly addressing causes of stress. Avoidant coping has been found to constitute psychological risks for adverse reactions to demanding life events (Holahan & Moos, 1987). Active problem-oriented coping has been shown to produce better emotional regulation to stressful events than avoidant strategies this was also reflected in terms of physical health for example, problem oriented versus avoidant strategy was connected with improved immune standing in HIV-seropositive men (Goodkin, Fuchs, Feaster, Leeka, & Rishel, 1992).

Coping Strategies in S-REF Model

The S-REF model highlights role of metacognitive beliefs and coping processes in instigating and preserving cognitive dysregulation. The dysregulation reflects in the form of rumination that begins as controlled strategy but eventually becomes an automatic cognitive practice (Segerstrom, Tsao, Alden, & Craske, 2000).

Later, this contributes to emotional vulnerabilities for example, ruminative coping enhancing leading to depressogenic thoughts and interference in problem solving behaviors due to repetitive thought processing. In such conditions, the attentional resources are devoted implicitly to content of the thoughts and rarely address the external situation (Matthews & Wells, 1988). Typical outcomes of such ruminative state can be observed through helplessness and loss of motivation that provides an indirect reflection of the beliefs about rumination.

Coping is selected using the predispositional beliefs about the situation and relevant coping experiences. In dealing with the situational demands, the coping reactions are applied through biasing lower processing networks. Thereby, this becomes a dynamic interplay between executive functions and stimulus-driven lower processing networks until incongruencies are resolved and termination of the experience can occur.

The internal or cognitive representation of the experiences is modified through the emotion oriented coping feedback that changes as a function of successful adjustment to the situation (Harley, 1996). Conversely, the problem-oriented coping is operationalized to alter reality in external environment (Lazarus & Folkman, 1984). Emotions are created from assimilation of appraisal and coping processes signalling the 'transactional' significance of the encounter to the person (Lazarus, 1999). Though under other conditions, discrepancy may remain if coping fails to resolve the problem, as Martin and Tesser (1989) argue that over time it may lead to progressively more unproductive ruminative thoughts. Different internally-directed strategies e.g., emotional or avoidant may rebound (Wenzlaff & Wegner, 2000), and essentially sustain deleterious self-beliefs. The resulting self-referent cognitive mechanics produce attentiveness for discrepancy and amplified self-focus attention, creating

vulnerability towards pathological sensitivity to uncertain situations and concepts. The vain coping efforts create worrisome conditions in individuals and may result in the use of thought control strategies further increasing the availability of undesirable self-beliefs. Reasonably, the coping can be considered successful if maladaptive beliefs are remain inactivated during selection of coping strategy otherwise a cyclic cognitive processing i.e., rumination will give way to *secondary emotions* (Matthews & Wells, 2000), causing emotional disruptions.

The S-REF processing tends to stimulates maladaptive arrays of interaction with external world this is especially mediated by coping choices (Matthews & Wells, 1996). For example, avoidance oriented coping in troubling scenarios is associated with depression (Fichman et al., 1999). Logically, the avoidance is preventing exposure to the cause hence the lack of problem-oriented coping instils a feeling of powerlessness over the situational demands. In other cases, when maladaptive coping succeeds in avoiding catastrophes e.g., self-discrepancies, it is attributed as an adaptive coping for the individual and attracts him to use the same maladaptive technique in future challenges.

Another domain of research inquiry investigated maladaptive coping and chronic distress in students. (Matthews, Hillyard, & Campbell, 1999) evaluated how students managed test anxiety in approaching examination using MCQ questionnaire (Wells, 2013) for meta-worry and dispositional worry, and problem-focused, emotion-focused and avoidance (Endler & Parker, 1990). However, emotion-focused coping had substantial loadings on both metacognitive and coping factors, showing that metacognition is especially linked to emotion-focused strategies such as self-criticism (which tend to be maladaptive). Research (Hong, 2007) indicates that neurotic 'worry about worry', is closely linked to coping strategies. Conclusively, it

can be deduced that the coppice of coping especially one that represent the coping style of an individual is important in determining the longitudinal effects on cognitive-emotional regulation i.e., maladaptive coping will result in dysfunctional self-regulation and vice versa.

Appraisal of Events

According to Frydenberg (2014) the appraisal of ruminative thought usually determines the nature of coping responses for e.g., threat, loss and challenge. Perkins, Cooper, Abdelall, Smillie, and Corr (2010) found that neurotic and trait-anxious individuals are more likely to perceive threat in demanding circumstances appraising a personal lack in capacities required for successful coping. This type of a cognitive bias has been reported in experimentally manipulated situations, an implication of negative self-bias for self (Hertel & Mathews, 2011). In other studies e.g. Gallagher (1990) found that extraversion to be associated with challenge, while it's appraisal is found to be controlled by optimism in stressful situations (Allen, Frings, & Hunter, 2012). The interlink between appraisal and coping can be seen through a match that exist between type of situation and type of coping strategy e.g., in a situation where an appraisal is that of challenge, coping response is more likely to be task focused.

Metacognitions and Emotional Self-Regulation

Metacognitions can be regarded as type of an appraisal that involves an evaluation of self-cognitions, beliefs and cognitive self-control. According to Wells and Matthews (1996) metacognitions play an important role in self-regulation. Metacognitions are dominant in influencing the coping choices, especially if the self-knowledge advocates that rumination helps in solving problem. SON and ITTS

(2012) found metacognitions to play a key role in the processing of self-referenced social cognitions and indulgence in thoughts of appearance and social competence.

The negative beliefs associated with the uncontrollability of thoughts inculcates more brooding and preservative form of ruminations that may block cognitive restructuring, flexibility and self-transformation (Cheek & Melchior, 1990). The metacognitive strategies scale by Wells and Cartwright-Hatton (2004) assesses metacognitive style in five dimensions namely Positive beliefs, Uncontrollability of thoughts, Lack of cognitive confidence, Need for control, Cognitive self-consciousness that significantly correlates with trait anxiety. The metacognitive dimensions signify a cognitive self-regulatory mechanism that monitors and evaluates cognitive processes during appraisal and coping enabling a self-reflective. Meta-experience i.e., awareness of goal discrepant state culminates into strategies of action, that may sometime be thought suppression or denial.

Positive and Negative Beliefs about Rumination in Self-Regulation. Rumination has been reported to amplify symptoms of depression. Previous empirical evidences provide ample support across nonclinical and clinical samples (Lyumbomirsky & Tkach, 2004). The positive and negative beliefs are two major types of beliefs underlying the cyclic nature of rumination. According to Papageorgiou and Wells (2004) positive beliefs are indicative of a perception that ruminative coping is helpful in reaching a desired state (e.g., I need to ruminate about my problems to find answers to my problem). Typically, this type of coping is less problem focused and more emotional in nature (Lyubomirsky, Layous, Chancellor, & Nelson, 2015). Failure in reaching the desired state or goal may lead to intensified rumination and further hindrance in problem solving. This state surfaces the negative beliefs about rumination that reflect uncontrollable and harmful nature of ruminative

thinking (e.g., *rumination about my problem is uncontrollable*). The clinical and nonclinical sample showed significant differences between these groups however, the research is criticized for possible chance patterns and not employing multigroup modeling techniques (Papageorgiou & Wells, 2003). Another noteworthy attempt to explain the core variables of the S-REF model was by Roelofs et al., (2007). Their findings indicated that positive beliefs were associated with rumination while negative beliefs with symptoms of depression.

Thought control strategies. Wells and Davies (1994) developed the Thought Control Questionnaire to cover a broad range of strategies for controlling their thoughts especially with reference to clinical population using semi-structured questionnaire on nonclinical and patients. The thought control consists of cognitive escaping strategies from psychologically challenging events using distraction, social control (i.e., *consulting with a friend*), punishment, reappraisal, and worry (electing to direct one's attention towards adverse thoughts). The practice of worry and punishment approaches are connected with pathological worry and emotional problems in both clinical and non-patient groups (Reynolds & Wells, 1999; Wells & Davies, 1994). Previous studies indicated that punishment and worry strategy differentiates obsessive compulsive disorder patients from normal group (Amir, Cashman, & Foa, 1997). Holeva, Tarrier, and Wells (2001) tested the S-REF model showing that coping strategies characterized by worry would be positively associated with the development of post-traumatic stress following a shock (road traffic accidents).

Metaworry. The characteristics of worry can be differentiated quantitative and qualitatively within clinical and nonclinical populations (Ruscio & Borcovec, 2004). More recently, the cognitive explanations indicate that excessive worry is

associated with the presence of uncertainty intolerance and metacognitions i.e., positive and negative beliefs about worry (Behar, DiMarco, Hekler, Mohlman & Staples, 2009). The positive beliefs generally contribute to the worry initiation in the presence of anxiety-cues (i.e., worrying helps me to avoid problems in the future*).* The initial worry about internal or external noncognitive events for the purpose of coping is called type-1 worry. Following an ongoing course of worrisome thinking gives way to negative thinking beliefs that highlight the uncontrollability altering the trend to pathological worrying called the type-II worrying or *metaworry* (Wells & Cartwright-Hatton, 2004). Metaworry engages thought control strategies to avoid worrying about worry. There has been robust inquiry into the relationship between negative metacognitions and worry however longitudinal studies posit severe scarcity (Behar et al., 2009). The cognitive model suggests that reacting negatively on cognitive, emotional and behavioral level to uncertain events represents intolerance of uncertainty (Dugas, 2007). The intolerance of uncertainity has been shown to trigger the metacognitive beliefs about worry. Further, the model has shown indirect and direct links to worry. Concludingly, Iijima and Tanno (2013) have pointed that the literature depicting various important correlates and covariates of worry show a paucity therefore role of cognitive factors requires further exploration using prospective designs.

The core of S-REF model submits that the cognitive mechanisms work parallel, supplementing each other to provide information in order to create a whole picture of the current situation. Here, the relevance of the experience is seen in the framework of memory retrieval for self-referent knowledge and by sizing the costs and rewards of coping strategies. Consequently, a potential problem-focused approach is arrived at to finish the attempt at reducing the discrepancy between actual and

desired state. Separately, this process is dysfunctional when the appraisal is making erroneous choices of coping. For example, employing an emotion-focused approach where an active problem-solving approach is required will aggravate the discrepancy hence leading to more psychological distress and eventually into emotional psychopathology over time.

Executive Functions

Executive functions have been described differently for example, executive functions can be abilities of psychological nature that helps individuals in self-regulation and self-control. Executive functions can be cognitive aspects for rational thinking and planned behavior and perform the functions of perception, attention, memory, learning and thinking (Blair & Ursache, 2011). We may not always operate rationally or regulate our behavior purposefully (Stanovich, 2009), consequently we face a self-regulatory failure. A common response to self-regulatory failure is to act with deliberation. This is a result of executive thinking skills (ETS). ETS facilitates the self-regulation functions and self-control. The executive functions are mostly automatic in nature that include regulation of emotions, attentions and stress responses.

When it is not desirable for the brain and behavior to respond automatically, the interrelated cognitive faculties are employed for the maintenance, management and integration of information and to attain a specific goal. The role of memory is of particular importance, updated information and memory operation control both work as important functions. Another important role of the executive functions is the cognitive flexibility and adjustment of behavioral responses. Hence the EF can be

consolidated as integrated working memory, inhibitory control and attentional set-shifting processes (Miller & Cohen, 2001).

Bidirectional Model of Emotions and Self-Regulation

Executive functions play an important role in self-regulation by organizing and regulating complex information while producing goal directed behavior. The executive functions manage thoughts and actions (Lysaker et al., 2010) and enables problem solving. Some studies have found support for psychopathologies due to deficient executive functions (Menon, 2011; Snyder, Miyake, & Hankin, 2015) and EF tasks performance was found to be positively associated with cognitive and social competence throughout lifespan (Liew, 2012).

The executive functions share a bidirectional relationship with emotion and attentional control operating in an interactive feedback loop. The executive functions operate either in a top down or bottom up perspective. According to Miller and Cohen (2001) the top down perspective highlights the role of executive functions in terms of directing attention, organizing cognitive resources and regulating emotions (Ochsner & Gross, 2005). On the other hand bottom up perspective signifies the role of emotions, attention and stress stimulations (Koole, 2009; Wells & Matthews, 2014). Importantly, during an episode of high or low attention focus, e.g., emotional or stress arousal, it is the executive attention that is responsible for registering a discrepancy between stimulus and response (Petersen & Posner, 2012). Emotional control lies in the limbic system that triggers neurobiological interaction, thus cognitions and emotional content will initiate collaborative EF and self-regulatory mechanism. The limbic system will not activate motor, emotional and stress physiology unless the cognitive faculties address the environmental contingencies.

In a demand state the attention functions cause alertness and executive orientation (Abramovitch, Dar, Hermesh, & Schweiger, 2012). The same system will vary in comparison when one is in normal rest mode. During an episode of stress or conflict recognition, the brain activates the executive functions to resolve the challenge at hand (Barkley, 2012), however when this goal is not met, the same information begins overwhelming the capacity and resources (Rypma, Prabhakaran, Desmond, Glover, & Gabrieli, 1999). The resulting reaction gives way to the production of neuroendocrine hormone activity mostly unconscious and leads to stress reaction further causing difficulties in controlling attention and using executive functions.

According to Wells and Matthews (1996) beliefs about thoughts-metacognitive beliefs are responsible for taking it along to psychological displacement. The construct of worry and rumination has been often debated upon since they both possess a universal functionality in human beings. Researchers have demonstrated that rumination is very much a function of normal human mental process in terms of conceptual likeness- both engage in repeated, recurring thought processes especially when the demand exceeds one's capacities however rumination may serve adaptive functions within clinical arena (Papageorgiou & Wells, 2001). Despite many overlaps between rumination and worry the research has highlighted that both preserve unique, distinct features (Papageorgiou & Wells, 2001; Watkins & Baracaia, 2001; Wells & Carter, 2002).

Self-Regulation and Organizational Settings

One's ability to self-regulate may be their most essential asset. In organizations, managers want people to achieve high performance levels therefore, industrial–organizational psychologists are interested in individuals' regulation of their own levels of job performance (Vancouver, 2000). But despite knowing what is important for people to self-regulate at work, organizational know little about how people attempt self-regulation, especially, how it can be done most effectively. The self-regulation research emphasizes goals being broadly oriented in trying to avoid negative outcomes that is fundamentally aversive, and threat based (Elliot, 1999). These approach orientations motivate affective and cognitive processes that facilitate optimal task engagement (Elliot & Harackiewicz, 1996).

The self-regulation requires strategic thought and action (Mischel & Mendoza-Denton, 2003). The organizational environment itself poses various challenges, the type of organization also determines the types of daily encounters employees are likely to face. The working dynamics of the organizations are parallel with the self-regulation attempts of organizational workforce. For example, the context of the current research includes three work environments that have striking differences in their work culture, physical and psychological environment, and level of accountability (Aspinwall & Staudinger, 2003). The self-regulatory processing will use the cues from the work environment in terms of workplace processes, systems or structures, the policies culture, resources etc. all of these will influence the ways the employees perceive their surrounding work environment.

In Pakistan, the work environment varies by types of system that runs the organizations. The environment of private organizations is considered quite competitive, demanding high accountability and the employees are engaged in task

oriented workload. The government and semi-government set-up are based on permanent jobs, with laid back framework thus the employees feel less threatened by factors of job insecurity. Where employees in private sector have to maintain an active and delivering role to prove their value for the organization. Similarly, the stress levels also vary due to the competitive environment in private organizations that is relatively quite low in semi-government and government set-ups. Currently, the author aims to identify potential cognitive processing components that may enable efficient self-regulation by using four timewaves. The type of organization and varying environments will enable the understanding of effective cognitive processing model.

Rationale of the Study

The present study attempts to address an important aspect of human cognitive architecture in testing the Self-Regulatory Executive Function (S-REF) model of rumination. Researchers have indicated the deleterious effects of rumination on various aspects of behavioral functioning in humans. Literature presents evidences representing rumination as both to be a cause of development of depression (Robinson & Alloy, 2003) and a sustaining factor (Nolen-Hoeksema, McBride, & Larson, 1997). Despite many attempts, the differences arisen in terms of time period focus of ruminative thinking. Another regime supposes that rumination can vacillate from past, current and future focus, while the others assume it focuses on past and present (Smith, Alloy, & Abramson, 2006).

Most literature on self-regulation is with reference to efficacy in academic learning strategies (Bouffard-Bouchard, Parent, & Larivee, 1991; Zimmerman, 2000), resisting adverse peer pressures (Caprara, Gerbino, Paciello, Di Giunta, & Pastorelli, 2010), academic time management (Rakes & Dunn, 2010), self-monitoring (Vohs & Baumeister, 2016), self-evaluation, and goal setting. Some authors have also highlighted the role of self-beliefs i.e., a more proficient belief may lead to higher goal-setting and commitment to the target goals (Burnette, O'boyle, VanEpps, Pollack, & Finkel, 2013).

According to authors (Wells & Matthews, 2014) volitional techniques of control, such as avoiding ruminating about past mistakes and ignoring distractions, are found to be effective. Examining negative features of one's functioning can lessen motivation to self-regulatory activities. Self-observation may lead to cyclic self-experimentation (Jordalen, 2017). We are often engaged in making decisions and diagnosing natural variations. Systematic self-observation can guide to better private

understanding and volitional control or performance. Bandura and Cervone (1986) identified self-reflective functions closely related to self-observation: self-judgment and self-reactions. Self-judgment engages self-evaluation of one's output and attributing causal meaning to the consequences. Self-evaluation evaluates self-monitored information with a goal, for example an athlete comparing his performance with previous attempts.

A growing similarity across different newer conceptualization of rumination is that of metacognitive beliefs in the choice of rumination as an emotion regulation strategy. Although the most prolific model of rumination, well grounded, tried and tested is that of Nolen-Hoeksema (1991) response style theory which states that rumination is a result of repetitively thinking about the causes, consequences and symptoms of one’s negative affect. However, it lacks in addressing the question of how rumination fits within biological and cognitive processes like metacognitive beliefs or attention (Smith et al., 2006). This study aims to address this gap by including these cognitive self-regulatory executive functions.

We aim to address a comprehensive yet very analytical model of rumination by tapping different elements of rumination. The S-REF model is a logical conceptualization of rumination in that; it captures the functions involved with respect to self-control and executive functions within the subjective level and the very process of rumination. Kirkegaard and Thomsen (2006) highlights the need for further differentiation of rumination so that the concept can be distinguished from other types of negative thought. The premise for the selection of S-REF model; that also makes it a well-rounded one is that, it encapsulates the multifacets of rumination rather than a constricted one-dimensional view.

This perspective in measurement of rumination is relatively new and it has not been addressed enough to stipulate grounded evidences across a variety of contexts. The S-REF model is still in its evolutionary process. An edge of this model over the response style model is that it integrates the metacognitions into the conceptualization of rumination that enacts to develop rumination as a stable response style. Thus it carries a broader view, which includes attention, cognition regulation, beliefs about emotion regulation strategies and interaction between different levels of cognitive processing (Wells & Matthews, 1996). Therefore, it also provides an insight into response styles.

The present study is a unique exploration into the S- REF model of rumination with respect to two features. Firstly, it is a longitudinal observation of the model that adds a newer dimension to the exploration into the rumination phenomena, previously an extravagance of research has been carried on cross-sectional levels but not enough on a longitudinal run which is required to complete the picture. How S-REF model works on longitudinal span may surface important findings that can be beneficial for prevention or strategic management of rumination.

Secondly, the S-REF model has been used extensively on clinical populations like depressive and other emotionally dysfunctional populations. Presently, we attempt to observe it on a nonclinical population with the support of other external environment factors which make our context and population more prone to stress and instabilities that can result in dire consequences both on psychological grounds as well as physiological ones. The present study may also underline how different self-regulatory and executive functions are interacting with the ruminative cycle resulting in or being caused by a particular response pattern. Thus, the chain of relationship between the antecedents i.e., self-knowledge, mediating processes-rumination-self

regulation and executive functions leading to an emotional self-regulation process may present a rich picture of the S-REF model within our context.

Lastly, it is expected that the current study will enable us to highlight and track out factors that distinguish the harmful from helpful aspects of rumination through the causal chain. The importance of metacognitive beliefs has been specifically addressed in research (Papageorgiou & Wells, 2003) that are potentially harming in rumination with the consideration of S-REF model. These important facets are incorporated along with the broad selection of other self- regulatory components. Thus, rumination in S-REF model will explore the process in a larger context such that how it steers as experiential process and which milieu characterizes rumination most prominently.

Chapter 2

METHODOLOGY

Research Design

The current study was carried out in two phases. The first phase was a pilot study whereas the second consisted of the main study. The former phase was executed with the objectives of testing the suitability of the scales and or the need of cultural adaptation requirements. The pilot study further served to identify the psychometric properties of scales employed for the main study.

After estimating the reliability indices of the scales, establishing their suitability for our prevalent population while yielding an initial insight into the pattern of relationships among the variables being investigated, the main study was carried out to test the S-REF model of rumination both on cross-sectional and longitudinal trends.

Phase I: Pilot Study

As mentioned, the pilot study was conducted to address the following objectives.

Objectives

1. To investigate the suitability of the scales used for the present study.
2. To ensure the adequacy of psychometric properties of the scales.
3. To gain an initial insight into the proposed pattern of relationships.

The instruments used in the present study were developed and validated on a different population. It was thus essential to carry a try out to see if they are comprehensible for the indigenous population. The pilot study results may warrant proposed relationship before the main study so that the researcher can be more cognized about any path appearing contrary to the theoretical directions in the exploration of the proposed model.

Table 1.

Demographic details of the Pilot Study (N=95)

Variables	Categories	*M*	*SD*	*f*	%
Age		30.36	6.57	95	100
Gender	Men			54	57
	Women			41	43
Marital Status	Married			55	58
	Unmarried			35	37
Family System	Nuclear			14	15
	Combined			42	44
Organization Type	Government			55	58
	Semi- Government			27	28
	Private			13	14
Work Experience		7.12	6.01	90	95
Work hours		8.70	2.43	86	90

A total sample comprising of women and men were purposively selected from government, semi-government and private organizations and institutions around twin cities of Pakistan i.e., Rawalpindi, Islamabad and Lahore. A major portion of the sample was obtained from government and private organizations and institutions. The mean age was approximately 30 years. Of the entire sample a higher number was found to be married, while 15% of the participants did not report their status. The data also revealed that combined family system was quite high compared to nuclear living.

On the professional front the mean experience was approximately 7 years, employees serving approximately 9 working hours per day.

Instruments

All instruments employed for the present research are Likert type scales, administered to the aforesaid sample in order to ensure their psychometric properties and gain an initial insight into the dynamics of the proposed S-REF rumination model. The details of the instruments are given below.

Life Changes Stressors Checklist (LCSC). The stressors checklist was obtained from "Major Life Changes as Stressors," Stress Management Guidebook (1996). The LCSC provides comprehensive categories in identifying different aspects of life changes as potential sources of discrepancy leading to stress. The main purpose for this inclusion was to identify potential sources of stress between time-waves. The participants checked from a variety of subcategories under personal, family, work related and environmental stressors checklist. Further, the checklists are created in accordance with specific needs therefore the reliability coefficients are not indicated. However, the total frequency under each category reflected the dominance of stress from a specific source of life events.

Metacognition Questionnaire (MCQ). The Meta-Cognitions Questionnaire (Hatton & Wells, 1997) is a 65-item self-report measure that assesses the positive and negative beliefs and appraisals about worry and unwanted intrusive thoughts. The questionnaire has five subscales: (1) *positive beliefs about worry,* (2) *negative beliefs about danger and uncontrollability of thoughts* (3) *cognitive confidence,* (4) *control of intrusive thoughts, and* (5) *cognitive self-consciousness*. Wells and Cartwright-Hatton (2004) published a brief 30-item version of the MCQ that is psychometrically sound.

To meet the defined objectives in the current research this short version was used. The internal consistency for the subscales ranged from α =.65 to α = .83. The range of scores for subscales is between 6 to 24, while total score ranges between 30 to 120, with higher score showing elevated levels of dysregulated metacognitions. For example, high scores on "(lack of) cognitive confidence" designates doubt on memory and additional unhelpful beliefs about one's cognition (Wells and Cartwright-Hatton, 2004).

The Positive Beliefs about Rumination Scale. The Positive Beliefs about Rumination Scale (Papageorgiou & Wells, 2001) is a 9-item scale that assesses positive metacognitive beliefs about the benefits and advantages of rumination. PBRS has shown good internal consistency (Cronbach's α = .89) and test-retest reliability over 6 weeks (*r* = .85). Respondents are required to indicate agreement with each of the items on a 4-point rating scale ranging from 1 (do not agree) to 4 (agree very much) (Papageorgiou & Wells, 2001).

The Negative Beliefs about Rumination Scale (NBRS). The NBRS (Papageorgiou et al., 2001) comprises of two subscales assessing negative metacognitive beliefs about rumination. It has good test-retest reliability of Cronbach's α = .85 and high internal consistency (Luminet, 2004). The NBRS-1 is an 8-item subscale that assesses metacognitive beliefs about uncontrollability and harm associated with rumination. The NBRS-2 is a 5-item subscale that assesses metacognitive beliefs about interpersonal and social consequences of rumination. Respondents are required to indicate the extent to which they agree with each of the items on a 4-point rating scale ranging from 1 (do not agree) to 4 (agree very much).

Anxious Thought Inventory (AnTI). The inventory is a cognitive measure of worry. The AnTI (Wells, 1994) is a 22-item questionnaire designed to assess both

worry content and negative appraisal about worry (i.e., metaworry). The AnTI has three subscales: social worry, health worry and metaworry. The AnTI metaworry subscale has a unique relationship with pathological worry and significantly discriminates Generalized Anxiety Disorder from other anxiety disorders (Wells & Carter, 1999). An acceptable internal consistency has been observed for all subscales ranging from $\alpha = .75$ to $\alpha = .85$ (Wells, 1994).

Thought Control Questionnaire (TCQ). Wells and Davies (1994) devised the TCQ to assess the effectiveness of the strategies used for the control of unpleasant and unwanted thoughts. It is a 30-item instrument that also explores the relationship between the use of different strategies and measures of stress vulnerability and psychopathology. The items are scored on a four- point rating scale with 1-never, 2-sometimes, 3-often and 4-almost always. The TCQ measures five factors that correspond to different strategies for controlling unwanted thoughts. The subscales are *Distraction* (items 1, 9, 16, 19 and 21); *Social Control* (items 5, 8, 12, 17, 25 and 19); Worry (items 4, 7, 18, 22, 24 and 26); *Punishment* (items 2, 6, 11, 13, 15 and 28); and *Re-appraisal* (items 3, 10, 14, 20, 23 and 27). The scales have reported to be psychometrically sound ranging from .64 to .74 with the total score of test-retest reliability to be .83 indicating that it is a stable measure.

Coping Inventory for Stressful Situation (CISS). Endler and Parker (1993) developed the CISS, a 48- item questionnaire that measure coping styles by asking subjects how they would respond to a variety of stressful situations. Using a 5- point Likert scale with choices ranging from “not at all” to “very much”, this inventory assesses individuals according to three basic coping styles: *task- oriented coping*- 16 items, *emotion- oriented coping*- 16 items, and *avoidance- oriented coping*- 16 items.

The internal consistency of the three dimensions of the CISS ranged from .81 to .90 and test-retest correlation ranged between .55 to .73 (Endler & Parker, 1993).

Appraisal of Life Events (ALE). ALE is a checklist of 16 adjectives, which are devised to elicit respondents' cognitive appraisals of stressful life events in term of threat, challenge and loss, with higher scores indicating high degree of the dimension. Challenge (6 items), suggests the degree to which the environment is perceived as one that allows personal development through potential mastery of stressors; Threat (6 items), the degree to which the environment is perceived as hostile, apt to generate anxiety, and may be potentially harmful; and Loss (4 items) the potential for suffering. The three dimensions of the ALE Scale have good psychometric properties, with internal consistency estimates ranging from $\alpha = .75$ to $\alpha = .87$ (Ferguson, Mathews & Cox, 1999).

Committee Approach for Assessing Contextual and Linguistic Compatibility of Instruments

The present model has been vastly used to provide to the clinical disorder inquiry therefore it was necessary to know if the instruments had any features restricting it's use on the normal population. Furthermore, we understood that the instruments used for our study were foreign and that contextual differences could be likely therefore prior to the pilot study committee approach was utilized to test the contextual and linguistic compatibility of the instruments.

A group of 3 professionals (psychologists) and 3 participants other than those in the field of psychology were requested to read the questionnaire intently and provide feedback on the above queries before commencing with any data collection efforts. The committee group deemed the questionnaires as approved, with their

consent on both grounds and a minor suggestion regarding the format alteration i.e., using table format instead of boxes for ratings were suggested, and that was attended to. The corrected questionnaire booklet was then organized for the pilot study.

Sample

The sample for pilot study comprised of 94 participants. Some major factors in choosing the sampling technique for the pilot study included the research design of the main study, minimized attrition of participants in the main study, participant's accessibility and consent. Thus, the participants were selected on convenient sampling technique from different occupational categories. The baseline academic qualification of graduation that would ensure comprehension of the measures and holding permanent employee status to maintain access to the subjects at least within the research period. . The inclusion criteria for age was between 25 to 45 years. The sample further distributed into 57% men and 43% women, working in different capacities in various private (15%), semi government (27%) and government organizations (58%), in the cities of Islamabad/Rawalpindi and Lahore. The professions included were banking sector, police departments, teaching and medicine. The demographic characteristics of the sample showed that the average age was 30 years, while approximately 44% of the sample belonged to combined family system with 24% residing in nuclear system while rest were missing at random. The average work experience was approximately 7-years along with average working hours 8-hours per day.

Procedure

A comparable sample to that of the main study was ensured. Several criteria were intricately addressed such as, working professionals from various private, semi-government and government sector were included in the pilot study. The minimum educational qualification set as a base for participants was graduation, while the age range was between 25 to 45 years. The total sample for pilot study was obtained from three major cities including Islamabad, Rawalpindi and Lahore. Most employees were approached in a one to one session and after being informed about the nature of the study as well as the assurance given on confidentiality of the information obtained, the participant was let to read the questionnaire booklet and fill according to their preferences. They were requested to share any concern or item that appeared ambiguous to them.

Results for Pilot Study

Objective 1: Psychometric Evaluation of the Instruments

The results in Table 1 (page, 59) show an appropriate range of reliability coefficients for the Metacognitive questionnaire (MCQ), Positive beliefs about rumination scale (PBRS), Negative beliefs about rumination scale (NBRS), Appraisal of life events (ALE), Anxious thought inventory (AnTI), Thought control questionnaire (TCQ), and Coping inventory for stressful situation (CISS) suggesting psychometric adequacy of the instruments with reference to present sample.

Table 2.

Alpha reliability coefficient of subscales (N=94).

Scales	No. of Items	Alpha Coefficients
Metacognitive Subscales		
Positive Beliefs About Worry	6	.75
Negative Beliefs About Worry	6	.67
Cognitive Confidence	6	.77
Control of Intrusive Thoughts	6	.74
Cognitive Self-Conscious	6	.74
Beliefs about Rumination		
PBRS	9	.87
NBRS	9	.87
Appraisal of Life Events Subscales		
Threat Appraisal	6	.88
Loss Appraisal	4	.83
Anxious Thought Inventory Subscale		
Metaworry	6	.73
Thought Control Subscales		
Distraction	6	.64
Social Control	6	.59
Worry	6	.72
Punishment	6	.71
Reappraisal	6	.79
Coping for Stressful Situation Subscales		
Emotion Oriented Coping	16	.79
Avoidance Oriented Coping	16	.80

The coefficients for internal consistency showed adequate size of reliability coefficients. The *distraction and social control* subscales from Thought Control Questionnaire showed relatively lower alpha coefficients. However, they were considered to be explored further in the main study with larger sample size. The factors that may have contributed to inconsistency include situational or general features of the individual for example fatigue, emotional strain or motivation, variations of memory, attention or accuracy. A true score is a repeatable feature of the concept being measured. It is the part of the observed score that would recur across different measurement occasions in the absence of error. The subscales of distraction and social control are strategies for situational coping due to circumstances leading to unwanted thoughts that may have contributed to subjective fluctuations. Hence, providing a likelihood to lower reliability coefficients.

Pilot Study Objective 2: Trend Analysis for the Study Variables

Table 3.

Intercorrelation matrix for Pilot Study variables (N=94).

S.No	Subscales	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Positive Beliefs about worry	-	.20**	.37**	.39**	.37**	.39**	.29**	.22**	.18**	.42**	.27**	.30**	.24**	.33**	.23**	.05	.00
2	Negative Beliefs about worry		-	.42**	.46**	.19**	.36**	.51**	-.05	.04	.51**	.40**	.19**	.60**	.26**	.14**	.33**	.32**
3	Cognitive Confidence			-	.47**	.05	.27**	.50**	.06	.04	.53**	.44**	.16**	.32**	.21**	.10*	.20**	.14**
4	Control of Intrusive Thoughts				-	.34**	.34**	.45**	.13**	.04	.41**	.34**	.34**	.38**	.30**	.17**	.23**	.22**
5	Cognitive Self Conscious					-	.30	.16	.39	.09	.18	.13	46	.23	.40	.40	.15	.13
6	Positive Beliefs about Rumination						-	.32**	.18**	.14**	.41**	.38**	.40**	.30**	.40**	.39**	.15**	.11*
7	Negative Beliefs about Rumination							-	-.01	.18**	.55**	.47**	.20**	.41**	.37**	.16**	.28**	.23**
8	Distraction								-	-.01	.11*	.10*	.48*	-.04	.34**	.43**	-.07	-.06
9	Social Control									-	.19**	.09	-.01	.03	.19**	.15**	.09	.05
10	Worry										-	.62**	.33**	.41**	.39**	.22**	.21**	.11*
11	Punishment											-	.32**	.23**	.35**	.24**	.22**	.17**
12	Reappraisal												-	.20**	.40**	.41**	.12**	.10*
13	Metaworry													-	.23**	.10*	.26**	.28**
14	Emotion Focused Coping														-	.71**	.14**	.11*
15	Avoidance Focused Coping															-	.15**	.13**
16	Threat Appraisal																-	.77**
17	Loss Appraisal																	-

*, $p < .05$; **, $p < .01$.; two tailed

The results from the pilot study reflected the appropriateness of the instruments, for contextual and linguistic compatibility as reflected in the psychometric evaluation and committee approach. The correlation results showed associations that were parallel with previous findings. For example, the interscale association were observed to follow the same significant directions as indicated in the preceding researches ($p < .05$). For example, the associations between metacognitive subscales i.e., positive and negative beliefs about worry, cognitive confidence, control of intrusive thoughts significantly and positively were correlated with each other while interestingly cognitive self-consciousness was found to be nonsignificantly correlated with all the study variables.

Likewise, positive and negative beliefs about rumination showed significant positive associations and similar results were observed for thought control strategies e.g., between distraction and worry, punishment and reappraisal ($p < .05$); between social control and worry ($p < .01$) and worry and punishment, reappraisal ($p < .01$) subscales. The emotion and avoidance oriented coping and threat and loss appraisals were also found to be significantly positively correlated ($p < .01$). the intrascale correlations revealed positively significant associations also showing support to their originally proposed direction.

The correlations were also assessed across scales and meaningful patterns emerged for example, metacognitive subscales were more positively and significantly ($p < .001$) associated frequently with other subscales except for social control and distraction that were found nonsignificant. Correspondingly, the other interscale correlations reflected rational associations e.g., coping strategies and appraisal of life

events (emotion and avoidance coping with threat and loss) to be positively significant ($p < .001$) while those subscales that were expected to show negative directions were seen to diverge or show nonsignificant association for example, distraction and metaworry (anxious thoughts), threat and loss; reappraisal and social control and cognitive self-consciousness; cognitive confidence and distraction and social control.

Henceforth, deriving from the empirical evidences obtained in the pilot study, it was concluded that further investigations could be carried with the indigenous sample that will stem meaningful implications.

Time-1 Method

The main study denoted the final phase of the research that intended to investigate the causal relationships between antecedents, situational processing and the outcomes of S-REF model. The results in pilot study lend support in determining the suitability of scales for our sample. Thus, the main study was performed on comparable sample of employed professionals to investigate the premise that rumination is a nonspecific process in response to inconsistency between actual and desired status and or a subset of worry.

The main study was based on a longitudinal design. The measurements were taken systematically on multiple points in time with a time lapse of four months between each measurement. This routine of data collection was organized in the following manner. Initially the variables were instrumentalized and data for time-1 was collected from working professional in a diversity of work environments. After a lapse of four-months second measurement was obtained from the same sample on all variables, this was repeated across 4-time measurement on the same sample. The entire practice of measurement spread over a period of 16-months approximately.

The time lapse between any two measurements supplied different scenarios of potential stress provoking situations. The cognitive processing was gauzed in terms of participants life or situational changes processing and coping. The situational changes within the environment were considered responsible for situational processing i.e., coping of the event. The categories of measurement were divided according to the S-REF model of rumination by Mathews and Well (1994). The dispositional or antecedent variables that are embedded within the unconscious cognitive architecture were labeled as “self-

knowledge". Rumination phase falling within the domain of self- regulatory executive functions is labeled as the *situational processing*. The distinction of the present study from those already present in S-REF research paradigm can be notified by considering a varied sample of professionals, that is less addressed in S-REF investigations and using more than single type of coping strategies for situation processing as compared to the original model. Most importantly, the current research used research design most commonly recommended by authors (Zhou & Wu, 2016) i.e., longitudinal research design.

Metacognitions and maladaptive coping. The S-REF model is suggestive of dysfunctional metacognitions as the cause for intrinsically-directed coping methods for example, emotion focus, thought control, and rumination. The probability of using an approach also depends on evaluations of situation and accessibility of generic coping measures. The metacognitive beliefs are thus, positively associated with maladaptive coping styles i.e., the link from self-knowledge to the supervisory executive.

Rumination as cognitive dysfunction. In addition to exacerbating immediate emotional distress, the ruminative cycle may also produce more far-reaching deleterious effects, associated with elaboration of self-knowledge and blocking of adaptive restructuring. Studies of experimental induction of worry and social phobia test this prediction feedback loop between situational processing and self-knowledge.

Maladaptive coping as cause of emotional dysfunction. A further prediction from the model is that use of maladaptive coping strategies should generate various symptoms of dysfunction and or subclinical disturbances of subjective state. This prediction has been tested in studies of (1) the relationship between thought control

strategies and emotional pathology, and (2) the relationship between coping and stress outcomes in experimental studies of performance (links between the ‘‘supervisory executive’’ and (1) overt response and (2) states of distress and worry.

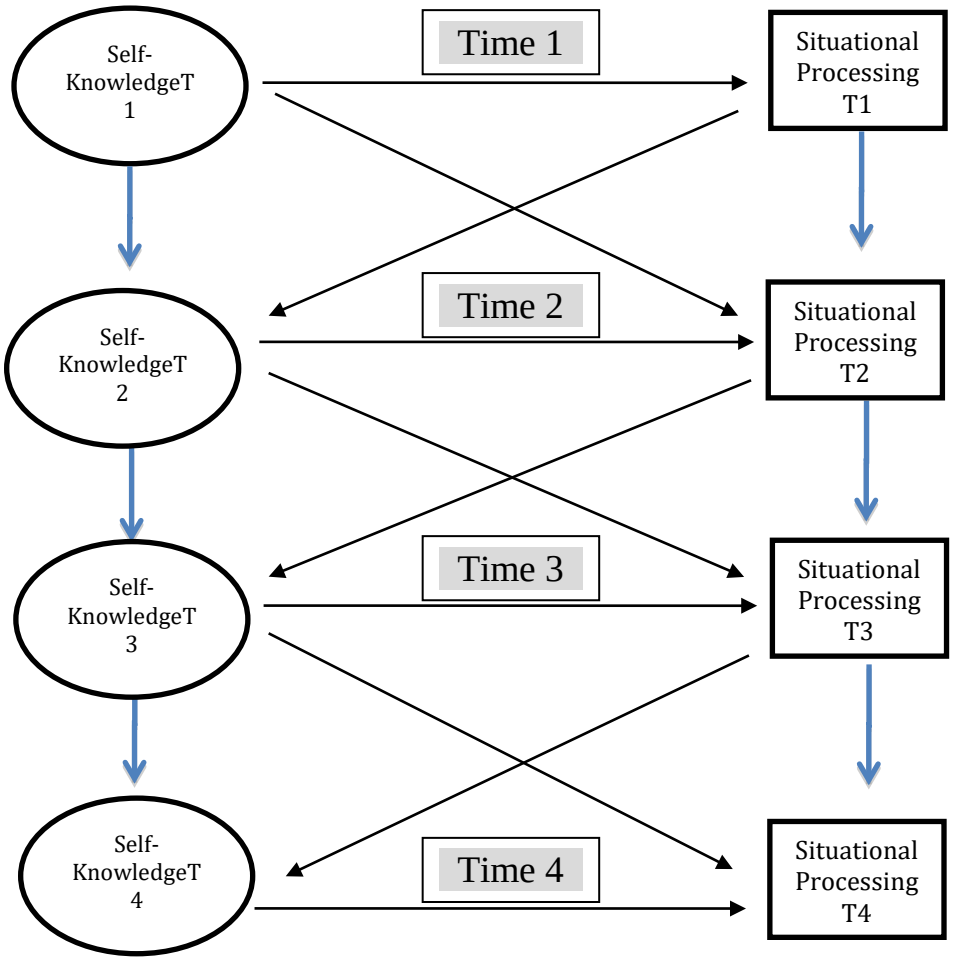

*Figure 3***.** Longitudinal Conceptual Framework from Time-1 to Time-4

**SK = Self-Knowledge Variables; SP = Situational Processing Variables*

The diagonal arrows signify the longitudinal causal relationship. The horizontal arrows depict a cross-sectional relation while top down is trajectorial variation within variables across time.

Sample

The sample of the main study comprised of employed professionals from various work environments, working in different capacities in various private and government organizations from the cities of Lahore, Islamabad and Rawalpindi. The participants were selected on the purposive sampling technique consisting of both men and women. The academic qualification criterion for the current sample was at least graduation. The age range varied between 25 to 45 years and included permanent employees, to avoid chances of attrition due to job change. The demographic characteristics of the main study (Time-1) sample represented an approximate average age of 33 years, with gender distribution of 25% women and 75% men. The sample consisted of 34% married individuals with 72% residing within combined family system. On the professional front the 43% participants were from government, 43% from private and 14% from semi-government organizations with an average experience of approximately 9-years working an average of 10-hours per day.

Table 4.

Demographic details of the Time-1 Main Study (N=514).

Variables	Categories	*M*	*SD*	*f*	%
Age		32.56	6.96	499	
	Missing			15	
Gender	Men			384	75
	Women			130	25
Marital Status	Married			332	33
	Unmarried			170	65
	Missing			14	
Family System	Nuclear			114	22
	Combined			315	61
	Missing			85	
Organization Type	Government			214	42
	Semi-Government			63	12
	Private			225	43
	Missing			12	
Work Experience		9.41	6.30	477	
	Missing			37	
Work hours		10.29	8.19	455	
	Missing			59	
Salary (in 1000)		48.31	31.23	402	
	Missing			112	

Instruments

Following instruments were used for the main study after the confirmation of psychometric soundness in pilot testing.

1. Metacognitive Questionnaire (Cartwright-Hatton & Wells, 1997)
2. Positive and Negative Beliefs about Rumination Scale (Papageorgiou & Wells, 2001; Papageorgiou, Wells & Meina, 2003)
3. Appraisal of Life Events (Ferguson, Matthews, & Cox, 1999)
4. Thought Control Questionnaire (Wells & Davies, 1994)
5. Coping Inventory for Stressful Situations (Endler & Parker, 1990)
6. Anxious Thoughts Inventory (Wells, 1994)

The participants responded to the Life Stressors checklist along with the complied booklet instruments indicating the potential sources of their life stress from the four main categories e.g., personal, work, family and environmental stressors. They were also provided with further open-ended option of outlining other sources within these categories that may have not been included in the list of sub-categories.

Procedure

The higher officials of various organizations were contacted by the researcher in person and were requested for permission to collect data from their organizations. They were assured of the use of data being restricted to academic research purpose. Participant were informed about the purpose of the study and their consents were gained. The participants received a copy of booklet containing all instruments required to be filled by them along with the instructions laid clearly as well as given verbally. They were assured of the confidentiality of the information collected for research.

Objectives of Main Study for Time-1

The main study for Time-1 was conducted with the following objectives

1. To evaluate the construct validity of the measures used for the present study.
2. To assess the internal consistency of instruments with Time-1 data.
3. To explore the association between the dispositional variables and situational processing variables with Time-1 data.
4. To assess the mean differences across demographic categories for all study variables of S-REF model.

Hypotheses

Addressing the Association between Dispositional Antecedents, Situational Processing Variables.

The hypotheses for the Time-1 main study were formulated as follows:

1. The metacognitive subscales will be positively associated with appraisal of life events subscales and coping for stressful situation subscales.
    a. Positive beliefs about worry will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.
    b. Negative beliefs about worry will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.
    c. Cognitive confidence will negatively associate with emotion and avoidance oriented coping, threat and loss appraisal.
    d. Control of intrusive thoughts will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

e. Cognitive self-consciousness will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

2. The positive and negative beliefs about rumination will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

3. The thought control strategies will associate positively with coping for stressful situations and appraisal of life events.

    a. Distraction strategy will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

    b. Social control strategy will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

    c. Worry will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

    d. Punishment strategy will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

    e. Reappraisal strategy will positively associate with emotion and avoidance oriented coping, threat and loss appraisal.

4. The coping of stressful situation subscales and appraisal of events subscales will be positively associated.

    a. Emotion oriented coping will positively associate with avoidance oriented coping, threat and loss appraisal.

    b. Avoidance oriented coping will positively associate with threat and loss appraisal.

Objective 4: To assess the mean differences between demographic categories for all study variables of S-REF model.

Hypotheses for Mean Differences across Gender

To assess the mean differences on all study variables of S-REF model across gender the following hypotheses were formulated:

1. There will be significant mean differences on the subscales of metacognitive beliefs across men and women.
    a. The women will show significantly higher mean on positive beliefs about worry compared to men.
    b. The women will show significantly higher mean on negative beliefs about worry compared to men.
    c. The women will show significantly lower mean on cognitive confidence compared to men.
    d. The women will show significantly lower mean on control of intrusive thoughts compared to men.
    e. The women will show significantly higher mean on cognitive self-consciousness compared to men.
2. The women will show significantly higher mean on positive and negative beliefs about rumination compared to men.
3. There will be significant mean differences on the subscales of appraisal of life events scale across men and women.
    a. The women will show significantly higher mean on loss compared to men.

b. The women will show significantly higher mean on threat compared to men.

4. There will be significant mean differences on the subscales of thought control strategies across men and women.
    a. The women will show significantly lower mean on distraction compared to men.
    b. The women will show significantly higher mean on social control compared to men.
    c. The women will show significantly higher mean on worry compared to men.
    d. The women will show significantly higher mean on punishment compared to men.
    e. The women will show significantly lower mean on reappraisal compared to men.
5. The women will show significantly higher mean on the subscales of metaworry compared to men.
6. The women will show significantly higher mean in terms of emotion oriented coping and avoidance oriented coping compared to the men.

Hypotheses for Mean Differences across Marital Status

To assess the mean differences on all study variables of S-REF model across marital statuses the following hypotheses were formulated:

1. There will be significant mean differences on the subscales of metacognitive beliefs across marital status.
    a. The married group will show significantly higher mean on positive beliefs about worry compared to the unmarried group.
    b. The married group will show significantly higher mean on negative beliefs about worry compared to the unmarried group.
    c. The married group will show significantly lower mean on cognitive confidence compared to the unmarried group.
    d. The married group will show significantly higher mean on control of intrusive thoughts compared to the unmarried group.
    e. The married group will show significantly higher mean on cognitive self-consciousness compared to the unmarried group.
2. The married group will show significantly higher mean on positive and negative beliefs about rumination compared to the unmarried group.
3. There will be significant mean differences on the subscales of appraisal of life events scale across marital status.
    a. The married group will show significantly higher mean on loss compared to the unmarried group.
    b. The married group will show significantly higher mean on threat compared to the unmarried group.

4. There will be significant mean differences on the subscales of thought control strategies across marital status.
    a. The married group will show significantly lower mean on distraction compared to the unmarried group.
    b. The married group will show significantly higher mean on social control compared to the unmarried group.
    c. The married group will show significantly higher mean worry compared to the unmarried group.
    d. The married group will show significantly higher mean on punishment compared to the unmarried groups.
    e. The married group will show significantly higher mean on reappraisal compared unmarried groups.
5. The married group will show significantly higher mean on the subscales of metaworry compared to the unmarried group.
6. The married group will show significantly higher mean in terms of emotion oriented coping and avoidance oriented coping compared to unmarried group.

Hypotheses for Mean Differences across Family System

To assess the mean differences on all study variables of S-REF model across different types of family system the following hypotheses were formulated:

1. There will be significant mean differences on the subscales of metacognitive beliefs across combined and nuclear family system.
    a. There will be significant mean differences on positive beliefs about worry among combined and nuclear family system.
    b. There will be significant mean differences on negative beliefs about worry among combined and nuclear family system.
    c. There will be significant mean differences on cognitive confidence among combined and nuclear family system.
    d. There will be significant mean differences on control of intrusive thoughts among combined and nuclear family system.
    e. There will be significant mean differences on cognitive self-consciousness among combined and nuclear family system.
2. There will be significant mean differences on positive and negative beliefs about rumination across family system.
3. There will be significant mean differences on the subscales of appraisal of life events scale across family system.
    a. There will be significant mean differences on loss among combined and nuclear family system.
    b. There will be significant mean differences on threat among combined and nuclear family system.

4. There will be significant mean differences on the subscales of thought control strategies across combined and nuclear family system.
    f. There will be significant mean differences on distraction among combined and nuclear family system.
    g. There will be significant mean differences on social control combined and nuclear family system.
    h. There will be significant mean differences on worry among combined and nuclear family system.
    i. There will be significant mean differences on punishment among combined and nuclear family system.
    j. There will be significant mean differences on reappraisal among combined and nuclear family system.
5. There will be significant mean differences on the subscales of combined and nuclear family system.
6. There will be significant mean differences on the subscales of coping inventory for stressful situations in terms of emotion oriented coping and avoidance oriented coping across combined and nuclear family system.

Results Main Study Time-1

Objective 1: Addressing the Construct Validity of Scales through Confirmatory Factor Analysis.

The aims of Time-1 study included construct validation of study variables. Confirmatory analysis was carried out to confirm the effectiveness of instruments in indigenous culture. Confirmatory factors analysis (CFA) was conducted using AMOS version 22 software, verifying factor structure for study's observed variables. CFA allows for testing the presence of relationship between observed variables and their fundamental latent constructs. The knowledge provided by theory or empirical research enables postulating an association pattern prior to testing the hypotheses statistically.

CFA was based on data from 514 working professionals within various organizational settings. Maximum likelihood method was used for estimation of parameters of the model since the data was normally distributed. Certain technical assumptions were considered when using CFA for example, sample size between 5-20 cases per parameter estimate, multivariate normality, outliers, parameter identification, missing data interpretation of model fit indices (Schumacker & Lomax, 1996). CFA was carried out for all study measures, model fit was assessed through Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Incremental Fit Index and Mean Square Error of Approximation (RMSEA) with the criteria of good fit specified using values greater than .90 (Schrieber et al., 2006). However, a more desirable index is indicated to be a nonsignificant chi-square value. Another important consideration was to exclude items having low item-loadings. According to Stevenes (2002), an acceptable value of item loading is usually from .30 but as sample size effects the chi-square significance directly therefore, an item-loading of .28 is also acceptable if sample size exceeds 300. Field

(2005) advocates that a factor is reliable if it has four or more loadings of at least 0.6 regardless of sample size. Items having different frequency distributions (Tabachnick & Fidell, 2007) should follow Comrey and Lee (1992) in using stringent cut-offs from .32 (poor), .45 (fair), .55 (good), .63 (very good) or .71 (excellent). Subsequently, using Field and Tabachnick and Fidell (2005; 2007) suggestions it was decided that items with loading less than .30 shall be excluded from the scale.

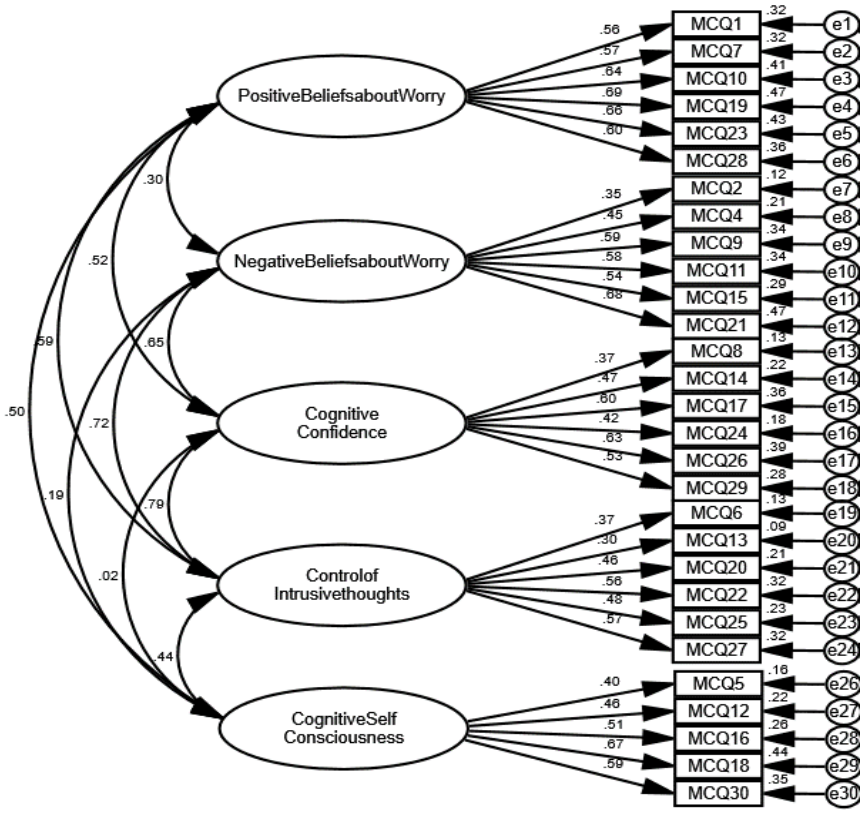

Figure 4. The Measurement Model for Metacognitive Questionnaire-30 (MCQ-30).

The figure 4 (page, 78) shows the measurement model for Metacognitive questionnaire (MCQ). The data was obtained using metacognitive questionnaire on five-dimensions using a five-point Likert scale as indicated by the theoretical conceptualization by the original authors. The correlations between the factors in Table 3

(page, 61) also provided directions for the associations between dimensions and evidence for the absence of multicollinearity. Further, there were no univariate or multivariate outliers.

Table 5.

Table for Model fit indices for Metacognitive Questionnaire (N=514)

MCQ	χ^2	*df*	CFI	TLI	RMSEA	$\Delta\chi^2(df)$
Default Model	1035.40	395	.81	.77	.06	
Model 2	440.20	327	.97	.95	.03	595.20(68)
Model 3	324.02	300	.99	.99	.01	116.18(27)

Model 1 represents the default model where the initial CFI, TLI and RMSEA in Table 5 depicted lack of good fit between model and observed data. The factor loadings were assessed for adequacy of sizes therefore model was revised, and errors were allowed to covary. The model 2 represents fit indices after Item 3 was deleted from the cognitive self-consciousness factor as it showed low (i.e., Lambda= .29) loading, and the theoretical relevance was approximately reflected in other items. The final model 3 showed good fit of the model to the data. The final model as presented in figure 2 showed that all items were valid indicators of respective latent factors. Item loadings for positive beliefs about worry ranged from .56 to .69; item loadings for the factor negative beliefs about worry ranged from .35 to .68; for cognitive confidence from .37 to .63; control of intrusive thoughts from .37 to .57 and for cognitive self-consciousness from .40 to .67.

The $\Delta\chi^2(df)$ in Table 5 indicates difference in chi-square values between default model and after adding error covariance in model 2, that were further evaluated for

significant $\chi^2(df)$ differences. There were significant differences observed between default model and final model hence, it can be concluded that the revised model was significantly improved after covarying the error variances.

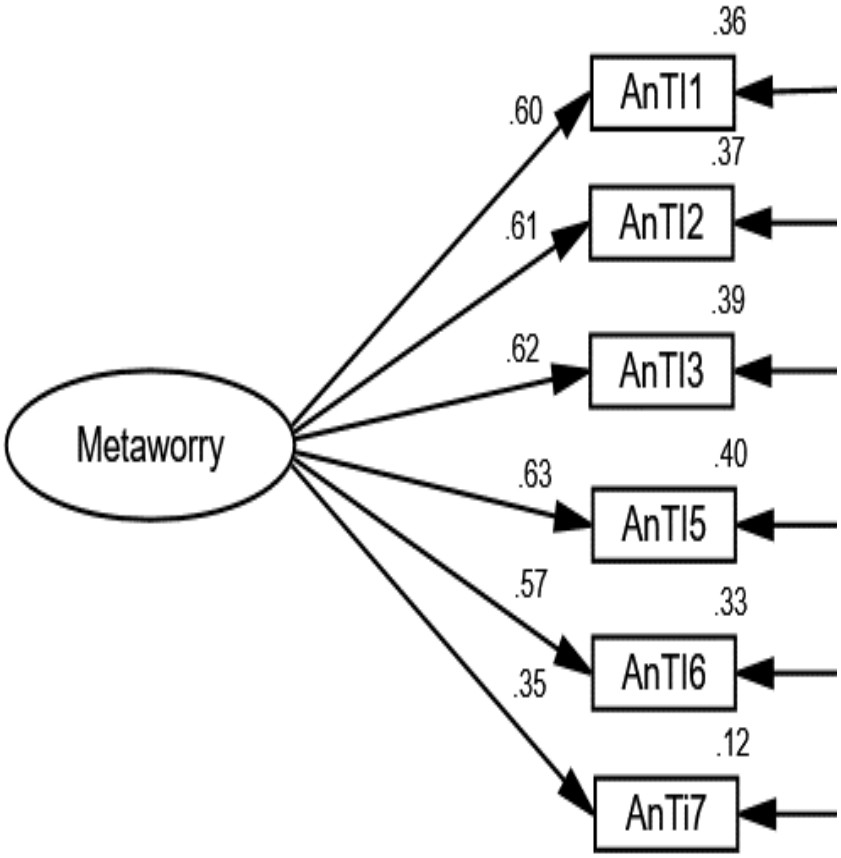

Figure 5. The Measurement Model for Anxious Thoughts Subscale-Metaworry (AnTi)

The anxious thoughts questionnaire was used to obtain data on one-dimension of the scale i.e., metaworry using a five-point Likert scale. Prior to the analysis the assumptions for univariate outliers were assessed that was satisfactory. The figure 5 shows the measurement model for metaworry. The default model in the Table 6 (page,

81) represents the initial CFI, TLI and RMSEA showing a lack in good fit between the model and observed data.

Table 6.

Table showing Model fit indices for Metaworry (N=514).

AnTi	χ^2	*df*	CFI	TLI	RMSEA	$\Delta\chi^2(df)$
Default Model	36.59	14	.94	.91	.06	
Model 2	22.30	9	.97	.94	.05	14.29(5)
Model 3	9.94	8	.99	.99	.02	12.36(1)

The results of the final revised model 2 in Table 6 indicated that the data supported the metaworry (AnTi) factor structure. The model was revised, and errors were allowed to covary. A total of one covariance was added reducing chi-square fir index into the acceptable range. The final model as presented in figure 5 (page, 80) showed good fit of the model to the data shown in Table 6.The model 2 showed fit indices after deleting item 4 showing a loading of Lamda = .06, the remaining items were valid indicators of their respective factors. Item 4 was assessed for its theoretical relevance and was later excluded, the remaining item-loadings for metaworry ranged from .35 to .63. The $\Delta\chi 2(df)$ were further evaluated for $\chi^2(df)$ differences. There were significant differences between models hence, it was concluded that the model was significantly improved after covarying the error variances.

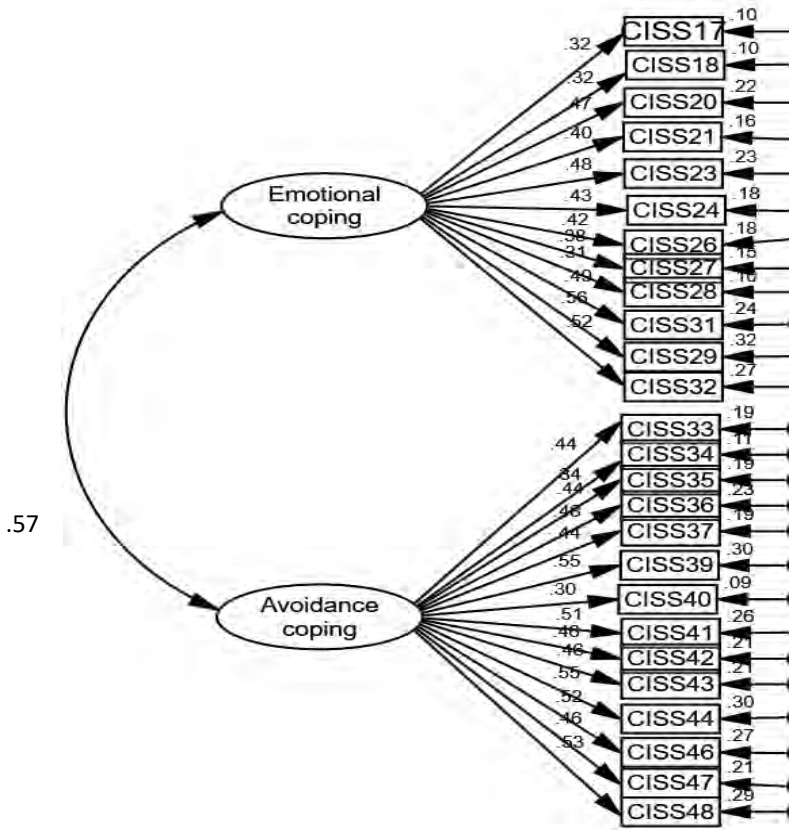

Figure 6. The Measurement Model for Emotion and Avoidance Oriented Coping Subscales

Table 7 shows model fit indices for CFA for coping in stressful situations. The results show that default model has poor fit indices. Therefore, the entire model was assessed for items with low loadings, were deleted from emotion and avoidance oriented coping after assessing for theoretical significance. The model was revised, and errors were covaried. A total of 19 covariances were added that enabled chi-square index in the acceptable range (i.e., model 2, Table 7). The final model 2 showed good fit to the data. The final model in figure 6 show, all items as valid indicators of their respective factors. The item loadings for emotion oriented coping ranged from .31 to .56 while, for avoidance oriented coping ranged from .30 to .55.

Table 7.

Table showing Model fit indices for Emotion and Avoidance Oriented Coping (N=514)

CISS	χ^2	*df*	CFI	TLI	RMSEA	$\Delta\chi^2(df)$
Default Model	2733.03	463	.50	.46	.10	
Model 2 (item 19 deleted)	1004.16	286	.82	.70	.07	1728.87(177)
Model 3 (item 22 deleted)	790.18	259	.85	.76	.06	213.98(27)
Model 4 (item 25 deleted)	544.12	233	.91	.84	.05	246.06(26)
Model 5 (item 38 deleted)	427.48	209	.93	.88	.05	116.64(24)

The model 2 represents fit indices after items with lower loadings including item 19 (.28), item 22 (.29), item 25 (.18), were deleted from the emotion oriented coping factor while item 38 (.14) was deleted from avoidance oriented coping, the theoretical relevance of the items deleted was approximately reflected in other items. The final model 5 presents the fit-indicators with $\Delta\chi^2(df)$ indicating the difference between previous and final model. There were significant differences between each revised model hence it was concluded that the final model was significantly improved after adding error covariances and item deletion.

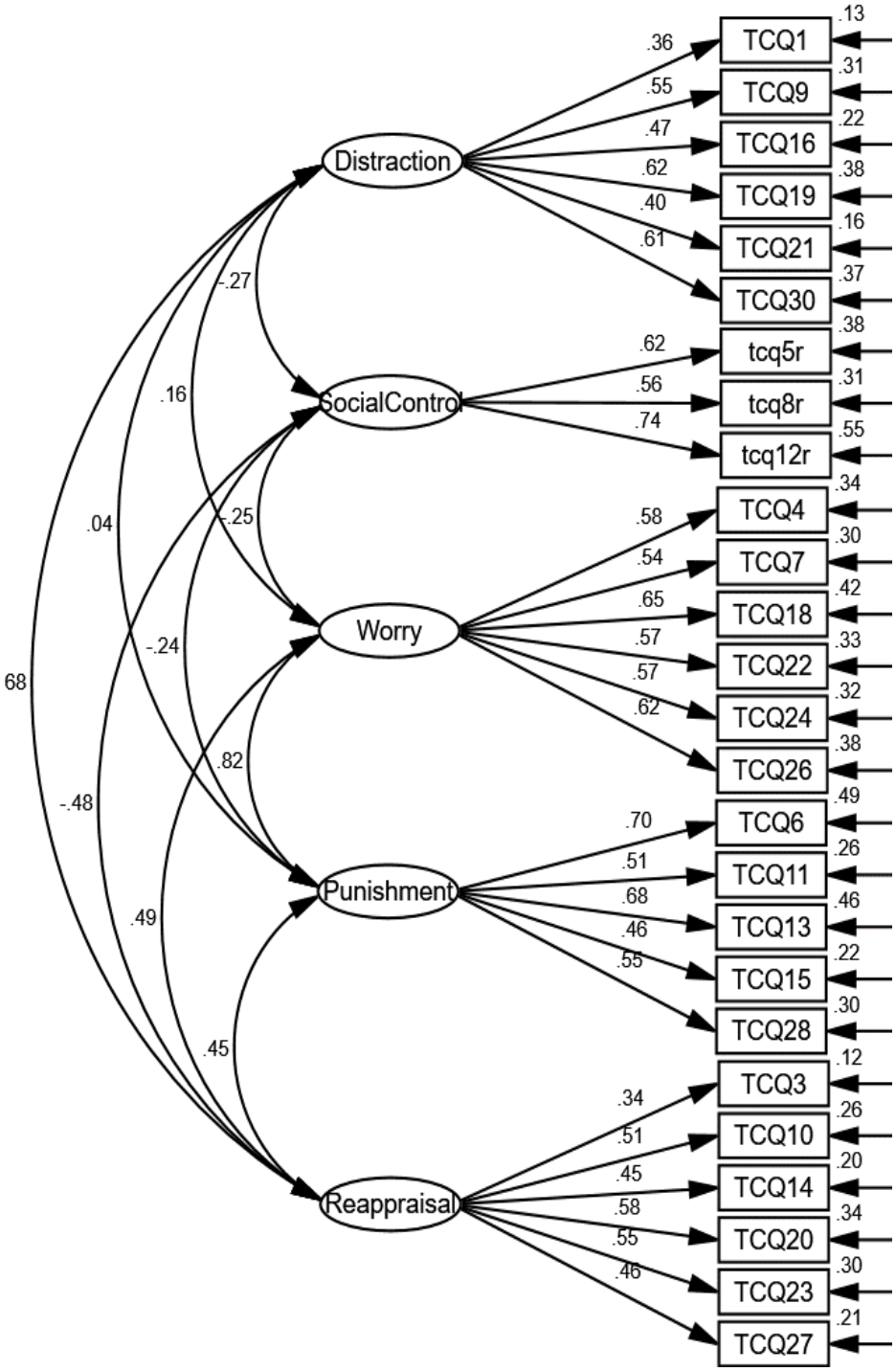

Figure 7. The Revised Measurement Model for Thought Control Questionnaire

Table 8.

Table showing Model fit indices for Thought Control Questionnaire (N=514)

TCQ	χ^2	*df*	CFI	TLI	RMSEA	$\Delta\chi^2(df)$
Default Model	1213.76	395	.69	.71	.05	
Model 2 (item 17 deleted)	736.69	319	.87	.82	.05	477.07(76)
Model 3 (item 2 deleted)	609.59	292	.90	.86	.05	127.1(27)
Model 2 (item 25 deleted)	445.75	266	.94	.91	.04	163.84(26)
Model 3 (item 29 deleted)	305.60	241	.98	.97	.02	140.15(25)

Table 8 shows model fit indices for the measurement model for thought control strategies. The results show that default model had poor fit to the data initially. Items 17, 25 and 29 were excluded from the social control factor that represented low item loadings of .08, .08 and .09. Further, item 2 was also excluded from the punishment factor due to low loading i.e., .07. The model was then revised, and errors were covaried, reducing chi-square fit index into the acceptable range showing good fit. The final model presented on figure 7 (page, 84) shows that all items are valid indicators of their corresponding factors. Item factor loadings for the first factor i.e., *distraction* ranged from Lambda = .36 to .62; for the second factor i.e., social control shows item loadings from =.56 to =.62; for worry the item loadings ranged from .54 to .65; for punishment the item loadings were from .46 to .70 and reappraisal showed from .34 to .58. The $\Delta\chi^2(df)$ indicated further evaluation of difference in $\chi^2(df)$ between default and revised model for effect size. it was observed that there were significant differences between models hence, it was concluded that the model was significantly improved.

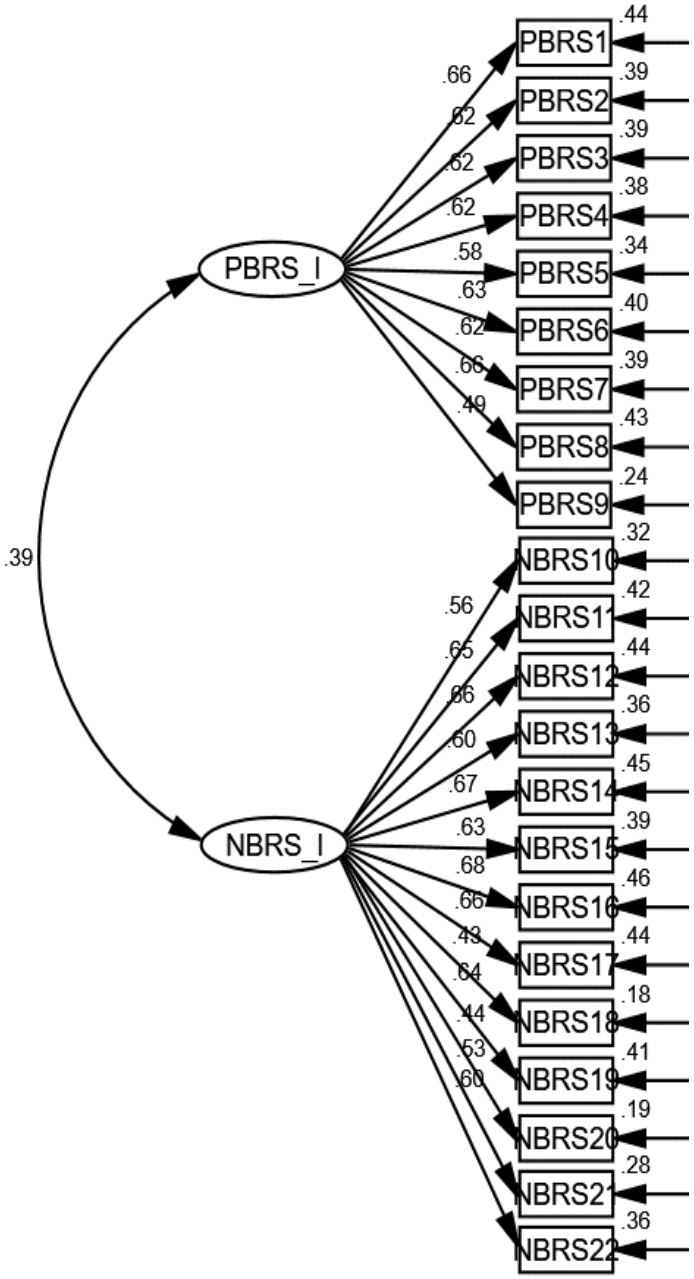

Figure 8. Revised Measurement Model for Positive and Negative Beliefs about Rumination Scale

Table 9.

Model fit indices for Positive and Negative Beliefs about Rumination Scale (N=514)

P-NBRS	χ^2	*df*	CFI	TLI	RMSEA	$\Delta\chi^2(df)$
Default Model	579.79	208	.89	.87	.06	
Model 2	150.22	150	1.00	1.00	.00	429.57(58)

Table 9 shows model fit indices for the default and revised measurement model for positive and negative beliefs about rumination scale. The results show that default model had poor fit to the data initially. The model was revised, and errors were covaried, reducing chi-square fit index into the acceptable range showing good fit. The final model presented in figure 8 (page, 87) shows that all items are valid indicators with acceptable item loadings for their corresponding factors. Item loading for the positive beliefs factor ranged from Lambda = .49 to .66 while, for the negative beliefs factor ranged from Lambda = .43 to .68. The $\Delta\chi^2(df)$ indicated further evaluation of difference in $\chi^2(df)$ between default and revised model. it was observed that there were significant differences between models hence, it was concluded that the model was significantly improved.

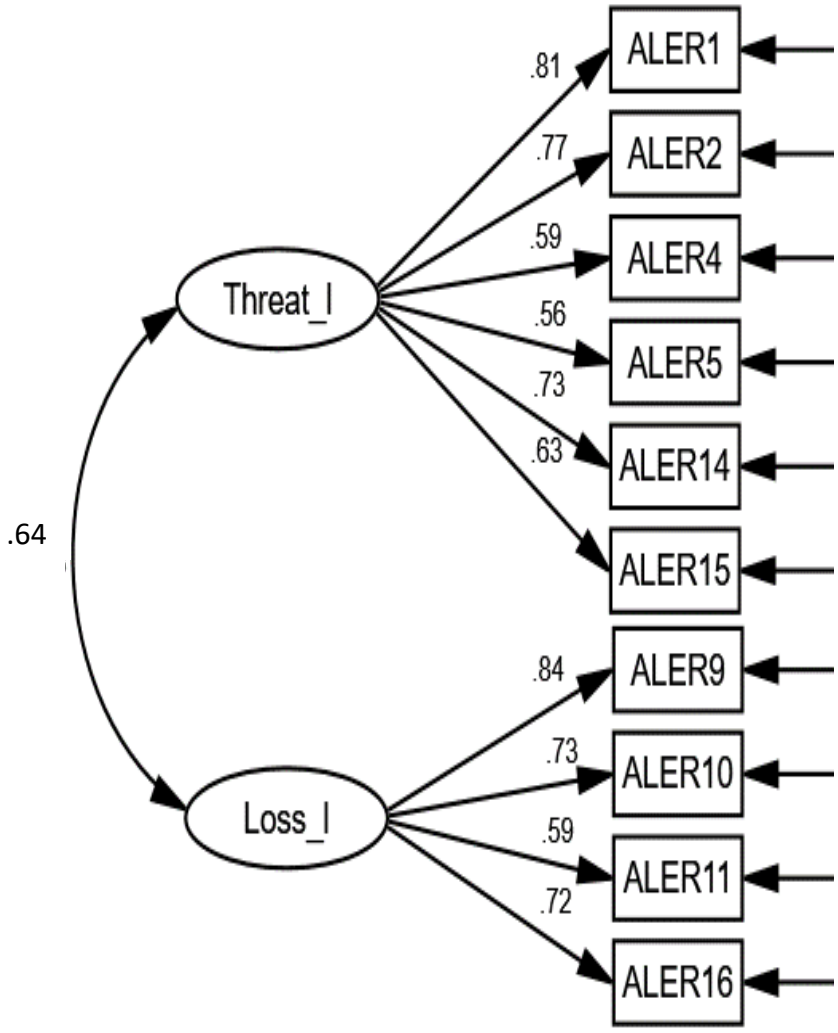

Figure 9. Measurement Model for Appraisal of Life Events

The data was gathered on Appraisal of Life Event using threat and loss dimensions. Prior to CFA the assumptions were evaluated that were found satisfactory. It was observed that the default model was deficient in good fit with the data.

Table 10.

Model fit indices for Appraisal of Life Events (N=514).

ALE	x^2	*df*	CFI	TLI	RMSEA	$\Delta\chi^2(df)$
Default Model	166.45	34	.94	.90	.09	
Model 2	15.09	24	1.00	1.01	.00	151.36(10)

Table 10 shows model fit indices for the measurement model for appraisal of life events. The results show that default model had poor fit to the data. The model was revised by adding errors covariances, reducing chi-square fit index into the acceptable range showing good fit. The final model presented in figure 9 (page, 88) shows that all items are valid indicators of their corresponding factors. Item factor loadings for the first factor i.e., *threat* ranged from Lambda = .56 to .81 and for the second factor i.e., loss shows item loadings from Lambda =.59 to .84. The $\Delta\chi^2(df)$ indicated further evaluation of difference in $\chi^2(df)$ between default and revised model for effect size. it was observed that there were significant differences between models hence, it was concluded that the model was significantly improved.

Objective 2: Assessing the Alpha Reliability with Time-1 data.

Table 11.

Time-1 Alpha reliability coefficients for study variables (N=514).

Scales	No. of Items	Cronbach Alpha
Metacognitive Subscales		
Positive Beliefs About Worry	6	.78
Negative Beliefs About Worry	6	.74
Cognitive Confidence	6	.76
Control of Intrusive Thoughts	6	.77
Cognitive Self Conscious	6	.77
Beliefs about Rumination		
PBRS	9	.85
NBRS	9	.88
Appraisal of Life Events Subscales		
Threat Appraisal	6	.88
Loss Appraisal	4	.80
Anxious Thought Inventory Subscale		
Metaworry	6	.77
Thought Control Subscales		
Distraction	6	.69
Social Control	6	.54
Worry	6	.76
Punishment	6	.63
Reappraisal	6	.66
Coping for Stressful Situation Subscales		
Emotion Oriented Coping	16	.79
Avoidance Oriented Coping	16	.80

The alpha coefficients of results are explained in comparison with our pervious findings in pilot study. Overall, the alpha coefficients improved for the metacognitive subscales the difference in improvement was small however, an increase was noticed. Likewise, the beliefs about rumination reflected a decrease of .02 in positive beliefs and an increase of .01 in negative beliefs depicting relatively same change. The anxious thoughts subscale (AnTi) showed an increase by .04 while thought control strategies revealed mixed variations of results.

An improvement in alpha coefficients were observed for the subscales of distraction (.05) and worry (.04) however the social-control, punishment and reappraisal depicted a decrease in alpha coefficients ranging between .02 to .13. The coping strategies showed a parallel size with that of the pilot test finding indicating statically overtime.

Table 12.

Time-1 Correlation matrix for Metacognitive subscales, Emotion and Avoidance Focused Coping and Threat and Loss Appraisal (N=514)

S. No	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PBW	-	.26**	.30**	.44**	.40**	.33**	.29**	.20**	.17*	.41**	.24**	.32**	.35**	.38**	.25**	-.010	-.06
2	NBW		-	.37**	.45**	.20**	.36**	.47**	-.00	-.03	.49**	.39**	.15*	.52**	.29**	.22**	.24**	.22**
3	CC			-	.44**	.01	.25**	.44**	.10	-.00	.46**	.39**	.07	.25**	.21**	.12	.10	.02
4	CIT				-	.39**	.36`**	.46**	.19**	-.08	.39**	.27**	.34**	.41**	.40**	.23**	.20**	.18**
5	CSC					-	.32**	.19**	.37**	.10	.19**	.02	.45**	.37**	.41**	.44**	.25**	.24**
6	PBRS						-	.29**	.22**	.07	.38**	.32**	.37**	.31**	.44**	.37**	.04	.03
7	NBRS							-	.09	.10	.47**	.41**	.18**	.35**	.38**	.20**	.18*	.10
8	Dstr								-	-.01	.14*	.06	.50**	.11	.28**	.41**	.04	.08
9	SC									-	.16*	-.02	-.11	-.02	.13	.08	.01	-.02
10	Wrry										-	.58**	.27**	.31**	.37**	.19**	.12	.02
11	Pnsh											-	.26**	.11	.30**	.16*	.14*	.10
12	Reapp												-	.25**	.39**	.35**	.16*	.17*
13	AnTi													-	.35**	.22**	.23**	.26**
14	EOC														-	.73**	.16*	.15*
15	AOC															-	.19**	.19**
16	Threat																-	.75**
17	Loss																	-

Note. PBW= Positive Beliefs about Worry; NBW= Negative Beliefs about Worry; CC= Cognitive Confidence; CIT= Control of Intrusive Thoughts; CSC= Cognitive Self Consciousness; PBRS= Positive Beliefs about Rumination; NBRS= Negative Beliefs about Rumination; Dstr= Distraction; SC= Social Control; Wrry= Worry; Pnsh= Punishment; Reapp= Reappraisal; EOC= Emotion Oriented Coping; AOC= Avoidance Oriented Coping; AnTi= Metaworry; CI= Confidence Interval; LL= lower Limit; UL= upper limit. **, p< .05; **, p < .01*.

The correlations were computed between dispositional antecedent and situational processing variables. The results indicated that within the scale correlation coefficients were in line with the previous findings of pilot study showing significant associations. The associations between positive and negative beliefs about worry, cognitive confidence, control of intrusive thoughts significantly and positively correlated ($p < .01$) with each other while cognitive self-consciousness was found to be non-significantly correlated with cognitive confidence ($p > .05$).

Likewise, positive and negative beliefs about rumination showed significant positive associations and comparable results were observed for thought control strategies e.g., between distraction, worry and reappraisal ($p < .01$); between social control and worry ($p < .01$) and worry and punishment, reappraisal ($p < .01$) subscales. The emotion and avoidance oriented coping and threat and loss appraisals were also found to be significantly positively correlated ($p < .01$). the intrascale correlations revealed positively significant associations also showing support to their originally proposed direction.

The inter-scales correlations showed meaningful patterns for example, metacognitive subscales were more often found positively and significantly ($p < .01$) associated with others except for social control and distraction that were found nonsignificant. Correspondingly, other interscale correlations reflected rational associations e.g., coping strategies and appraisal of life events (emotion and avoidance coping with threat and loss) positively significant ($p < .01$). Subscales indicated to show negative directions were seen to deviate in direction or show nonsignificant association e.g., distraction and metaworry (anxious thoughts), threat and loss; reappraisal and social control and cognitive self-consciousness; cognitive confidence and distraction and social

control. Conclusively, the entire matrix represented satisfactory patterns of associations suggesting directions for further explorations.

Table 13.

Table showing Time-1 Mean Differences between Men and Women on all study variables (N=514).

Variables	Gender				*t*	*p*	95% CI		Cohen's *d*
	Men (*n*= 384)		Women (*n*= 130)						
	M	*SD*	*M*	*SD*			*LL*	*UL*	
PBW	13.32	3.91	13.48	4.09	.38	.71	-.65	.95	.04
NBW	13.12	3.65	15.45	4.50	5.24	.00	1.5	3.10	.57
CC	12.46	3.45	12.51	4.14	.12	.90	-.76	.85	.01
CIT	13.64	3.43	14.17	3.63	1.45	.15	-.21	1.25	.15
CSC	15.29	3.33	16.31	3.47	2.94	.00	.33	1.70	.30
PBRS	21.67	3.24	22.56	5.46	1.58	.12	-.22	2.00	.20
NBRS	26.54	2.95	27.69	8.06	1.36	.01	-.52	2.81	.19
Dstr	15.86	3.74	16.70	3.24	2.50	.05	.18	1.50	.24
SC	14.20	2.95	14.45	3.65	.68	.06	-.39	.89	.08
Wrry	12.58	3.73	13.32	4.10	1.88	.60	-.03	1.52	.19
Pnsh	12.73	3.60	12.93	3.49	3.03	.00	-.53	.92	.06
Reapp	12.74	3.30	15.41	2.98	3.12	.00	.36	1.67	.85
EOC	14.40	8.89	49.45	9.26	3.16	.00	1.11	4.77	.86
AOC	49.57	8.62	52.04	9.76	2.65	.01	.64	4.31	.27
AnTi	13.38	3.43	15.26	4.06	4.68	.00	1.09	2.68	.50
Threat	13.05	6.95	14.19	8.08	1.37	1.41	-.50	2.79	.15
Loss	9.24	5.07	10.23	5.23	1.84	.07	-.07	2.06	.19

Note. PBW= Positive Beliefs about Worry; NBW= Negative Beliefs about Worry; CC= Cognitive Confidence; CIT= Control of Intrusive Thoughts; CSC= Cognitive Self Consciousness; PBRS= Positive Beliefs about Rumination; NBRS= Negative Beliefs about Rumination; Dstr= Distraction; SC= Social Control; Wrry= Worry; Pnsh= Punishment; Reapp= Reappraisal; EOC= Emotion Oriented Coping; AOC= Avoidance Oriented Coping; AnTi= Metaworry; CI= Confidence Interval; LL= lower Limit; UL= upper limit.

Table 13 indicates the mean differences for study variables across gender. There were significant differences with reference to negative beliefs about worry ($p < .001$) and metaworry (AnTi; $p < .001$). Likewise, significant difference was also observed for cognitive self-consciousness ($p < .01$) reflecting moderate effects. The negative beliefs about rumination, punishment, distraction and avoidance oriented coping represented relatively small effects in the significant variations explained by gender ranging between $d = .6$ to .27. The major variations were observed in reappraisal ($d = .85$) and emotion oriented coping ($d = .86$) depicting a large effect size (Cohen, 1992). The results evidently showed women scoring higher on entire list of study variables in Table 13 (page, 93). Consequently, the results illustrate significant differences in terms of cognitive processing in men and women.

Table 14.

Table showing Time-1 Mean Differences between Married and Unmarried subjects on all study variables (N=514).

	Marital Status								
	Unmarried (*n*=332)		Married (*n*= 170)				95% CI		Cohen's *d*
Variables	*M*	*SD*	*M*	*SD*	*t*	*p*	*LL*	*UL*	
PBW	13.30	3.96	13.42	3.99	-.31	.76	-.86	.63	.03
NBW	14.76	4.16	13.20	3.86	4.12	.00	.82	2.30	.39
CC	12.37	3.72	12.59	3.62	-.63	.54	-.91	.47	.06
CIT	13.99	3.42	13.66	3.54	.98	.32	-.33	.99	.09
CSC	16.40	3.40	15.11	3.34	4.03	.00	.66	1.92	.38
PBRS	22.09	5.71	21.85	5.36	.47	.64	-.79	1.28	.04
NBRS	27.89	8.83	26.39	7.72	1.85	.06	-.10	3.11	.18
Dstr	16.31	3.31	15.96	3.17	1.13	.26	-.26	.96	.11
SC	14.11	3.57	14.34	2.91	-.74	.43	-.87	.39	.07
Wrry	13.21	3.97	12.57	3.74	1.74	.09	-.08	1.36	.17
Pnsh	13.15	3.50	12.64	3.61	1.48	.14	-.17	1.19	.14
Reapp	15.08	3.30	14.47	3.20	1.97	.05	.00	1.22	.19
EOC	49.44	9.10	46.11	8.94	3.83	.00	1.62	5.03	.37
AOC	51.34	9.17	49.53	8.84	2.09	.04	.10	3.51	.20
AnTi	15.16	3.92	13.16	3.37	-.39	.00	1.29	2.70	.55
Threat	13.21	7.47	13.49	7.13	-.31	.70	-1.69	1.13	.04
Loss	9.43	5.15	9.56	5.12	-.31	.76	-1.14	.83	.03

Note. PBW= Positive Beliefs about Worry; NBW= Negative Beliefs about Worry; CC= Cognitive Confidence; CIT= Control of Intrusive Thoughts; CSC= Cognitive Self Consciousness; PBRS= Positive Beliefs about Rumination; NBRS= Negative Beliefs about Rumination; Dstr= Distraction; SC= Social Control; Wrry= Worry; Pnsh= Punishment; Reapp= Reappraisal; EOC= Emotion Oriented Coping; AOC= Avoidance Oriented Coping; AnTi= Metaworry; CI= Confidence Interval; LL= lower Limit; UL= upper limit.

The mean differences in Table 14 (page, 96) were assessed within demographic category of marital status. The entire sample (*N*= 514), consisted of 332 unmarried and 170 married participants. There were significant differences with reference to metaworry (AnTi; $p < .001$), negative beliefs about worry ($p < .001$), cognitive self-consciousness ($p < .001$) and emotion oriented coping ($p < .001$). The effect sizes for metaworry (AnTi; $d = .55$), negative beliefs about worry ($d = .39$), and cognitive self-consciousness ($d = .38$) were suggestive of moderate effects.

Likewise, significant difference was also observed for negative beliefs about rumination ($d = .19$; $p < .01$). The reappraisal and avoidance oriented coping also represented relatively small effects in the significant variations explained by marital status ranging from $d= .19$ to $d= .20$. The results evidently showed that unmarried sample scored higher mean scores on entire list of the above variables. Consequently, the results illustrated in significant differences in cognitive processing within marital status.

Table 15.

Table showing Time-1 Mean Differences between Nuclear and Combined Family Systems on all Study Variables (N=514).

	Family System								
	Nuclear (*n*= 114)		Combined (*n*= 315)				95% CI		*Cohen's*
Variables	*M*	*SD*	*M*	*SD*	*t*	*p*	*LL*	*UL*	*d*
PBW	13.89	3.94	13.29	3.96	1.36	.17	-.26	1.45	.15
NBW	14.32	4.31	13.46	3.88	1.95	.05	-.01	1.73	.21
CC	12.25	3.72	12.56	3.54	-.79	.43	-1.09	.47	.09
CIT	13.73	3.28	13.97	3.56	-.636	.53	-1.00	51	.07
CSC	16.10	3.23	15.51	3.39	1.58	.11	-.14	1.31	.18
PBRS	22.37	5.35	21.94	5.49	.71	.48	-.76	1.63	.08
NBRS	27.34	8.22	26.73	8.19	.66	.51	-1.21	2.43	.07
Dstr	15.99	3.40	16,23	3.17	-.66	.51	-1.12	.28	.07
SC	14.00	3.53	14.43	3.08	-1.19	.24	-1.32	.35	.13
Wrry	12.54	3.60	13.02	3.90	-1.14	.26	-1.19	.38	.13
Pnsh	12.61	3.29	13.01	3.66	-1.02	.31	-1.19	.38	.11
Reapp	14.80	2.95	14.79	3.31	.02	.98	-.70	.71	.06
EOC	47.62	8.98	46.74	8.91	.89	.37	-1.07	2.83	.10
AOC	50.39	8.67	50.09	8.76	.31	.76	-1.63	2.22	.03
AnTi	14.48	3.64	13.56	3.68	2.38	.02	.12	1.71	.25
Threat	13.82	7.61	13.41	6.99	.49	.63	-1.20	1.99	.06
Loss	9.61	5.12	9.49	5.10	.21	.84	-1.00	1.24	.02

Note. PBW= Positive Beliefs about Worry; NBW= Negative Beliefs about Worry; CC= Cognitive Confidence; CIT= Control of Intrusive Thoughts; CSC= Cognitive Self Consciousness; PBRS= Positive Beliefs about Rumination; NBRS= Negative Beliefs about Rumination; Dstr= Distraction; SC= Social Control; Wrry= Worry; Pnsh= Punishment; Reapp= Reappraisal; EOC= Emotion Oriented Coping; AOC= Avoidance Oriented Coping; AnTi= Metaworry; CI= Confidence Interval; LL= lower Limit; UL= upper limit.

The family systems were evaluated from mean difference across entire list of study variables. It was observed that only two variables from the complete list i.e. negative beliefs about worry and anxious thoughts showed significant mean differences between nuclear and combined-family systems. The nuclear-family system represented higher scores on the entire list of study variables however, specifically significantly on negative beliefs about worry ($p < .05$, $d =. 21$); and anxious thoughts ($p < .05$, $d = .25$). Overall the family system depicted a small effect size for both variables. Concludingly, the results indicated that majorly the cognitive processing was less different within participants in terms of family systems.

Table 16.

Time-1 One-way analysis of variance between types of organizations for all subscales and main variables (N=514)

	Government (*n*= 213)		Private (*n*= 215)		Semi-Govt. (*n*= 62)		*F*	*p*	Groups	M.D (i-j)	*95% CI*	
Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*			*i-j*		*LL*	*UL*
PBW	13.47	3.88	13.30	4.14	13.11	3.82	.22	.80	N-A			
NBW	13.29	3.75	14.54	4.24	12.55	3.89	8.22	.00	Gvt-Pvt	-1.25	-2.19	-.31
									Pvt-SemiGvt	1.99	.59	3.38
CC	12.49	3.37	12.71	3.93	11.74	3.41	1.67	.19	N-A			
CIT	13.55	3.44	14.26	3.61	13.22	3.27	3.18	.04	N-A			
CSC	14.96	3.48	16.05	3.24	16.06	3.51	5.99	.00	Gvt-Pvt	-1.08	-1.88	.90
PBRS	21.67	5.48	22.56	5.28	20.90	6.03	2.63	.07	N-A			
NBRS	25.82	7.76	28.57	8.41	24.35	7.33	9.25	.00	Gvt-Pvt	-2.76	-4.69	-.82
									Pvt-SemiGvt	4.22	1.40	7.04
Dstr	15.68	3.24	16.54	3.20	16.53	3.17	4.09	.02	Gvt-Pvt	-.86	.09	1.62
SC	14.42	2.99	14.10	3.21	14.15	3.41	.55	.58	N-A			
Wrry	12.71	3.81	13.13	3.93	11.98	3.60	2.19	.11	N-A			
Pnsh	12.84	3.76	12.99	3.46	12.45	3.37	.53	.59	N-A			
Reapp	14.33	3.35	15.09	3.09	14.87	3.48	2.81	.06	N-A			
EOC	45.00	8.46	49.47	9.33	46.32	8.67	13.03	.00	Pvt-SemiGvt	-4.47	-6.59	-2.34
AOC	48.77	8.78	51.77	9.24	49.76	8.55	5.64	.04	Gvt-Pvt	3.15	.02	6.28
AnTi	15.09	4.11	17.23	4.59	15.44	4.09	13.34	.00	Gvt- SemiGvt	2.13	-3.15	-1.11
									Pvt-SemiGvt	1.78	-3.34	-.23
Threat	13.36	6.97	13.67	7.56	12.38	7.18	.69	.50	N-A			
Loss	9.33	5.00	9.71	5.24	9.39	5.33	.29	.75	N-A			

Note. PBW= Positive Beliefs about Worry; NBW= Negative Beliefs about Worry; CC= Cognitive Confidence; CIT= Control of Intrusive Thoughts; CSC= Cognitive Self Consciousness; PBRS= Positive Beliefs about Rumination; NBRS= Negative Beliefs about Rumination; Dstr= Distraction; SC= Social Control; Wrry= Worry; Pnsh= Punishment; Reapp= Reappraisal; EOC= Emotion Oriented Coping; AOC= Avoidance Oriented Coping; AnTi= Metaworry; CI= Confidence Interval; LL= lower Limit; UL= upper limit.

The mean differences associated with subscales across government, semi government and private organizations are reported in the Table 16. As depicted above in table the results showed only eight comparisons indicating statistically significant differences in cognitive mechanisms within various types of Organization. The results presented significant mean differences for negative beliefs about worry across government and private and private and semi-government ($p < .01$) organizations. The cognitive self-consciousness depicted significant differences between government and private organizations ($p < .01$), emotion oriented coping showed differences between private and semi-government ($p < .01$) and avoidance oriented coping showed between government and private ($p < .05$), government and semi-government ($p < .05$) organizations. Lastly, the anxious thoughts revealed significant differences between private and government organizations ($p < .01$).

The post hoc analysis (Bonferroni) showed that most frequently study variables showed significant difference between private and government organizations for negative beliefs about worry, cognitive self-consciousness, negative beliefs about rumination, distraction, avoidance coping and metaworry (anxious thoughts). Additionally, similar frequently observed and closely followed by significant mean differences were between private and semi-government. Notably, there were no significant differences observed between semi-government and government in any of the study variables.

Discussion for Time-1

The first wave i.e. Time-1 of the main study was aimed at assessing measurement properties of scales, the directions of proposed relationships, and mean differences across demographic categories on S-REF model measures. The data was obtained from a purposively selected sample from various work environments. Considering the longitudinal design of the study full time permanent employees were recruited, extensive demographic information of the participants was obtained for future correspondence and later time-waves.

The second objective of Time-1 was to assess the construct validity of all measures. The measuring tools for the present study had been scarcely employed in indigenous milieu thus it was deemed necessary to identify construct validity issues if any. The entire regime of study variables was evaluated through confirmatory factor analysis procedure using AMOS software (version 23) to provide evidence for construct structure. The scales showed appropriateness of fit indices for the factor structure indicating model fit to the data. In some cases, the model fit was achieved after additionally correlating errors variances e.g., metacognitive questionnaire and thought control questionnaire, that can be attributed to the multifaceted nature of the measures. Nevertheless, the model fit indices were adequate.

The psychometric properties of the instruments were assessed with the assumption that internal consistency coefficients will further improve due after the pilot study due to larger sample size. However, the coefficients relatively remained same for some variables, a few subscales showed slight increase along with minor decreases were observed in a couple though by and large most coefficients remained unchanged. Overall all study variables showed acceptable range of reliability coefficients that indicated soundness of instruments regarding psychometric

evaluation. The correlation matrices showed that study variables followed the proposed pattern of associations. Previous research (Wells & Cartwright-Hatton, 2004) indicates facets of metacognitive questionnaire to positively correlate with each other that confirmed our present findings. Moreover, the literature also showed a positive correlation between metacognitive beliefs, emotion and avoidance oriented coping (Wells, 2000) arguing that maladaptive coping style being responsible for the maintenance of emotional dysregulation.

Mathews and Wells (2000) maintain that metaworry is furthered by emotion oriented coping that plays an imperative role in the development and maintenance of emotional disorders. Similar findings were evident in our results that showed a significantly positive association between metaworry and emotion oriented coping. Folkman (1984) states that a primary appraisal of threat or loss leads to emotional coping and avoidance when the lack of resources of the individual restrains from active problem focused coping indicating a positive relationship. Our findings were in-line with the preceding literature and showed a significantly positive relationship among threat, loss emotion and avoidance oriented coping.

The mean differences with reference to the demographic categories have been barely addressed in the past researches in particular to S-REF model, however some indications have been provided from different routes. Presently, our findings showed significant gender differences in terms of negative beliefs about worry, distraction punishment, reappraisal and anxious thoughts. According to researches, women have been reported to show elevated emotion oriented coping as compared to men.

According to Li, Yuan, and Lin (2008) women have a greater tendency towards negative stimuli supporting *female negativity bias hypothesis* hence causing a susceptibility to developing emotional disorder. Williams et.al., (2008) found that

women hold greater affective reactivity as compared to men supporting our findings of differences in means on negative beliefs about worry and anxious thoughts. More recent results suggest that this bias is formed very early in the processing of emotional content suggesting emotion oriented information processing to be found prevalent in women. The "cognitive reappraisal strategy" to decrease emotional response to emotional stimuli were tested in terms of gender differences by McRae, Ciesielski, and Gross (2012). They found greater capacity in men to regulate emotionally oriented responses compared to women due to reduced amydala activity. It is observed through our results that men were found to be higher in means for distraction and reappraisal. The male has been reported to be higher in problem-focused coping (Endler & Parker, 1998).

Positive and negative beliefs are positively associated with vulnerability to pathological worry (Cartwright-Hatton & Wells, 1997; Wells & Papageorgiou, 1998) and no differences were observed between patient with generalized anxiety disorder and nonpatients (Wells & Carter, 2001). Additionally, supporting the notion using worry as an information processing approach may donate to the production of Intrusive thoughts under some conditions. Nolen-Hoeksema (2001) showed that participants engaged in a physically distracting task immediately after dysphonic mood were more profoundly alleviated of dysphoria as compared to the passive group. These results remained consistent across nonclinical sample (Morrow & Nolen-Hoeksema, 1990).

Due to scarcity in exploration of sociodemographic categories in metacognitive component we could not come across empirical findings in terms of marital status. However, some inconsistent findings were seen through coping strategies in married versus unmarried groups (McRae, Ciesielski, & Gross, 2012)).

Married women were also reported to use more emotion oriented coping for e.g., when feared with burden of infertility (Chaplin, Hong, Bergquist, & Sinha, 2008). This lays a logical ground to use metacognitive strategies to deal with stressful situations and hence use thought control further to battle with the potential or feared loss. The mean differences with reference to demographic categories have been scarcely been investigated in the metacognitive domain. Some indications however have been provided (Bahrami, & Yousefi, 2011) presently our findings showed significant gender differences in terms of negative beliefs about worry, distraction punishment, reappraisal and anxious thoughts. According to Matud (2004) women have been reported to show elevated emotion oriented coping as compared to men this comparison was also highlighted in the stark difference between means of present study.

Due to scarcity in exploration of socio-demographic categories in metacognitive component we could not come across concrete findings in terms of marital status. However, some inconsistent findings were seen through coping strategies in married versus unmarried groups (Rooafzah et. al., 2014). Married women were also reported to use more emotion oriented coping when feared with burden of infertility (Chaplin, Hong, Bergquist, & Sinha, 2008). This lays a logical ground to use metacognitive strategies to deal with stressful situations and hence using thought control strategy further to battle with the potential or feared loss.

The final objective of Time-1 study highlighted mean differences in study variables between types of organization. The type of organization will dictate different norms resulting into various organizational environment and culture. According to Bandura (1997) social pressures in various environments play an important role in affecting cognitive processes. They are also responsible for potential

causes of stressors. A division in terms of organizational culture and environment when comparing government, semi-government and private organizations in Pakistan include working hours, monitoring system, job security, pay scales and job stress etc. The organization types may be parallel on some of these variables but they are evidently different in term of jobs security, job stress, and monitoring systems. Especially the private sector jobs are more demanding and there's greater auto mobility leading to major job stress.

The consequence of low performance in government jobs may lead to transfer to far regions but in private setup it may result in joblessness. Under these scenarios, employees of private organizations are logically susceptible to more threats or loss thus we presumed to have differences on metacognitive factor as well as coping strategies. Our results also support the above discussion empirically where the results show an elevated means for negative beliefs about rumination, emotion and avoidance oriented coping, cognitive self-consciousness and metaworry in private organizations. The cognitive elements of employees have early been a focus of attention in Pakistani context (Malik, Chugtai, Iqbal, & Ramzan, 2013). The results showed that the private organizations were found to be associated with numerically higher values for most metacognitive and thoughts control strategies.

The authors of S-REF model argue elevated threat appraisal and use of emotion oriented coping in uncertain or emotionally demanding contexts thus it was very likely to obtain mean differences between government and private organizations. The flavor of semi-government organization is partially private and partially government. To the best of our inquiry, the present comparison has infrequently been attended in the context of Pakistan. Thus, present results lay a foundation for future investigations into metacognitive dimensions. Some authors have shown the

association of cognitive function impairment in midlife with long working hours from 2,214 British civil servants. The results indicated adverse effects on cognitive functioning on unhealthy lifestyle (Caruso, Hitchcock, Dick, Russo, & Schmit, 2004), diabetes (Johnson, & Lipscomb, 2006), fatigue, depression and increasing evidences for dementia as a results of mid-life risk factors (Whitmer et. al., 2005)

The previous literature is suggestive of differences in work environments of government and private sector organizations (Shahzad, Hussain, Bashir, Chishti, & Nasir, 2011). Our findings assert that private organizations are significantly different from government and semi-government organization with reference to cognitive self-consciousness, emotion and avoidance oriented coping and metaworry. This can reasonably be attributed to the evidence provided by Shimazu and Schaufeli (2007) who maintain that maladaptive coping is high when problem focused coping is negatively associated with stress in organizational environment.

Additionally, evidence provided by a cross sectional study showed impaired performance of executive function on attention test (Virtanen et.al., 2009). These facts are in arrangement with our results. Therefore, the elevated mean values for private and semi-government organizations on negative beliefs about worry and distraction variable are admissible. It is a contribution of present research, adding to existing literature that significant differences in metacognitive features exist between private, government and semi-government organizations. Future attempts should focus on exploring factors associated with present findings.

Time-2 Results

Sample

The sample of the Time-2 study comprised of same employed professionals from various work environments, working in different capacities in various private, semi-government and government organizations from the cities of Lahore, Islamabad and Rawalpindi. As the time span between each time-wave was only four months therefore there were no major changes observed in the sample demographics. However, attrition of many subjects occurred mainly due to transfers, resignation and participants not willing to continue further.

Instruments

The same instruments were used for the Time-2 study. Following is the list of instruments.

1. Metacognitive Questionnaire (Cartwright-Hatton & Wells, 1997)
2. Positive and Negative Beliefs about Rumination Scale (Papageorgiou & Wells, 2001; Papageorgiou, Wells & Meina, 2003)
3. Appraisal of Life Events (Ferguson, Matthews, & Cox, 1999)
4. Thought Control Questionnaire (Wells & Davies, 1994)
5. Coping Inventory for Stressful Situations (Endler & Parker, 1990)
6. Anxious Thoughts Inventory (Wells, 1994)

Procedure

The same participants were approached and verified with the personal record in demographic forms previously provided by these subjects on Time-1. The attrition rate was found high and in 4-months span, we had lost 124 (24%) participants due to job change, workload, official assignments and lack of interest etc.

Objectives of Time-2 Main Study

1. To assess the internal consistency of instruments with Time-2 data.
2. To test the effect of Time-1 antecedents on Time-2 outcomes.
3. To test differences in bivariate correlations across time points within study variables.

Assessing the Trends of Association between Time-1 and Time-2 Variables.

Hypotheses

1. There will be significant positive correlation between subscales of metacognitive scales between Time-1 and Time-2.
    a. There will be significant positive correlation between positive beliefs about worry subscales for Time-1 and Time-2.
    b. There will be significant positive correlation between negative beliefs about worry subscales for Time-1 and Time-2
    c. There will be significant positive correlation between cognitive confidence subscales for Time-1 and Time-2
    d. There will be significant positive correlation between control of intrusive thoughts subscales for Time-1 and Time-2
    e. There will be significant positive correlation between cognitive self-consciousness subscales for Time-1 and Time-2.
2. There will be significant positive correlation between positive beliefs about rumination scales between Time-1 and Time-2.
3. There will be significant positive correlation between negative beliefs about rumination scales between Time-1 and Time-2.

4. There will be significant positive correlation between thought control subscales between Time-1 and Time-2.
    a. There will be significant positive correlation between distraction subscales for Time-1 and Time-2.
    b. There will be significant positive correlation between social control subscales for Time-1 and Time-2
    c. There will be significant positive correlation between worry subscales for Time-1 and Time-2
    d. There will be significant positive correlation between punishment subscales for Time-1 and Time-2
    e. There will be significant positive correlation between reappraisal subscales for Time-1 and Time-2
5. There will be significant positive correlation between metaworry subscales of Time-1 and Time-2.
6. There will be significant positive correlation between coping inventory subscales between Time-1 and Time-2.

Paired Mean Differences between Time-1 and Time-2 Data

Hypotheses

1. There will be significant differences in means of metacognitive subscales between Time-1 and Time-2 measures.
    a. There will be significant differences in means of positive beliefs subscale between Time-1 and Time-2 measures.
    b. There will be significant differences in means of negative beliefs subscale between Time-1 and Time-2 measures.
    c. There will be significant differences in means of cognitive confidence between Time-1 and Time-2 measures.
    d. There will be significant differences in means of control of intrusive thoughts subscale between Time-1 and Time-2 measures.
    e. There will be significant differences in means of cognitive self-consciousness between Time-1 and Time-2 measures.
2. There will be significant differences between means in positive and negative beliefs about rumination scales between Time-1 and Time-2
3. There will be significant differences between means in thought control subscales between Time-1 and Time-2.
    a. There will be significant differences in means of distraction between Time-1 and Time-2 measures.
    b. There will be significant differences in means of social control between Time-1 and Time-2 measures.
    c. There would be significant differences in means of worry between Time-1 and Time-2 measures.

d. There will be significant differences in means of punishment between Time-1 and Time-2 measures.

e. There will be significant differences in means of reappraisal between Time-1 and Time-2 measures.

4. There will be significant differences between means in the anxious thoughts subscale of metaworry between Time-1 and Time-2.

5. There will be significant differences in means of appraisal of life events subscales between Time-1 and Time-2 measures.

    a. There will be significant differences in means of threat subscale between Time-1 and Time-2 measures.

    b. There will be significant differences in means of loss subscale between Time-1 and Time-2 measures.

6. There will be significant differences between means in the subscales of coping inventory for stressful situations between Time-1 and Time-2.

    a. There will be significant differences in means of emotion oriented coping between Time-1 and Time-2 measures.

    b. There will be significant differences in means of avoidance oriented coping between Time-1 and Time-2 measures

Assessment of Internal Consistency with Time-2 data.

Table 17.

Time- 2 Alpha reliability coefficients of Subscales for study variables (N=390).

Scales	No. of Items	Cronbach Alpha
Metacognitive Subscales		
Positive Beliefs about Worry	6	.77
Negative Beliefs about Worry	6	.69
Cognitive Confidence	6	.68
Control of Intrusive Thoughts	6	.72
Cognitive Self Conscious	6	.77
Beliefs about Rumination		
Positive Beliefs about Rumination	9	.82
Negative Beliefs about Rumination	9	.91
Appraisal of Life Events Subscales		
Threat Appraisal	6	.86
Loss Appraisal	4	.85
Anxious Thought Inventory Subscale		
Metaworry	6	.77
Thought Control Subscales		
Distraction	6	.69
Social Control	6	.64
Worry	6	.76
Punishment	6	.74
Reappraisal	6	.73
Coping for Stressful Situation Subscales		
Emotion Oriented Coping	16	.85
Avoidance Oriented Coping	16	.86

The scales showed psychometric adequacy for internal consistency coefficients for Time-2 data (*N*=390). All scales represented soundness of measures with minor decrement for example positive beliefs about rumination and threat subscales. Conversely, the emotion and avoidance oriented coping and thought control subscale showed slight increases while cognitive self-consciousness, anxious thoughts and worry remained unchanged. Overall, the coefficient depicted acceptable sizes for further analysis.

Table 18.

Time-1 Correlation matrix subscales for Metacognitive scale, Beliefs about Rumination, Thought Control scale, Coping Inventory for Stressful Situation and Appraisal for Life Events for Time-1(N=514) and Time-2(N=390).

S.no	Subscales	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Positive Beliefs about worry	-	.26**	.30**	.44**	.40**	.33**	.29**	.20**	.17*	.41**	.24**	.32**	.35**	.38**	.25**	-.01	-.06
2	Negative Beliefs about worry	.12**	-	.37**	.45**	.20**	.36**	.47**	-.00	-.03	.49**	.39**	.15*	.52**	.29**	.22**	.24**	.22**
3	Cognitive Confidence	.10**	.27**	-	.44**	.01	.25**	.44**	.10	-.00	.46**	.39**	.07	.25**	.21**	.12	.10	.02
4	Control of Intrusive Thoughts	.05**	.12**	.13**	-	.39**	.36`**	.46**	.19**	-.08	.39**	.27**	.34**	.41**	.40**	.23**	.20**	.18**
5	Cognitive Self-Conscious	.07**	.19**	.32**	.11**	-	.32**	.19**	.37**	.10	.19**	.02	.45**	.37**	.41**	.44**	.25**	.24**
6	Positive Beliefs about Rumination	.16**	.08**	.13**	.09**	.18**	-	.29**	.22**	.07	.38**	.32**	.37**	.31**	.44**	.37**	.04	.03
7	Negative Beliefs about Rumination	.14**	.13**	.12**	.12**	.11**	.14**	-	.09	.10	.47**	.41**	.18**	.35**	.38**	.20**	.18*	.10
8	Distraction	.04**	.11	-.03	.10**	.13**	.08**	-.01	-	-.01	.14*	.06	.50**	.11	.28**	.41**	.04	.08
9	Social Control	-.17	-.05	-.02	.01	-.03	.06	-.08	.09	-	.16*	-.02	-.11	-.02	.13	.08	.01	-.02
10	Worry	.09**	.07**	.04**	.06**	.09**	.06**	.14**	-.07	-.13	-	.58**	.27**	.31**	.37**	.19**	.12	.02
11	Punishment	.21**	.16**	.15**	.31**	.36**	.18**	.25**	.12**	.08	.05**	-	.26**	.11	.30**	.16*	.14*	.10
12	Reappraisal	.04**	.12**	.23**	.04**	.21**	.17**	.08**	.03**	.23	.07**	.11**	-	.25**	.39**	.35**	.16*	.17*
13	Metaworry	.02**	.09**	.25**	.04**	.01**	.04**	.08**	.12**	-.09	.15**	.29**	.02**	-	.35**	.22**	.23**	.26**
14	Emotion Focused Coping	.09**	.09**	.06**	.04**	.04**	-.02**	.04**	.14**	.14**	.05**	.11**	.07**	.05**	-	.73**	.16*	.15*
15	Avoidance Focused Coping	.08**	.04**	-.02	.12**	.00**	.02**	.01**	.23**	.10**	.06**	.06**	.07**	.02**	.04**	-	.19**	.19**
16	Threat Appraisal	.35**	.12**	.10**	.11**	.01**	.12*	.15**	.14*	-.08	.25**	.14**	.03**	.19**	.12**	-.15*	-	.75**
17	Loss Appraisal	.41**	.11**	.30**	.11**	.04**	.15**	.19**	.11**	-.07	.20**	.20**	.04**	.20**	.10**	.00**	.02**	-

**p<.05, **p<.01.*

Above Diagonal= T1 measurement; Below Diagonal= T2 measurements

Correlation Comparisons across Time-1 and Time-2

The paired comparison of association across time waves showed a variety of changes in magnitude and directions. Typically, majority of the pairs showed similar directions however, some of the variables e.g., correlation between Time-1 distraction and negative beliefs about rumination *r*= -.00, while in Time-2 *r*= .11; Time-1 control of intrusive thoughts and social control showed *r*= -.08, in Time-2 *r*= .01; Time-1 control of intrusive thoughts and distraction showed *r*= -.01, while in Time-2 *r*= .09; Time-1 punishment and social control showed *r*= -.02, while in Time-2 *r*= .06; Time-1 reappraisal and social control showed *r*= -.1, in Time-2 *r*= .13; Time-1 positive beliefs about worry and threat showed *r*= -.01, while in Time-2 *r*= .34; Time-1 threat and social control showed *r*= .01, while in Time-2 *r*= -.12 and Time-1 loss and positive beliefs about worry threat showed *r*= -.06, while in Time-2 *r*= .35 presented change of direction yet the values were dominantly nonsignificant except for threat and loss with positive beliefs about worry.

For reason of comparison, the variables are clustered to enable organized explanation of results. The differences in associations that ranged between -.20 to .-10 included variables positive beliefs about worry and social control (r_{diff} = -.17); worry and social control (r_{diff} = .13) and threat and avoidance oriented coping (r_{diff} = .15), these variables were nonsignificant. For the range of association between -.09 to .00 included distraction and negative beliefs about rumination (r_{diff} = -.01, $p > .05$), social control and negative beliefs about worry (r_{diff} = -.05, p >.05), social cognitive confidence (r_{diff} = -.02, $p > .05$), social control and cognitive self-consciousness (r_{diff} = -.03, $p > .05$), social control and negative beliefs about rumination (r_{diff} = -.08, p >.05), worry and distraction (r_{diff} = -.07, $p > .05$), metaworry (AnTi) and social

control (r_{diff} = -.09, p >.*05*), emotion oriented coping and negative beliefs about rumination (r_{diff} = -.02, p < .01), avoidance oriented coping and negative beliefs about rumination (r_{diff} = -.02, p > .05) and threat and social control (r_{diff} = -.02, p > .08).

The majority of the r_{diff} in study variables lied between .01 to .20 however, the highest range of difference i.e., between .21 to .41 was found between positive beliefs about worry and punishment (r_{diff} = .21, p < .001), positive beliefs about worry and threat (r_{diff} = .35, p < .001), positive beliefs about worry and loss (r_{diff} = .41, p < .001), negative beliefs about worry and cognitive confidence (r_{diff} = .27, p < .001), cognitive self-consciousness and cognitive confidence (r_{diff} = .32, p < .001), cognitive confidence and loss (r_{diff} = .30, p < .001), punishment and control of intrusive thoughts (r_{diff} = .31, p < .001), cognitive self-consciousness (r_{diff} = .36, p < .001) and negative beliefs about rumination (r_{diff} = .25, p < .001); and metaworry (anxious thought), avoidance oriented coping and distraction (r_{diff} = .23, p < .001), threat and worry (r_{diff} = .25, p < .001) and lastly, loss and cognitive confidence (r_{diff} = .30, p < .001) and worry (r_{diff} = .20, p < .001). Interestingly, the social control and emotion oriented coping displayed a nonsignificant relationship in Time-1 that was observed to have become significantly positive in Time-2.

Table 19.

Table for Paired Sample t-test for Time-1 and Time-2

	Time 1 (*n*=390)		Time 2 (*n*=390)		*t*	*p*	95% CI for Mean Difference		*Cohen's d*
Variables	*M*	*SD*	*M*	*SD*			*LL*	*UL*	
PBW	13.45	4.00	14.12	3.67	-3.25	.02	-1.23	-.10	.17
NBW	13.69	4.23	14.80	4.17	-3.78	.00	-1.69	-.52	.26
CC	12.26	3.67	13.89	4.17	-4.58	.00	-2.19	-1.08	.42
CIT	13.82	3.56	14.55	3.74	-2.65	.01	-.97	.08	.20
CSC	15.50	3.42	15.69	3.57	-.72	.10	1.04	2.08	.05
PBRS	15.95	3.36	15.71	3.56	.91	.00	-1.73	-.16	.07
NBRS	14.49	2.99	14.44	2.64	.24	.02	-1.73	-1.16	.02
Dstr	12.96	3.94	13.74	4.09	-2.58	.00	-4.35	-1.84	.19
SC	13.06	3.70	13.75	3.89	-2.53	.01	.211	1.18	.18
Wrry	14.63	3.37	15.01	3.76	-1.38	.00	-1.72	-.59	.11
Pnsh	47.58	9.31	48.67	10.93	-1.37	.00	-1.67	-.63	.11
Reapp	50.20	9.24	49.89	10.94	.40	.69	-.48	.49	.03
EOC	13.66	7.19	14.22	7.28	-1.01	.37	-2.02	.76	.08
AOC	9.68	5.03	9.52	5.23	.42	.03	.17	3.03	.03
AnTi	16.38	4.50	14.50	3.89	2.48	.00	1.28	2.48	.44
Threat	12.89	7.54	14.41	7.07	-.48	.004	-2.56	-.48	.21
Loss	9.33	5.25	9.44	5.17	.64	.77	-.86	.64	.02

Note. PBW= Positive Beliefs about Worry; NBW= Negative Beliefs about Worry; CC= Cognitive Confidence; CIT= Control of Intrusive Thoughts; CSC= Cognitive Self Consciousness; PBRS= Positive Beliefs about Rumination; NBRS= Negative Beliefs about Rumination; Dstr= Distraction; SC= Social Control; Wrry= Worry; Pnsh= Punishment; Reapp= Reappraisal; EOC= Emotion Oriented Coping; AOC= Avoidance Oriented Coping; AnTi= Metaworry; CI= Confidence Interval; LL= lower Limit; UL= upper limit.

To test the hypothesis of significant differences between variables across Time-1 and Time-2, paired sample *t*- test was performed. Prior to the analysis, the assumption of normally distributed differences of scores was examined that was satisfied. The results showed significant mean differences for all study variables except reappraisal, emotion oriented coping and loss indicating higher scores for most variables during Time-2. Cohen's *d* ranged between .03 to .44 reflecting from negligible to small effects according to the guidelines provided by Cohen (1992).

Predicting the Time-2 situational processing variables with the Time-1 variables.

To predict the situational processing variables in Time-2, multiple regression analysis was performed with the predictors of Time-1 (i.e., self-knowledge variables). A preliminary verification was executed to ensure the assumptions of normality, multicollinearity, homoscedasticity, and linearity for each study variable that were satisfied. The dependent variables included were taken from Time-2 data i.e., T2-emotion oriented coping, T2-avoidance oriented coping, T2-threat, T2-loss. The dependent variables were independently regressed on Time-1 independent variables.

Table 20.

Table showing Time-1 Predictor (Self-Knowledge) variables on T2- Emotion Oriented Coping in Multiple Regression Analysis (N=390).

	T2- Emotion Oriented Coping		
		95% CI	
Variables	*β*	*LL*	*UL*
Constant	62.57	46.81	78.34
Positive Beliefs about Worry	-.17	-1.10	.07
Negative Beliefs about Worry	-.16	-1.15	.19
Cognitive Confidence	-.07	-.88	.45
Control of Intrusive Thoughts	.25*	.06	1.52
Cognitive Self Consciousness	-.12	-1.15	.29
Positive Beliefs about Rumination	.02	-.38	.46
Negative Beliefs about Rumination	-.21	-.61	.02
Distraction	-.01	-.72	.66
Social Control	-.01	-.69	.62
Worry	.11	-.37	1.00
Punishment	.11	-.31	.95
Reappraisal	-.05	-.89	.59
R^2	.12		
F	.14		

*Note: *p<.05*

The multiple regression analysis with predictors from Time-1 self-knowledge variables on T2- emotion oriented coping (dependent variable) represented nonsignificant regression F (17, 293) = .87, $p > .05$ for all except control of intrusive thoughts. The results indicated that control of intrusive thoughts at Time-1 positively predicted emotion oriented coping ($\beta = .25$, $p < .05$) at Time-2.

Table 21.

Table showing Time-1 Self-Knowledge (Predictor) variables of T2-Avoidance Oriented Coping in Multiple Regression Analysis (N=390).

	T2- Avoidance Oriented Coping		
		95% CI	
Variables	*β*	*LL*	*UL*
Constant	49.88	35.36	64.41
Positive Beliefs about Worry	-.11	-.86	.24
Negative Beliefs about Worry	-.21	-1.19	.04
Cognitive Confidence	.01	-.58	.65
Control of Intrusive Thoughts	.18	-.16	1.23
Cognitive Self Consciousness	-.06	-.85	.49
Positive Beliefs about Rumination	.05	-.29	.48
Negative Beliefs about Rumination	-.18	-.54	.05
Distraction	.01	-.62	.70
Social Control	.09	-.31	.93
Worry	-.05	-.79	.52
Punishment	.16	-.15	1.03
Reappraisal	.05	-.57	.86
R^2	.01		
F	1.08		

The second multiple regression analysis was conducted on the T2- avoidance oriented coping where nonsignificant regression findings were observed F (17, 305) = .68, $p > .05$). The results indicated that there were nonsignificant effects of Time-1 knowledge across situational avoidance coping in Time-2

Table 22.

Table showing Time-1 (Self-Knowledge) variables as Predictors of T2- Threat in Multiple Regression Analysis (N=390).

		Time 2- Threat	
		95% CI	
Variables	*β*	*LL*	*UL*
Constant	6.79	-3.00	16.58
Positive Beliefs about Worry	-.06	-.48	.25
Negative Beliefs about Worry	.19	-.05	.80
Cognitive Confidence	.07	-.27	.56
Control of Intrusive Thoughts	-.05	-.57	.36
Cognitive Self Consciousness	-.24*	-.96	-.07
Positive Beliefs about Rumination	.14	-.08	.45
Negative Beliefs about Rumination	-.07	-.26	.14
Distraction	.17	-.06	.80
Social Control	.12	-.13	.69
Worry	.06	-.33	.56
Punishment	-.27**	-.89	-.10
Reappraisal	.14	-.17	.76
R^2	.05		
F	1.60		

Note: **p<.05, **p<.01.*

The third multiple regression analysis was conducted on Time-2 dependent variable threat that represented nonsignificant regression coefficients for majority of the Time-1 predictors F (17, 304) = 1.29, $p > .05$). However, it was observed that a single standard unit increase in cognitive self-consciousness β= -.24, ($p<$ .05) significantly predicted .24 units decrease in Time-2 threat. Likewise, punishment represented a significant decrease β = -.27, ($p<$ .05) to the predictive model. However, the overall model was nonsignificant reflecting nonsignificant effect size.

Table 23.

Table showing Time-1 variables as Predictors of T2- Loss in Multiple Regression Analysis (N=390).

		T2- Loss	
		95% CI	
Variables	*β*	*UL*	*LL*
Constant	7.06	-.05	14.17
Positive Beliefs about Worry	.03	-.22	.31
Negative Beliefs about Worry	.16	-.08	.53
Cognitive Confidence	-.07	-.40	.20
Control of Intrusive Thoughts	.01	-.32	.36
Cognitive Self Consciousness	-.30**	-.78	-.13
Positive Beliefs about Rumination	.16	-.04	.35
Negative Beliefs about Rumination	-.03	-.17	.12
Distraction	.15	-.09	.54
Social Control	.12	-.09	.51
Worry	-.05	-.39	.25
Punishment	-.12	-.44	.13
Reappraisal	.03	-.30	.38
R^2	.01		
F	1.06		

*Note: **p<.01.*

Lastly, the dependent variable i.e., T2 loss was considered for multiple regression that showed nonsignificant model coefficients F (17, 307) = 1.04, $p > .05$ with $R^2 = .01$. It was again observed that some predictors i.e., Time-1 cognitive self-consciousness significantly ($\beta = -.30$, $p < .05$) negatively predicted Time-2 loss. However, the overall model showed nonsignificant contribution to the Time-2 loss suggesting an overall non substantive contribution of the multiple predictors.

Discussion for Time-2

The Time-2 wave was anticipated to examine comparable components of Time-1 and Time-2 with reference to S-REF model. The first objective was to assess the internal consistency of the scales with Time-2 data. This was intended for multiple reasons. The Time-2 internal consistency coefficients provided a comparison for Time-1 for all scales. According to the results, the Time-2 alpha-coefficients for entire list of scales represented an adequate size. The reliability for Time-1 and Time-2 was evaluated with the time interval of approximately 3-months.

It was observed that for metacognitive subscales the alpha-coefficients for Time-1 were high on positive beliefs about worry, negative beliefs about worry and cognitive confidence while for control of intrusive thoughts and cognitive self-consciousness the Time-2 showed higher coefficient values. A study on clinical utility of metacognitive questionnaire (MCQ-30) in people with epilepsy (Fisher, Cook, & Noble, 2016) showed comparisons of internal consistency between Time-1 and Time-2 showing improved alpha-coefficients for Time-2 by minor differences indicating a variability from Time-1 to Time-2. Likewise, it has also been indicated that state measures are likely to show variances due to the nature of processing. Therefore, such changes can be attributed to the participants related and temporally intervening variables, more importantly both waves depict an acceptable range for alpha-reliability. According to Wells and Cartwright-Hatton (2004) the original test-retest coefficient ranges from acceptable to good lending support to our results. The fluctuations can be attributed to various forms of changes across time. Authors (Wells & Cartwright-Hatton, 2004) also assert that the reliability coefficients for negative

beliefs about worry to be an exception among good reliabilities for the rest of the scale.

The thought control measure (Wells & Davies, 1994) indicates strategies that individuals use to keep emotionally charging thoughts in control. The original results signified a good to high range for alpha coefficients. The present results also support previous conclusions and an increase in coefficient's values were observed in Time-2. In the case of positive and negative beliefs about rumination and appraisal of life events (i.e., threat and loss) minor differences were seen while metaworry illustrated no change at all, indicating stability overtime. The emotion and avoidance oriented coping depicted comparable results with those proposed by the original authors (Coping Inventory for Stressful Situations; Endler & Parker, 1999). The authors claim moderate to high coefficients for both male and female samples. The reliability at Time-2 was found to have improved slightly.

Our second objective was to assess the trend of association between Time-1 and Time-2 variables. The intercorrelations between subscales represented most trends in negative directions, however non-significant with relatively small values for correlation coefficient. These were suggestive of intraindividual changes over time. Some meaningful and significant intrasubscale associations between Time-1 and Time-2 included cognitive self-consciousness, positive and negative beliefs about rumination, distraction and threat. These results supported the hypothesis for cognitive self-consciousness and positive beliefs about rumination only. The entire list of hypotheses for rest of study variables was rejected due to the lack of empirical support and opposing directions.

The original coefficients for thought control subscales (Wells & Davies, 1994) were observed to be parallel in the current findings i.e., similar directions were

observed in our results. However, the distraction subscales significantly negatively correlated within intra-subscale for Time-2 for distraction, social control and worry. The original inter-subscale correlation indicated highest correlations between subscales worry and punishment likewise our results showed the same between distraction and worry. Logically, the relationships justify in connections with earlier explanations of worry being associated with cognitive avoidance (Borkovec, Ray & Stober, 1998). Likewise, Wells (1995) also suggests the metacognitions and worry work to deal with emotionally arousing content employing various thought control strategies. The type of thought control strategy used will be determined by its effectiveness in dealing with worry. At present, the significant opposite directions of distractions and worry were indicative of; an increase in distraction strategy enabled significant decrease in worry. Distraction has been found to be significantly negatively associated with Time-2 distraction signifying distractions strategy to play a negative role over time. Reasonably this can be explained in terms of, similar distraction strategies not being helpful over longer duration of time. In a study by Vickers and Vogellanz-Holm (2003) worry scores were found to be higher for post rumination conditions compared to post distraction conditions in spite of a preliminary dysphoric status proposing distraction to play an important role in lessening worry also suggestive of an inverse relationship that was observed as an addition finding other than those hypothesized.

The rest of hypotheses for significant positive relationship of thought control subscales between Time-1 and Time-2 were rejected for all due to opposing direction and non-significance. Another significant association was observed between the Time-1 positive beliefs about rumination and Time-2 negative beliefs about rumination. The relationship is theoretically consistent, often discussed within the

frame of beliefs about rumination and negative affect (Papageorgiou & Wells, 2002; Thomsen, Jørgensen, Mehlsen & Zachariae, 2004) however it has barely been explored earlier and presently our findings suggest significant correlation. Further the other results included a significantly positive correlation with Time-2 lack of cognitive confidence subscale, parallel with the results obtained by cross cultural comparison (Kubiak et al., 2014; Roelofs et. al., 2007). It is explained as a function of elevated emotional processing in ruminative individuals resulting in a lack of confidence in one's cognitive processing. The Time-1 positive beliefs about rumination were also found to correlate positively with Time-2 cognitive self-consciousness, Time-2 positive beliefs about rumination and Time-2 worry. According to Wells (1997) the subscale of metacognitions correlates with proneness to worry in nonclinical participants therefore the results are congruent with theoretical basis however the subscale has been scarcely explored with present combination of variables.

The S-REF model assumes that coping is context dependent hence stressful encounters are usually associated with emotion oriented coping. The emotion oriented coping is typically explained in terms of self-critical thinking (Lazarus & Folkman, 1984). Thus, we can reasonably expect the positive beliefs about rumination to be linked positively to avoidance oriented coping. Mathew and Winton (1995) reported emotion oriented coping in predicting trauma symptoms with severity of appraisal controlled enabling thought control process activation. In such a scenario another logical association may be avoidance that was found to be significantly positively associated with positive beliefs about rumination. It is essentially mentioned that these additional findings other than our proposed hypotheses may contribute further in understanding the latent growth for the entire time-waves. Next, the results depicted a

negative direction between Time-1 and Time-2 negative beliefs about rumination that was contrary to our assumption however the values display a nonsignificant undersize value. Other than that, a significant positive correlation was found with T2 threat. Wells and Papageorgiou (1998) suggested the likelihood of coping to be dependent of appraisal of life events an appraisal of threat may rationally be associated negative beliefs about rumination. Metaworry showed positively significant correlations with negative beliefs about worry, positive beliefs about rumination and negatively significant correlation with distraction. These findings lend support to theoretical conceptualizations in S-REF model (Mathews & Wells, 2004).

The third objective of Time-2 was to compare the paired mean differences among study variables between Time-1 and Time-2. The results showed significant differences in means across time-waves for majority of variables. The theoretical underpinning for S-REF model explains the entire system as a cognitive self-regulatory architecture (Mathews & Wells, 2004). When the self-regulatory processing is in dysfunctional mode a more brooding, negative affectivity is observed in dispositionally neurotic individuals (Mathews & Schwean et. al., 2000). However, in normal conditions the S-REF activation is less emotionally self-referent and focus on reducing the discrepancy between desired and actual status. It is more goal-directed (Martin & Tesser, 1996) and when goals are met the S-REF activation terminates. The process is most like to vary from situation to situation depending on the motivational significance of external stimuli. Every episode of S-REF activation varies with the kind of metacognitive appraisal of triggering event. The difference in the means of the study variables can therefore be logically within the S-REF conceptualization. The time lapse (i.e., 4-months) between Time-1 and Time-2 is substantially sufficient for further episodes of S-REF stimulation with different

antecedent-scenarios. According to present results Time-2 showed greater values of means that were found significantly different upon assessing with *t*- test. The information in the stressor's checklist indicated a higher frequency of family and work stressors at Time-1, while environmental stressors showed maximum frequencies for Time-2. The environmental stressors e.g., natural disasters, war or terrorism were more intense reasons of stress and likewise beyond one's control as compared to family stressors e.g., separation or divorce or work stressors e.g., change in workload or supervisor. Hence the environmental stressors posit a greater amount of threat perception directed towards mere survival. This explains the differences seen in the self-regulation variables across Time-1 and 2.

The last objective for Time-2 concentrated on predicting Time-2 situational processing in terms of coping and appraisal with the predictors of Time-1 i.e., dispositional variables of self-knowledge. The results showed that Time-1 predictors i.e., control of intrusive thoughts were found to be significantly and positively predicting the emotion oriented coping at Time-2, implying that an increase in intrusive thought-control will cause an increase in later emotion oriented coping. These results were parallel with the previous findings indicating that S-REF activation (Mathews & Well, 2004) leading to perseverative coping.

Furthermore, our exploration with other Time-2 situational processing variables i.e., threat and loss as appraisal outcome showed that an elevated cognitive self-consciousness predicted a decrease in later threat and loss appraisal. Whereas an increase in punishment strategy also caused decrease in later threat appraisal. It must however be considered that the statistical evaluation of effect size revealed that the causal relationship across time was more attributable to chance errors, these results signify two directions of explanation. First, the emotional coping, threat and loss are

event specific appraisals therefore, it may be likely that factors e.g., competitiveness within organizational environment may have been responsible for magnified appraisal of such cognitive conditions that, consequently, may have carry over effects in Time-2.

Secondly, the other Time-1 predictors may appropriately be responsible for Time-1 situational appraisals based on temporal specificity of cognitive events therefore, significant causal relationship between the two set of research variables with Time-2 outcome was unlikely.

Time-3 Results

Sample and Procedure

The sample of the Time-3 study comprised of same professionals inducted previously for Time-1 and 2 studies. The time span between each time-wave was again four-months. The total sample for Time-3 was N=280 with further attrition by approximately 110 (28%) participants. The remaining participants were instructed to inspect their information and correct for any changes in their demographic statuses. Overall there were no major changes observed in the sample demographics except for life stressors and age. The attrition of subjects in this time-wave was majorly due to participant's unwillingness to continue further.

Instruments

The same instruments were used for the Time-3 study given as the following below.

1. Metacognitive Questionnaire (Cartwright-Hatton & Wells, 1997)
2. Positive and Negative Beliefs about Rumination Scale (Papageorgiou & Wells, 2001; Papageorgiou, Wells & Meina, 2003)
3. Appraisal of Life Events (Ferguson, Matthews, & Cox, 1999)
4. Thought Control Questionnaire (Wells & Davies, 1994)
5. Coping Inventory for Stressful Situations (Endler & Parker, 1990)
6. Anxious Thoughts Inventory (Wells, 1994)

Results for Time-3

Internal Consistency Coefficients for Measures with Time-3 data.

Table 24.

Time-3 Alpha reliability coefficients of S-REF Scales (N=280).

Scales	No. of Items	Alpha Reliability Coefficients
Metacognitive Subscales		
Positive Beliefs About Worry	6	.61
Negative Beliefs About Worry	6	.60
Cognitive Confidence	6	.55
Control of Intrusive Thoughts	6	.66
Cognitive Self Conscious	6	.71
Beliefs about Rumination		
PBRS	9	.60
NBRS	9	.86
Appraisal of Life Events Subscales		
Threat Appraisal	6	.79
Loss Appraisal	4	.76
Anxious Thought Inventory Subscale		
Metaworry	6	.60
Thought Control Subscales		
Distraction	6	.68
Social Control	6	.64
Worry	6	.66
Punishment	6	.61
Reappraisal	6	.52
Coping for Stressful Situation Subscales		
Emotion Oriented Coping	16	.69
Avoidance Oriented Coping	16	.68

Objective 3: Comparing Mean Differences in study variables across Time-1, Time-2 and Time-3 using Repeated Measure Design.

Hypotheses for Repeated Measure ANOVA

1. There will be significant differences between Time-1, Time-2 and Time3 means for metacognitive subscales i.e.
    a. There will be significant differences between Time-1, Time-2 and Time-3 means for positive beliefs about worry.
    b. There will be significant differences between Time-1, Time-2 and Time-3 means for negative beliefs about worry.
    c. There will be significant differences between Time-1, Time-2 and Time-3 means for cognitive confidence.
    d. There will be significant differences between Time-1, Time-2 and Time-3 means for control of intrusive thoughts.
    e. There will be significant differences between Time-1, Time-2 and Time-3 means for cognitive self-consciousness.
2. There will be significant differences between Time-1, Time-2 and Time3 means for beliefs about rumination i.e.
    a. There will be significant differences between Time-1, Time-2 and Time-3 means for positive beliefs about rumination.
    b. There will be significant differences between Time-1, Time-2 and Time-3 means for negative beliefs about rumination.
3. There will be significant differences between Time-1, Time-2 and Time3 means for subscales of thought control strategies i.e.
    a. There will be significant differences between Time-1, Time-2 and Time-3 means for distraction.

b. There will be significant differences between Time-1, Time-2 and Time-3 means for social control.

c. There will be significant differences between Time-1, Time-2 and Time-3 means for worry.

d. There will be significant differences between Time-1, Time-2 and Time-3 means for punishment.

e. There will be significant differences between Time-1, Time-2 and Time-3 means for reappraisal.

4. There will be significant differences between Time-1, Time-2 and Time3 means for coping strategies i.e.

   a. There will be significant differences between Time-1, Time-2 and Time-3 means for emotion oriented coping.

   b. There will be significant differences between Time-1, Time-2 and Time-3 means for avoidance oriented coping.

5. There will be significant differences between Time-1, Time-2 and Time-3 means for anxious thoughts subscale i.e., metaworry.

6. There will be significant differences between Time-1, Time-2 and Time-3 means for subscales of appraisal of life events i.e.,

   a. There will be significant differences between Time-1, Time-2 and Time-3 means for appraisal of threat.

   b. There will be significant differences between Time-1, Time-2 and Time-3 means for appraisal of loss.

The repeated measure analysis of variances (RM-ANOVA) was conducted using the statistical package for social sciences (version 22). One of the assumptions in the RM-ANOVA is sphericity i.e., assumption of circularity, that evaluates whether the variances or covariance matrix of the observed data follows a specific pattern. For longitudinal data, it is usually unlikely that this assumption holds however, if sphericity is observed the RM-ANOVA method provides a powerful test for repeated measures.

The assumption of multivariate analysis of variances was evaluated using Wilks' Lambda for all variables obtaining that showed significant differences for distractions (Wilks' Lambda= .98,F (2, 226) = 2.59 (p > .05) , social control (Wilks' Lambda= .98,F (2, 226) = 2.60 (p > .05), loss (Wilks' Lambda = .99 F (2, 226) = .74 (p > .05) and worry (Wilks' Lambda= 1.00 F (2, 226) = .16 (p > .05) the remaining variable showed significant differences.

The Mauchly's Test (1940) for the equality of the expected and the observed variance patterns was significant majorly for positive and negative beliefs about worry, distraction, social control, worry, emotion oriented coping and loss suggesting that the observed matrix have approximately equal variances. The variables that showed significant scores were corrected using Greenhouse-Geisser (1958) epsilon else using an uncorrected RM-ANOVA F-test would result in inflation of Type I Errors.

Table 25.

Mauchly's Test for Sphericity (*N= 280)*

Variables	Mauchly's	*p*	Greenhouse-Geisser
Positive beliefs about worry	.99	.27	.99
Negative beliefs about worry	.99	.20	.99
Cognitive confidence	.93	.00	.94
Control of Intrusive Thoughts	.93	.00	.94
Cognitive Self-consciousness	.90	.00	.91
Positive Beliefs about Rumination	.94	.00	.94
Negative Beliefs about Rumination	.96	.01	.96
Distraction	.96	.10	.96
Social Control	.99	.20	.20
Worry	.99	.26	.99
Punishment	.97	.03	.97
Reappraisal	.94	.00	.94
Emotion Oriented Coping	.98	.12	.98
Avoidance Oriented Coping	.93	.00	.93
Anxious Thoughts	.86	.00	.88
Threat	.96	.01	.96
Loss	.98	.09	.98

The analysis was followed by post hoc analysis that depicted significant differences between variables across time. The most frequent differences were observed between Time-1 and Time-2. Majority of the variables reflected significant differences as reported in Table 26 except for distraction, social control, threat and loss ($p > .05$)

Table 26.

Post Hoc Analysis for Repeated Measure ANOVA (N= 280)

	Time-1		Time-2		Time-3					95 % CI	
	M	*SD*	*M*	*SD*	*M*	*SD*	I-J	*MD*	*p*	*LL*	*UL*
Positive Beliefs about worry	13.33	3.71	14.01	3.21	14.58	3.06	1-3	-1.25	.00	-2.07	-.41
Negative Beliefs about worry	13.31	3.75	14.45	3.69	13.68	3.23	1-2	-1.24	.00	-2.07	-.41
							2-3	.88	.02	.10	1.65
Cognitive confidence	12.46	3.43	13.64	3.74	13.78	2.75	1-2	-1.18	.00	-2.01	-.36
							1-3	-1.32	.00	-1.97	-.67
Control of Intrusive Thoughts	13.58	3.27	14.25	3.19	13.04	3.64	2-3	1.21	.00	.44	1.99
Cognitive Self-consciousness	15.02	3.22	16.05	3.18	15.38	2.38	1-2	-1.03	.01	-1.81	-.25
							2-3	.67	.03	.04	1.29
Positive Beliefs about Rumination	21.61	5.19	22.82	4.61	21.81	3.30	1-2	-1.21	.03	-2.35	-.07
							2-3	-1.00	.03	-1.93	-.08
Negative Beliefs about Rumination	26.49	7.41	29.83	7.58	29.24	6.70	1-2	-3.34	.00	-5.19	-1.49
							1-3	-2.75	.00	-4.32	-1.19
Distraction	15.76	3.09	15.80	3.05	15.31	2.38	NA				
Social Control	14.47	2.92	14.48	2.29	14.00	2.82	NA				
Worry	12.74	3.50	13.61	3.32	13.92	3.03	1-2	-.87	.02	-1.65	-.10
							1-3	-1.18	.00	-1.91	-.46
Punishment	12.77	3.51	13.76	3.31	13.36	2.59	1-2	-.99	.01	-1.73	-.25
Reappraisal	14.22	3.18	15.04	3.19	14.73	2.51	1-2	-.83	.03	-1.58	-.08
Emotion Oriented Coping	46.17	.59	48.87	.62	49.91	.44	1-2	-2.70	.01	-4.73	-.67
							1-3	-3.73	.00	-5.59	-1.88
Avoidance Oriented Coping	49.11	8.50	49.62	9.25	52.56	6.24	1-3	-3.45	.00	-5.07	-1.83
							2-3	-2.94	.00	-4.69	-1.19
Anxious Thoughts (metaworry)	15.65	.29	14.49	.22	13.78	.17	1-2	1.16	.01	.22	2.10
							1-3	1.87	.00	1.05	2.69
							2-3	.71	.04	.03	1.38
Threat	13.52	6.74	14.31	6.44	14.04	6.02	NA				
Loss	9.91	4.86	9.82	4.64	10.05	4.30	NA				

The mean differences associated with subscales across time-waves are reported in the Table 26 (page, 137). As depicted above in the results majority of the comparisons showed statistically significant differences in cognitive mechanisms within 12-months period. The results presented significant mean differences for positive beliefs about worry ($p < .001$), negative beliefs about worry ($p < .001$) cognitive confidence ($p < .05$), control of intrusive thoughts ($p < .001$), cognitive self-consciousness ($p < .001$), positive beliefs about rumination ($p < .05$; .01), negative beliefs about rumination ($p < .001$), worry ($p < .05$; .01), punishment ($p < .001$), reappraisal ($p < .05$), emotion oriented coping ($p < .05$; .01), avoidance oriented coping ($p < .001$), anxious thoughts (metaworry) ($p < .05$; .01; .001). Most frequently observed differences were observed between Time-1 and 2 in metacognitive beliefs and thought control. Subsequently, number of significant differences between Time-2 and 3 and Time-1 and 3 were seen recurrently with metacognitive beliefs and coping strategies. It is noteworthy that anxious thoughts (metaworry) was the only study variable that represented significant mean differences in all times waves suggesting random trends.

Table 27.

Linear and Quadratic Effect sizes for Repeated Measure Analysis of Variances (N=280)

	Effect	*F*(2)	*p*	Partial Eta Square (ηp^2)
Positive Beliefs about Worry	Linear	4.23	.04	.02
	Quadratic	3.47	.06	.02
Negative Beliefs about Worry	Linear	1.37	.24	.01
	Quadratic	12.97	.00	.06
Cognitive Confidence	Linear	12.01	.00	.05
	Quadratic	3.05	.08	.00
Control of Intrusive Thoughts	Linear	4.57	.03	.02
	Quadratic	.33	.57	.00
Cognitive Self-Consciousness	Linear	24.90	1.16	.00
	Quadratic	11.24	.64	.01
Positive Beliefs about Rumination	Linear	33.82	.56	.01
	Quadratic	29.80	.91	.01
Negative Beliefs about Rumination	Linear	19.06	.00	.08
	Quadratic	.74	.39	.00
Distraction	Linear	.02	.88	.00
	Quadratic	3.85	.05	.02
Social Control	Linear	.002	.96	.00
	Quadratic	4.340	.04	.01
Worry	Linear	7.49	.01	.03
	Quadratic	1.13	.29	.01
Punishment	Linear	10.32	.002	.04
	Quadratic	2.21	.14	.01
Reappraisal	Linear	7.08	.01	.03
	Quadratic	1.43	.23	.01
Emotion Oriented Coping	Linear	10.29	.00	.04
	Quadratic	1.88	.17	.01
Avoidance Oriented Coping	Linear	.37	.37	.02
	Quadratic	16.43	.00	.00
Anxious Thoughts (metaworry)	Linear	8.78	.00	.04
	Quadratic	6.41	.01	.03
Threat	Linear	1.42	.24	.01
	Quadratic	.23	.64	.00
Loss	Linear	.04	.85	.00
	Quadratic	.31	.58	.00

The Table 27 (page, 135) shows values for partial eta squared (ηp^2) that states sample differences magnitude of effect. The effect sizes are interpreted as follows, .14 or more are considered large effects, .06 or more are medium effects while .01 or more are small effects according to Stevens (1996). The Table 27 depicts medium effect sizes for the significant differences across time waves for negative beliefs about worry in quadratic growth and negative beliefs about rumination in linear growth (ηp^2 = .08), while significant but small effect sizes were also observed for cognitive confidence in linear growth (ηp^2 = .05), control of intrusive thoughts in linear growth (ηp^2 = .02), distraction in quadratic growth (ηp^2 = .02), social control in quadratic growth (ηp^2 = .01), worry in linear growth (ηp^2 = .03), punishment in linear growth (ηp^2 = .04), reappraisal in linear growth (ηp^2 = .05), emotion oriented coping in linear growth (ηp^2 = .04), anxious thoughts in linear and quadratic growth (ηp^2 = .04; .03) and threat in linear growth (ηp^2 = .01). The rest of the list of variables provided negligible effects (ηp^2 < .01), while remainder were nonsignificant.

Graphical Representation of study variables in Repeated Measure ANOVA

The metacognitive variables showed a mean-score range between 8.80 to 52.85 for Time-1, for Time-2 between 10.03 to 51.27 and for Time-3 between 10.63 to 51.59. The plots serve useful in gaining an understanding of the scores and their trends. The figures below represent combined graph for individual subscales. Later, all variables have been taken together to consolidate the operational mechanism of cognitive functions and get an overview of the entire S-REF architecture.

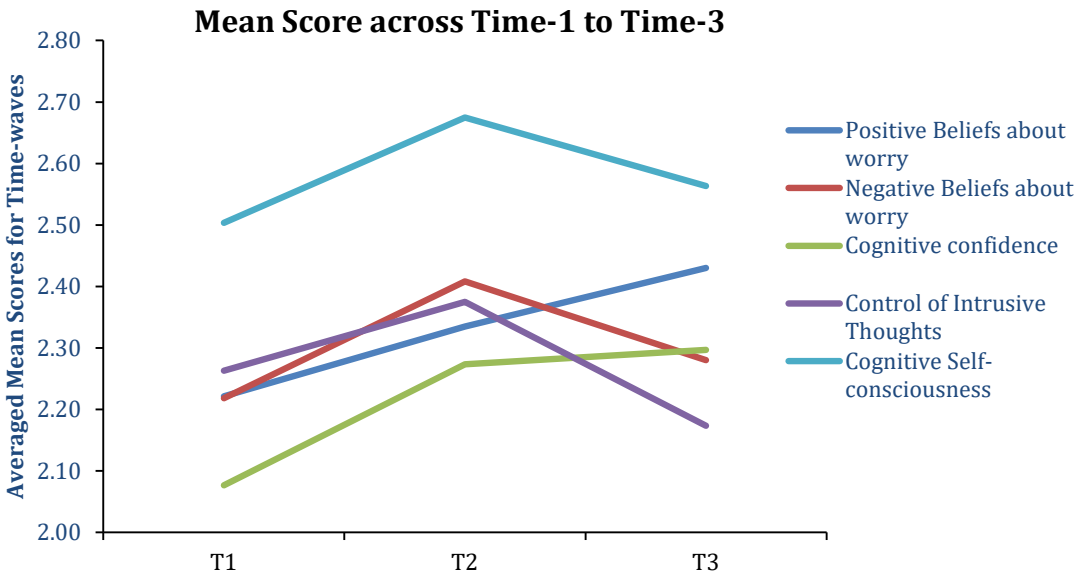

Figure 10. Metacognitive Beliefs across Time-1 to Time-3

Repeated measures ANOVA using a Greenhouse-Geisser correction enabled the conclusion that mean scores contrasted statistically significantly across time-waves (F (2.72, 5) = 6.99, $p <$ .001). Moreover, post hoc tests by Bonferroni correction showed that the positive beliefs about worry elicited an approximately linear growth from Time-1 to Time-2 that was later marked by a slight drop from Time-2 to Time-3. However, positive beliefs about worry were associated with nonsignificant scores indicating that means were similar from Time-1 till Time-3. The graphs for negative beliefs about worry, cognitive confidence and control of intrusive thoughts also depicted overall nonsignificant findings hence, the means were concluded to be similar across various times-waves. The cognitive self-consciousness elicited an approximately linear growth from Time-1 to Time-2 that was later marked by a relative planer increase from Time-2 to Time-3. The results depicted that differences between Time-1 and Time-3 were substantially different and significant.

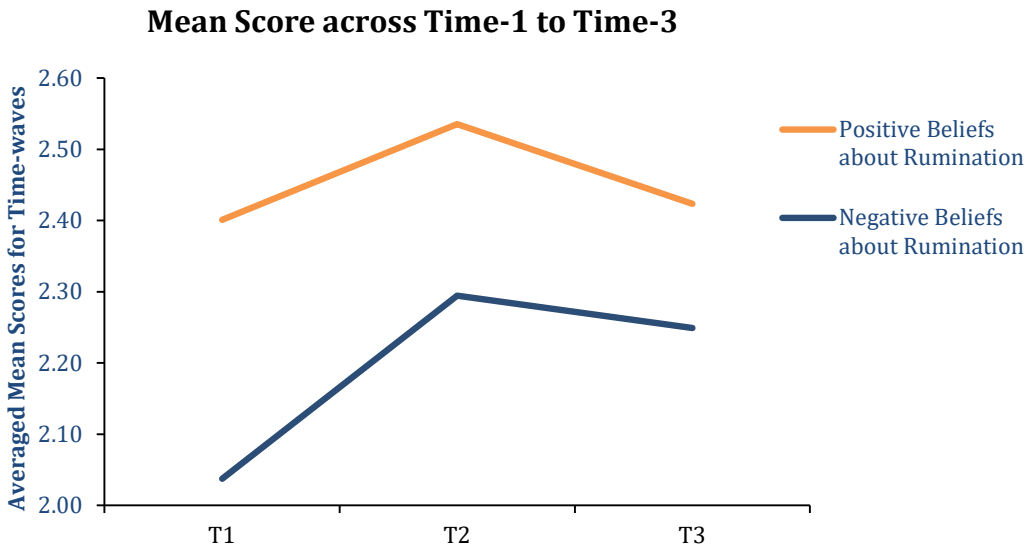

Figure 11. Positive and Negative Beliefs about Rumination across Time-1 to Time-3

Correspondingly, the repeated measure ANOVA using Greenhouse-Geisser correction and post-hoc test by Bonferroni was performed for positive and negative beliefs about rumination that yielded significant differences across Time-2 and Time-3 for positive beliefs and Time-1 and Time-2 for negative beliefs. Therefore, we conclude that longitudinally positive and negative beliefs about rumination indicated variant trends from Time-1 till Time-3.

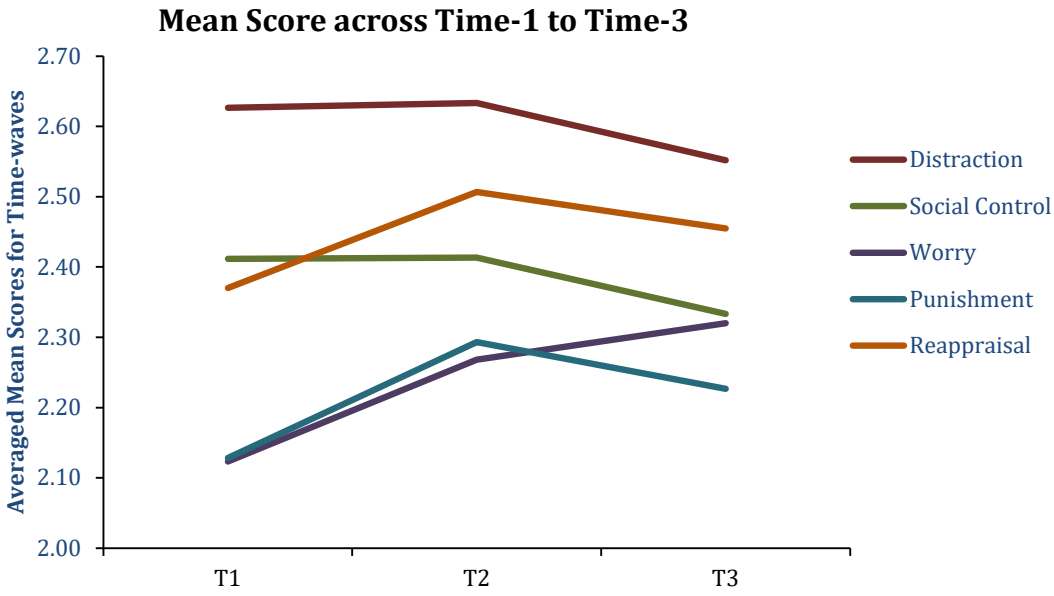

Figure 12. Thought Control Strategies across Time-1 to Time-3

The thought control strategies were evaluated for variation across time-waves using repeated measures ANOVA with sphericity assumed (F (2, 240) = 2.58, p > .05) that enabled the conclusion that mean scores for distraction, worry and punishment contrasted statistically significantly across time-waves. Moreover, post hoc tests by Bonferroni correction showed that distraction, worry and punishment elicited an approximately positive growth from Time-1 to Time-2 that was later marked by a relative contrast in later Time-waves.

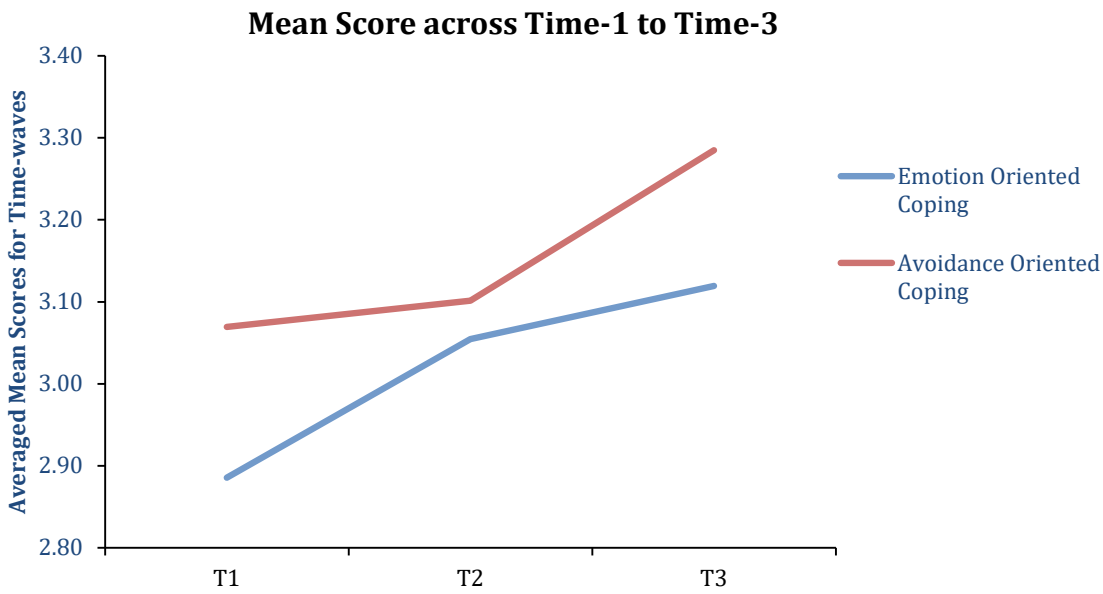

Figure 13. Coping Strategies across Time-1 to Time-4

The repeated measures ANOVA for emotion and avoidance oriented coping depicted emotion oriented coping to be significantly varied across time-waves whereas avoidance coping represented a nonsignificant trend. The graph showed differential positive and negative trend through the entire trajectory from Time-1 through Time-4 that were only significant for emotional coping strategy.

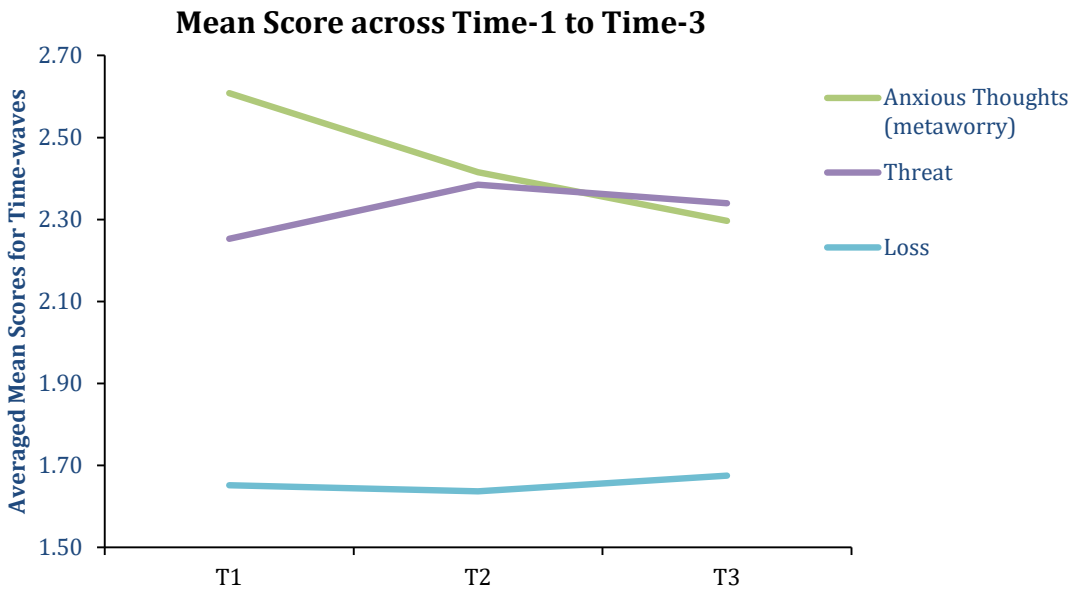

Figure 13. Coping Strategies across Time-1 to Time-3

The repeated measure ANOVA results showed that there was a statistically significant effect of time on anxious thoughts (metaworry), threat and loss. The post-hoc analysis using Bonferroni correction showed that metaworry elicited an approximately linear decline from Time-1 to Time-2 that was found to be significantly different between Time-1 and Time-3. Likewise, significant differences were observed for loss (between Time-1 and Time-3) and threat (Time-1 and Time-2).

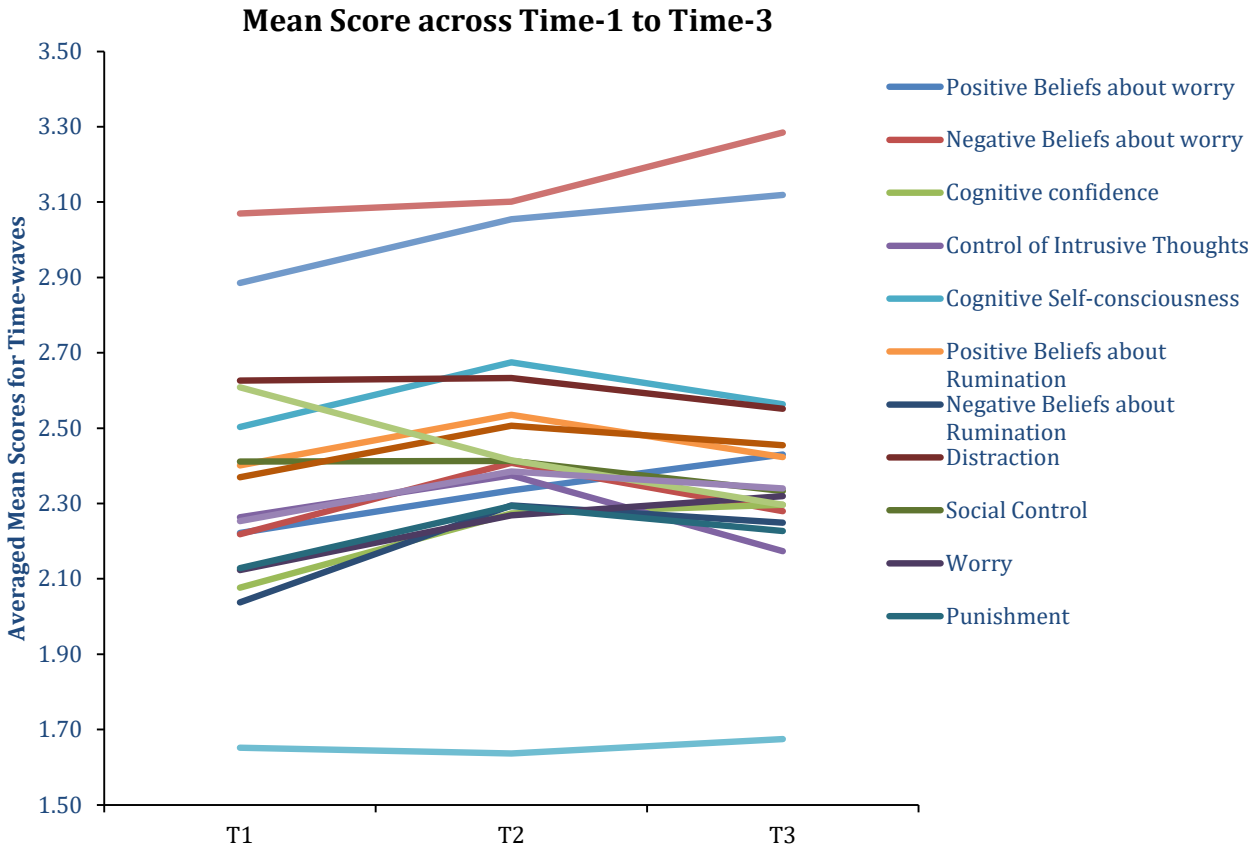

Figure 14. S-REF variables Comparison across Time-Waves

A repeated measures ANOVA with a Greenhouse-Geisser correction showed that means differed significantly for cognitive self-consciousness, positive and negative beliefs about rumination, distraction, worry, punishment, emotion oriented coping, anxious thoughts (metaworry), threat and loss between time points. Post-hoc tests using the Bonferroni correction revealed that the cognitive processing variables showed variant trends across time-waves. For example, the cognitive self-consciousness and distraction showed significant mean decline from Time-1 to Time-3 whereas the rest of the significantly variant variables depicted increased means signifying differential situational processing.

Objective 3: To explore the mediating relationship between dispositional variables and situational processing variables across Time-1 to Time-3.

The final aim of Time-3 study was marked by the exploration of mediating relationship between Time-1 dispositional variables, Time-2 situational processing variables as mediators and Time-3 dispositional variables as outcomes. The S-REF model houses the view that, though effects of coping are rather context-dependent, self-critical emotion oriented coping tends to be related with more adverse consequences in demanding encounters (Matthews & Wells, 1996). It was therefore assumed that S-REF activation in Time-1 will be likely in showing significant mediating effects on Time-3. The analysis was performed using Amos software version 22. The first model was designed with all Time-1 predictor subscales as antecedents with Time-2 emotion and avoidance oriented subscales and threat and loss as situational processing mediators and entire list of Time-3 subscales as outcomes.

The model was then revised by trimming and covarying of error variances indicated by the modification indices. However, the model remained short of adequate model fit. The final version of the model is shown in the following figure. The same inquiry was run for the entire various logical combinations of study variables separately with same mediators and outcome variables. The results depicted similar picture for all sets of variables. Despite various attempts in improving the model fit the models were severely short of reaching desired fit indices. Hence, it was concluded that longitudinally model did not mediate through situational processing indicators across time.

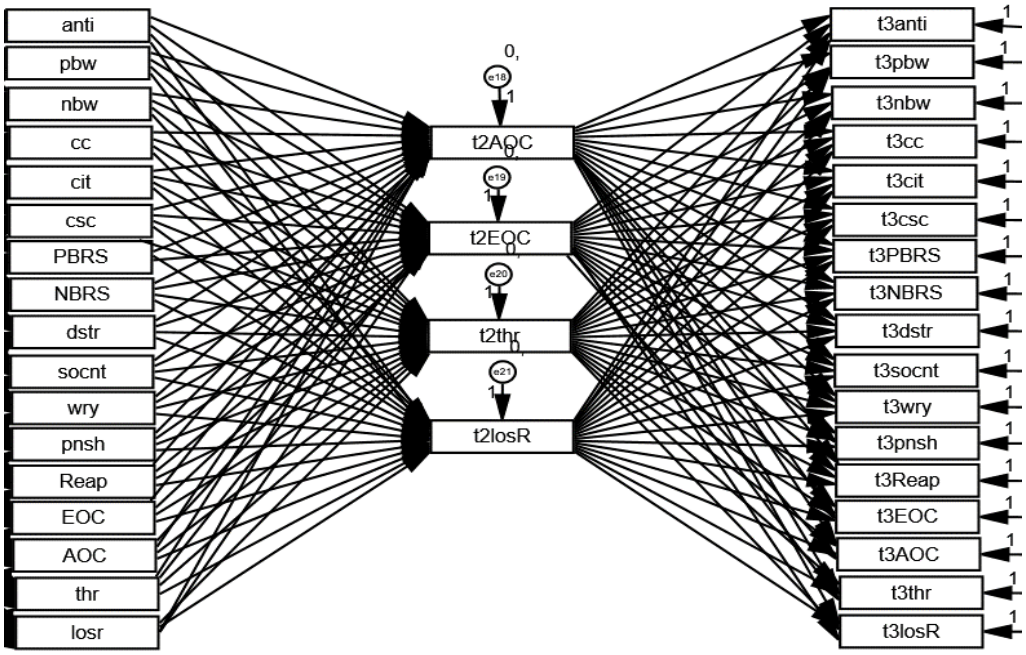

Figure 24(a). Default Model for Time-1 Predictors Mediated by Time-2 Situational Processing and Time-3 Outcome Variables.

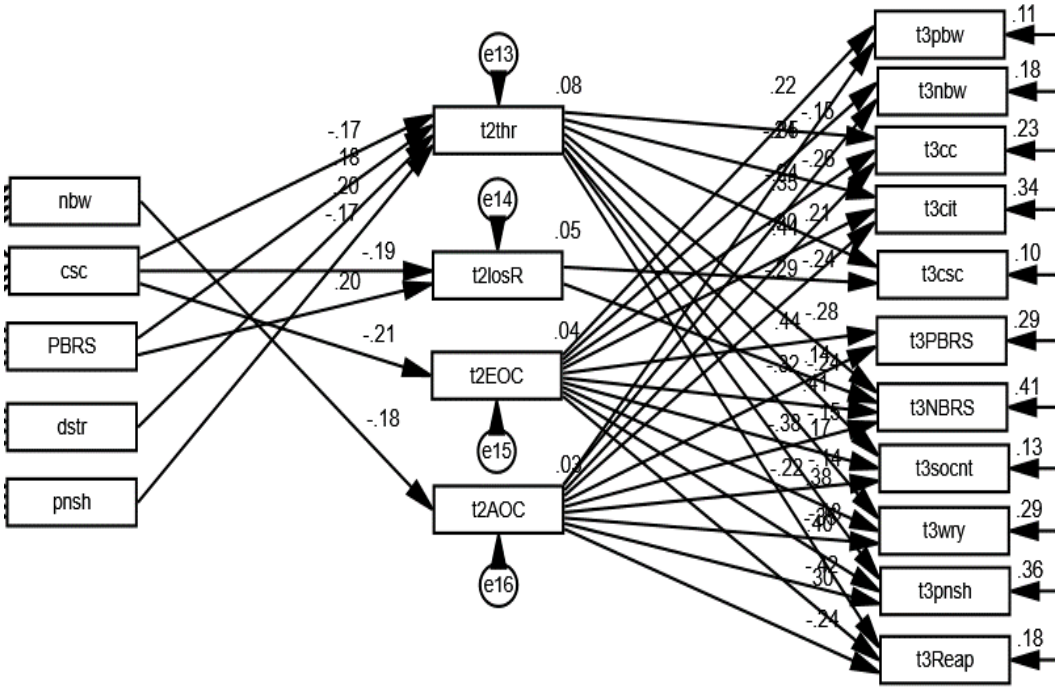

Figure 24(b). Mediation Model after Modification for Time-1, 2 and Time-3 Variables.

Table 28.

Table showing Direct, Indirect and Total Effects for Mediation Model across Time-1, 2 and Time-3 for all variables inclusive.

		Dependent Variables																			
		T2threat		T2EOC		T2AOC		T3Reap		T3punsh		T3wry		T3socnt		T3dstr		T3PBRS		T3CIT	
	Predictors	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*B*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Direct	NBRS			-.17	.02	-.14	.08														
	Thr	-.16	.02																		
	Eoc			.14	.09																
	Dstr	.15	.02																		
	Pbw			-.15	.02																
	T2thr							-.12	.02					-.14	.02	-.11	.09			-.16	.01
	T2Eoc									-.02	.77	.24	.02					.20	.04		
	T2Aoc											-.26	.01	-.06	.38			-.14	.21		
Indirect	NBRS									.00	.69	-.01	.59	.01	.17			-.02	.21		
	Thr							.02	.04					.02	.02	.02	.05			.03	.01
	Eoc									-.00	.65	.03	.03					.03	.07		
	Dstr							-.02	.01					-.02	.01	-.02	.07			-.02	.01
	Pbw									.00	.66	-.04	.02					-.03	.03		
	T2thr																				
	T2Eoc																				
	T2Aoc																				
Total	NBRS			-.17	.02	-.14	.09	-.12	.00	.69	.10	.59	.06	.17				-.02	.21		
	Thr	-.16	.02					.02	.04					.02	.02	.02	.06			.03	.01
	Eoc			.14	.09					-.00	.65	.03	.03					.03	.07		
	Dstr	.15	.01					-.02	.01					-.02	.01	-.02	.08			-.02	.01
	Pbw			-.15	.02					.00	.66	-.04	.02					-.03	.03		
	T2thr							-.12	.02					-.14	.01	-.11	.09			-.16	.01
	T2Eoc									-.02	.79	.24	.02					.20	.03		
	T2Aoc											-.26	.02	-.06	.41			-.14	.20		

Note: NBRS= Negative Beliefs about Rumination; PBRS= Positive Beliefs about Rumination; EOC= Emotion Oriented Coping; AOC= Avoidance Oriented Coping; Reap=Reappraisal; Pnsh=Punishment; Wry= Worry; Thr= Threat; Socnt=Social Control; Dstr= Distraction; Pbw=Positive Beliefs about worry; CIT= Control of Intrusive Thoughts.

The model was further assessed for the significant direct, indirect and total effects. Despite inadequate sizes of model fit the model presented some significant paths for example, the direct effects between Time-1 NBRS and Time-2 EOC ($p <$ .05); Time-1 threat and Time-2 threat ($p < .05$); Time-1 positive beliefs about worry and Time-2 EOC ($p < .05$). Similarly, for Time-2 threat and Time-3 Reappraisal, social control and control of intrusive thoughts ($p < .05$). The Time-2 emotion oriented coping was associated with significant direct effects with Time-3 worry and Time3- positive beliefs about rumination ($p < .05$), while Time-2 avoidance oriented coping and Time-3 worry also depicted significant direct effects.

The significant indirect effects were observed between Time-1 threat and Time-3 reappraisal, social control and control of intrusive thoughts; Time-1 emotion oriented coping with Time-3 worry; Time-1 distraction with reappraisal, social control and control of intrusive thoughts and Time-1 positive beliefs about worry with Time-3 worry and positive beliefs about rumination ($p < .05$).

The total effects were majorly significant for example. Time-1 threat and distraction presented significant total effects on Time-2 threat; Time-1 negative beliefs about rumination and positive beliefs about worry showed significant total effects on Time-2 emotion oriented coping; time-1 negative beliefs about rumination, threat, distraction ($p < .01$), and Time-2 threat on Time-3 reappraisal ($p < .05$); Time-1 emotion oriented coping, positive beliefs about worry ($p < .01$), and Time-2 emotion and avoidance oriented coping on Time-3 worry ($p < .05$). The Time-1 threat, distraction and Time-2 threat showed significant total effects on Time-3 social control and control of intrusive thoughts ($p < . 01$). Time-1 positive beliefs about worry and Time-2 emotion oriented coping on Time-3 positive beliefs about rumination also revealed significant total effects.

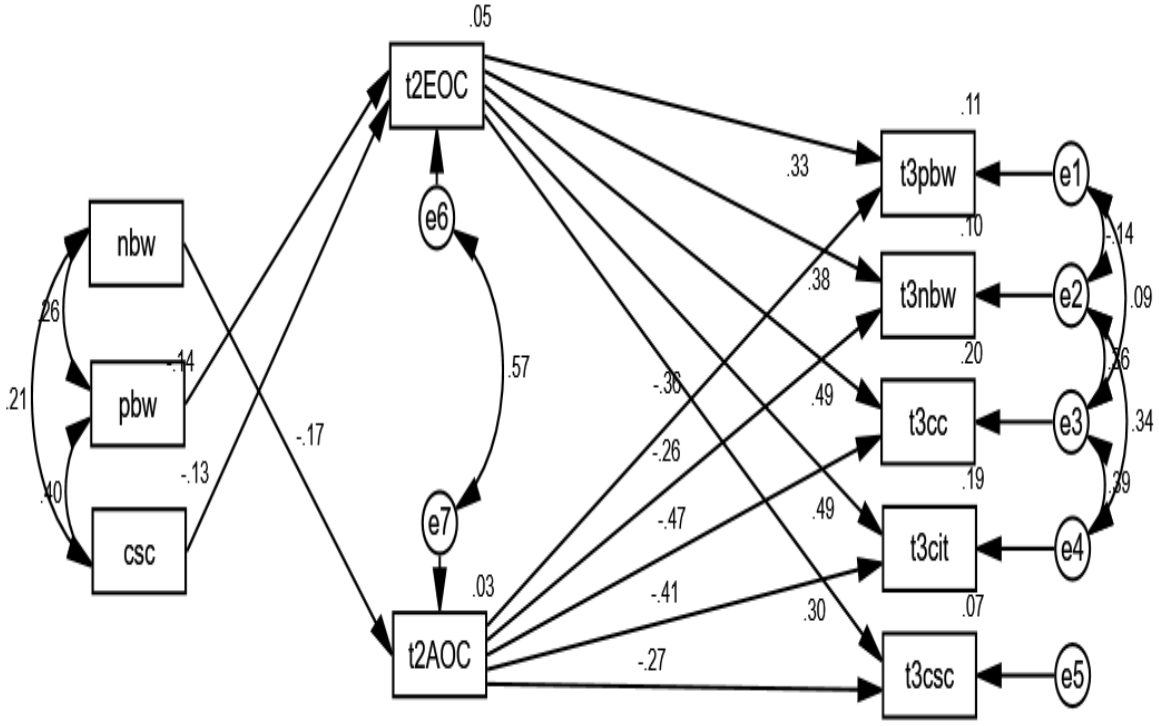

Figure 25. Mediated Model of Time-1Metacognitive Subscales Mediated by Time-2 Situational Processing and Time-3 Outcomes.

The model was executed with all the metacognitive variables from Time-1 as self-knowledge antecedents, Time-2 emotional and avoidance coping as situational processing while metacognitive variables from Time-3 as outcomes. The model was altered, and nonsignificant paths were excluded, that persistently showed lack of model fit. The same model was then tested by using the remaining Time-2 situational processing mediators i.e., threat appraisal and loss appraisal to investigate for mediation across time. The default model depicted a deficient picture of model fit i.e., $\chi^2(df)$ = 82.52 (23), *CFI*=.94, *TLI*= .88, 0*RMSEA*= .08.

Table 29.

Table showing Direct, Indirect and Total Effects for Mediation Model across Time-1, 2 and Time-3 for Metacognitive subscales.

		Dependent Variables													
		T2AOC		T2EOC		T3csc		T3cit		T3cc		T3nbw		T3pbw	
	Predictors	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Direct	Nbw	-.08	.12												
	Csc			-.07	.20										
	Pbw			-.09	.01										
	T2Aoc					.06	.43	-.03	.70	-.13	.23	-.01	.93	-.12	.10
	T2Eoc					-.04	.82	.08	.49	.14	.18	.06	.64	.10	.33
Indirect	Nbw					-.01	.26	.003	.57	.01	.14	.00	1.00	.01	.10
	Csc					.00	.69	-.01	.44	-.01	.19	-.00	.58	-.01	.37
	Pbw					.00	.54	-.01	.14	-.01	.05	-.01	.35	-.01	.17
	T2Aoc														
	T2Eoc														
Total	Nbw	-.08	.12			-.01	.23	.00	.56	.01	.14	.01	.99	.01	.10
	Csc			-.07	.20	.00	.66	.00	.44	-.01	.19	-.00	.58	-.01	.37
	Pbw			-.09	.01	.00	.54	-.01	.14	-.01	.05	-.01	.35	-.01	.17
	T2Aoc					.06	.43	-.03	.70	-.13	.23	-.01	.93	-.12	.10
	T2Eoc					-.04	.82	.08	.49	.14	.18	.06	.64	.10	.33

Note: nbw= Time-1 Negative Beliefs about Worry; csc= Time-1 Cognitive Self-Consciousness; pbw= Time-1 Positive Beliefs about Worry; T2EOC= Time-2 Emotion Oriented Coping; T2AOC= Time-2 Avoidance Oriented Coping; T3nbw= Time-3 Negative Beliefs about Worry; T3csc= Time-3 Cognitive Self-Consciousness; T3pbw= Time-3 Positive Beliefs about Worry; T3cc= Time-3 Cognitive Confidence.

The model shown in figure 25 (page, 149) was further assessed for the significant direct, indirect and total effects. Despite inadequate sizes of model fit the model presented some significant paths for example, the direct effects between Time-1 positive beliefs about worry and Time-2 emotion oriented coping ($p < .05$) and Time-2 emotion oriented coping with Time-3 positive beliefs about rumination were observed.

There were significant indirect effects observed between Time-1 positive beliefs about worry and Time-3 cognitive confidence. The total effects were significant for some relationships for example. Time-1 positive beliefs about worry on Time-2 emotion oriented coping and Time-3 cognitive confidence ($p < .05$).

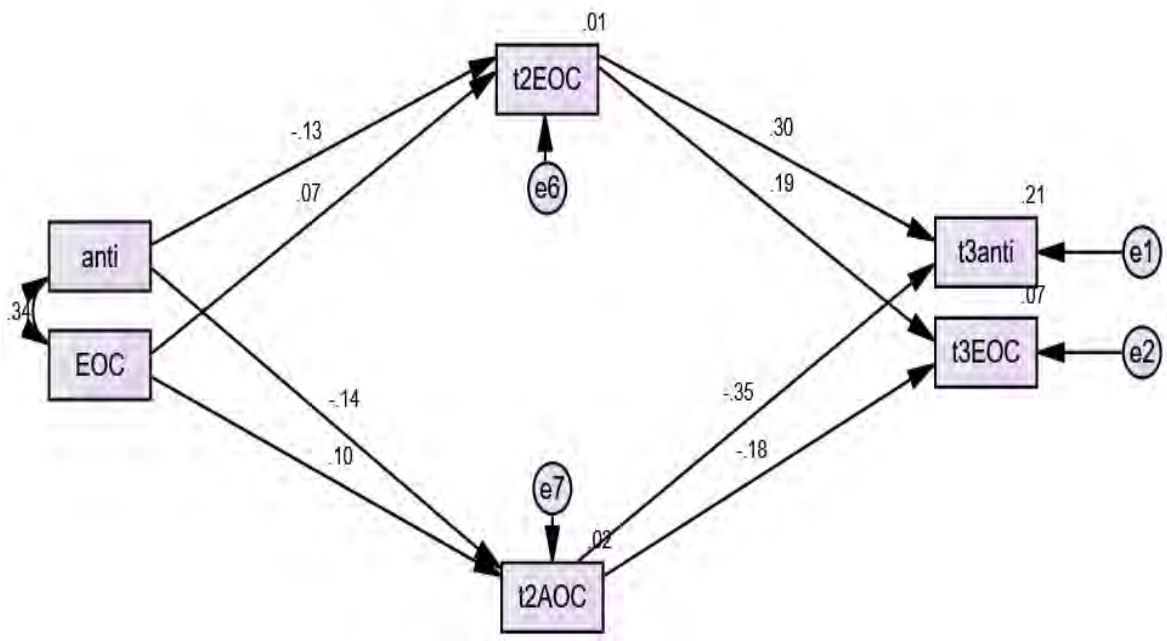

Figure 26. Time-1 and Time-3 Anxious Thoughts (Metaworry) and Emotion Oriented coping Mediated by Time-2 Emotion and Avoidance Oriented Coping.

The figure shows that the variables presented a poor model fit with emotion and avoidance oriented coping as mediators. The estimates showed nonsignificant values between antecedents and mediators and likewise with outcome variables. The model was further assessed for the significant direct, indirect and total effects. In addition to the lack of model fit i.e., $\chi^2(df) = 154.52$ (6), *CFI*=.14, *TLI*= .78, *RMSEA*= .22 in the overall model fit indices the model displayed total nonsignificant paths in all dimensions that are shown in Table 31 (page, 153).

Table 31.

Table showing Direct, Indirect and Total Effects for Mediation Model across Time-1, 2 and Time-3.

		Dependent Variables							
		T2AOC		T2EOC		T3EOC		T3AnTi	
	Predictors	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Direct	EOC	.07	.38	.06	.47				
	AnTi	-.11	.12	-.11	.17				
	T2Aoc					-.04	.66	-.17	.65
	T2Eoc					.04	.07	.14	.07
Indirect	EOC						.70	-.002	.82
	AnTi							.003	.58
	T2Aoc								
	T2Eoc								
Total	EOC	.07	.38	.06	.47	.00	.70	-.002	.82
	AnTi	-.11	.12	-.11	.17	.00	.85	.003	.58
	T2Aoc					-.04	.66	.04	.65
	T2Eoc					-.17	.07	.14	.07

Note: EOC= Emotion Oriented Coping; AnTi= Anxious thoughts (Metaworry);T2AOC= Time-2 Avoidance Oriented Coping; T2EOC= Time-2 Emotion Oriented Coping; T3AOC= Time-3 Avoidance Oriented Coping; T3AnTi= Anxious thoughts (Metaworry).

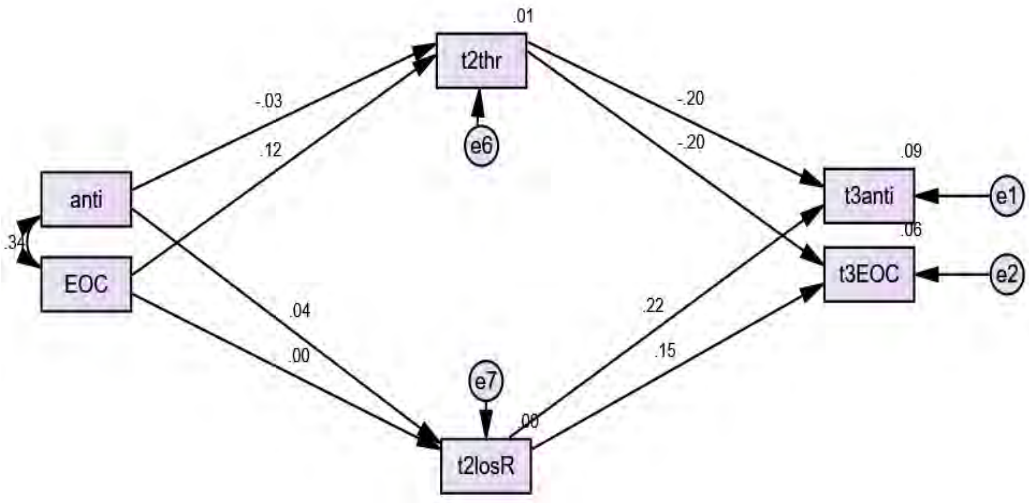

Figure 27. Time-1 and Time-3 Anxious Thoughts (Metaworry) and Emotion Oriented coping Mediated by Time-2 Threat and Loss Appraisal.

The figure 27 (page, 153) shows that the variables presented a poor model fit i.e., i.e., $\chi^2(df)$ = 167.75 (6), *CFI*=.09, *TLI*= 2.17, *RMSEA*= .23 with threat and loss as mediators. The estimates showed nonsignificant values between antecedents and mediators and likewise with outcome variables.

Table 32.

Table showing Direct, Indirect and Total Effects for Mediation Model across Time-1, 2 and Time-3 for Anxious thoughts (Metaworry).

		Dependent Variables							
		T2losR		T2thr		T3EOC		T3anti	
	Predictors	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Direct	EOC	-.01	.89	.10	.10				
	Anti	.03	.68	-.01	.82				
	T2LosR					.05	.59	-.09	.74
	T2thr					.04	.29	-02	.76
Indirect	EOC					-.01	.30	-.002	.85
	Anti					.00	.68	.00	.77
	T2LosR								
	T2thr								
Total	EOC	-.01	.89	.10	.10	-.01	.30	-.002	.85
	Anti	.03	.68	-.01	.82	.00	.68	.001	.77
	T2LosR					.05	.59	-.10	.75
	T2thr					.04	.29	-.02	.76

Note: EOC= Emotion Oriented Coping; AnTi= Anxious thoughts (Metaworry);T2LosR= Time-2 Loss(in retrospect); T2thr= Time-2 Threat; T3EOC= Time-3 Emotion Oriented Coping; T3AnTi= Anxious thoughts (Metaworry).

The model was further assessed for the significant direct, indirect and total effects. In addition to the lack of model fit in the overall model fit indices the model displayed total nonsignificant paths in all proportions.

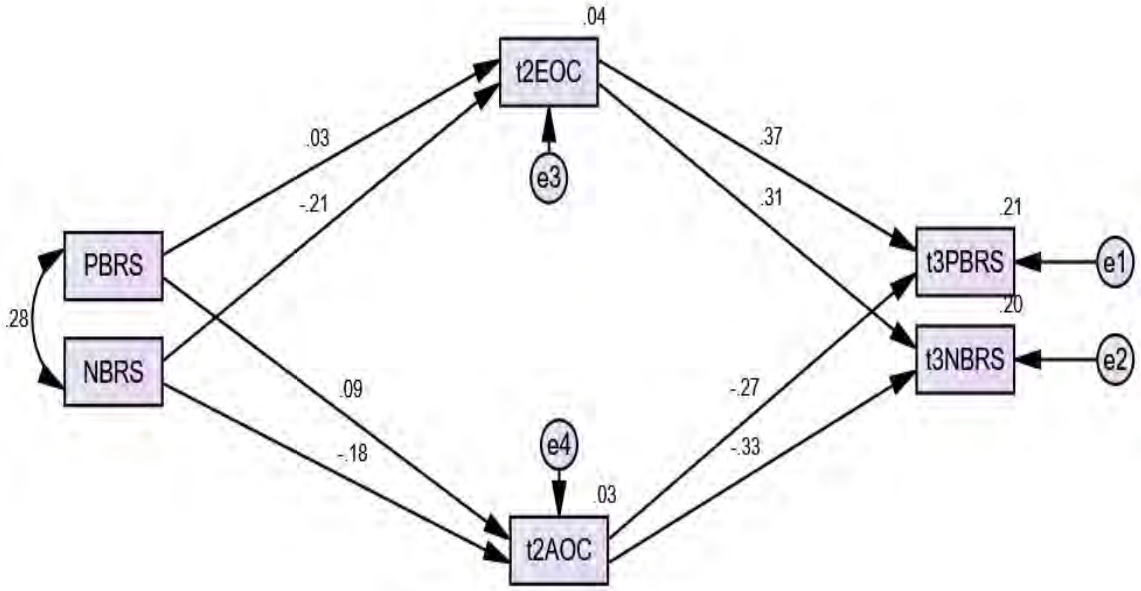

Figure 28. Time-1 and Time-3 Positive and Negative Beliefs about Rumination Mediated by Time-2 Emotion and Avoidance Oriented coping.

The figure 28 shows that the variables presented a poor model fit i.e., $\chi^2(df)$ = 200.85 (6), *CFI*=.13, *TLI*= 2.05, *RMSEA*= .25 with emotion and avoidance oriented coping as mediators. The estimates also showed nonsignificant values between antecedents and mediators and likewise with outcome variables. The results indicated empirical evidence for variant information processing self-regulation.

Table 33.

Table showing Direct, Indirect and Total Effects for Mediation Model across Time-1, 2 and Time-3.

		Dependent Variables							
		T2AOC		T2EOC		T3NBRS		T3PBRS	
	Predictors	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Direct	NBRS	-.14	.04	-.16	.24				
	PBRS	.05	.05	.002	.98				
	T2AOC					-.13	.24	.14	.24
	T2EOC					-.09	.37	.20	.03
Indirect	NBRS					.01	.50	-.01	.39
	PBRS					-.01	.25	-.01	.32
	T2AOC								
	T2EOC								
Total	NBRS	-.15	.04	-.16	.05	.01	.50	-.01	.39
	PBRS	.05	.24	.002	.98	-.01	.25	-.01	.32
	T2AOC					-.13	.23	.14	.20
	T2EOC					.09	.37	.20	.03

Note: NBRS= Negative Beliefs about Rumination; PBRS= Positive Beliefs about Rumination; T2AOC= Time-2 Avoidance Oriented Coping; T2EOC= Time-2 Emotion Oriented Coping; T3NBRS= Time-3 Negative Beliefs about Rumination; Time-3 PBRS= Positive Beliefs about Rumination

The model shown in figure 28 (page,156) was further assessed for the significant direct, indirect and total effects. Despite inadequate sizes of model fit the model presented some significant paths for example, the direct effects between Time-1 negative and positive beliefs about rumination and Time-2 avoidance oriented coping ($p < .05$) and Time-2 emotion oriented coping with Time-3 positive beliefs about rumination were observed.

There were no significant indirect effects observed between Time-1, 2 and Time-3. The total effects were significant for some relationships for example. Time-1 negative beliefs about rumination on Time-2 emotion and avoidance oriented coping and Time-2 emotion oriented coping with Time-3 positive beliefs about rumination ($p < .05$).

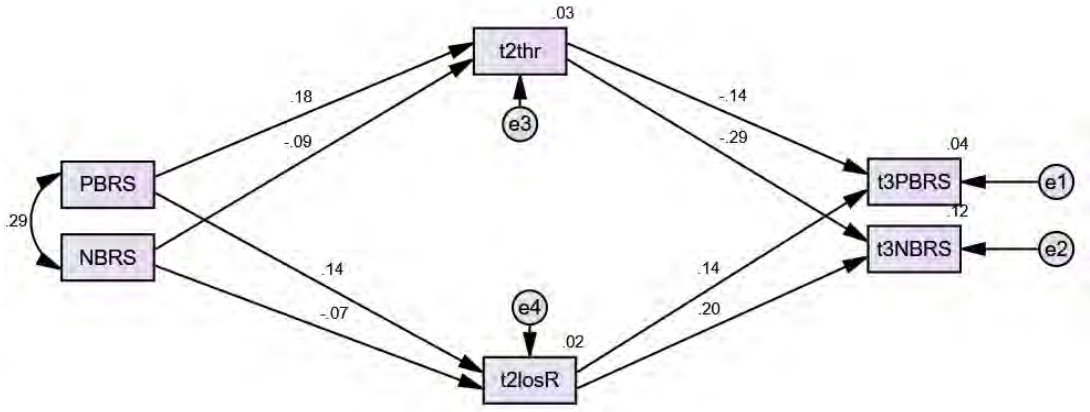

Figure 29. Time-1 and Time-3 Positive and Negative Beliefs about Rumination Mediated by Time-2 Threat and Loss Appraisal.

The figure 29 shows that the variables presented a poor model fit i.e., i.e., $\chi^2(df)$ = 219.39 (6), *CFI*=.06, *TLI*= 2.29, *RMSEA*= .26 with emotion and avoidance oriented coping as mediators. The estimates also showed nonsignificant values between antecedents and mediators and likewise with outcome variables.

Table 34

Direct, Indirect and Total Effects for Mediation Model across Time-1, 2 and Time-3.

		Dependent Variables							
		T2losR		T2thr		T3NBRS		T3PBRS	
	Predictors	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Direct	NBRS	-.03	.73	-.04	.55				
	PBRS	.10	.16	.13	.13				
	T2losR					.10	.30	-.03	.93
	T2thr					-.17	.07	.03	.81
Indirect	NBRS					.03	.62	-.00	.82
	PBRS					-.01	.43	.00	.86
	T2losR								
	T2thr								
Total	NBRS	-.03	.73	-.04	.55	.00	.62	-.00	.82
	PBRS	.10	.16	.13	.13	-.01	.43	.00	.86
	T2losR					.10	.30	-.03	.93
	T2thr					-.17	.07	.03	.81

The model was further assessed for the significant direct, indirect and total effects. In addition to the lack of model fit in the overall model fit indices the model displayed total nonsignificant paths in all dimensions.

Time-3 Discussion

The Time-3 was organized to further our findings regarding longitudinal relationship between S-REF variables. The analysis of Time-3 was considered in relation to previous time-waves. The foremost objective was to assess repeated measures across differences between means between dispositional antecedents and situational processing.

The initial inquiry of internal consistency reflected acceptable alpha-reliability coefficients. Although compared to the previous time-wave the coefficients were numerically lower, that can be addressed as a consequence of variability within state measures as a result of differential situations. However, the coefficients were in range with those proposed in earlier research (Wells, 2000). The second objective of Time-3 was comparing means in terms of repeated measures ANOVA. The results indicated some interesting findings, out of 17 only 11 variables showed significant mean differences across Time-1 to Time-3. This indicates reasonable variability due to situational processing. Additionally, it is maintained by the authors of S-REF model that situational processing or coping is mostly context-dependent and adverse situations more frequently provides to emotion oriented coping (Mathews & Wells, 1996). The result highlighted that the differences were mainly significant between Time-1, Time-2 and Time-3.

The life stressors were controlled for as covariates therefore the variation across time can be explained through the cognitive architecture of S-REF model. Cartwright-Hatton and Wells (1997) found significant correlations between metacognitive subscales and proneness to worry in nonclinical sample that was similar to anxious and depressed groups of patients (Wells & Carter, 2001). The authors suggest (Wells & Mathews, 1994) that emotional disorders usually have

underlying disturbed metacognitions that further determine the choice of coping and amount of attention allocated to the demanding situational thoughts. For example, positive and negative beliefs predicted obsessive thoughts after controlling for worry. Hence our results can be explained in the frame of S-REF “rumination as a source of cognitive dysfunction” (Mathews & Wells, 2004, p.153). The authors explain that upon activation of supervisory executive functions i.e. metacognitions may produce far-reaching damaging effects that are related to self-knowledge elaboration and obstructing adaptive restructuring of cognitive information.

The present results show that cognitive self-consciousness positive and negative belief about rumination, distraction and thought control were found significantly different across time. The mentioned variables work as part of cognitive regulatory process and aids in differentiating the coping strategy that is further dependent on the requirements appraised from the environment. This justifies the significant variation through the time-waves. Moreover, the mediation analysis revealed that the mediator variables did not play a significant role for any of the antecedent-outcome models when assessed across time-waves. This further strengthens the above argument that coping is situation dependent therefore, it is expected to mediate the described relationship when same time-wave mediators are introduced in the model.

Results for Time-4

Objectives of Time-4 Main Study

1. To assess the internal consistency of instruments and relationship between variables with Time-4 data.
2. To assess the inter, and intra-differences in the types of stressors across all timewaves.
3. To examine growth curve model for study variables from Time-1 through Time-4.

Objective 1: Internal Consistency Coefficients for Measures with Time-4 data.

Table 34.

Time-4 Alpha reliability coefficients of Scales (N=230).

Scales	No. of Items	Alpha Coefficients
Metacognitive Subscales		
Positive Beliefs About Worry	6	.61
Negative Beliefs About Worry	6	.60
Cognitive Confidence	6	.55
Control of Intrusive Thoughts	6	.66
Cognitive Self Conscious	6	.71
Beliefs about Rumination		
PBRS	9	.60
NBRS	9	.86
Appraisal of Life Events Subscales		
Threat Appraisal	6	.79
Loss Appraisal	4	.76
Anxious Thought Inventory Subscale		
Metaworry	6	.60
Thought Control Subscales		
Distraction	6	.68
Social Control	6	.64
Worry	6	.66
Punishment	6	.61
Reappraisal	6	.52
Coping for Stressful Situation Subscales		
Emotion Oriented Coping	16	.69
Avoidance Oriented Coping	16	.68

Objective 2: The Inter and Intra-differences in Types of Stressors across Timewaves.

Table 35.

Mauchly's Test for Sphericity for types of Stressors across Time-1 to 4 (*N= 230).*

Variables	Mauchly's	*p*	Greenhouse-Geisser
Personal Stressors	.59	.00	.81
Family Stressors	.92	.00	.95
Work Stressors	.93	.00	.95
Environmental Stressors	.94	.00	.96

The Mauchly's Test (1940) for the equality of the expected and the observed variance patterns was significant majorly for all types of stressors suggesting that the observed matrix have approximately unequal variances and also breaching the assumption of sphericity. The variables that showed significant scores were corrected using Greenhouse-Geisser (1958) epsilon else using an uncorrected RM-ANOVA F-test would result in inflation of Type I Errors. The analysis was followed by post hoc analysis that depicted significant differences between variables across time.

Table 36

Post Hoc Analysis for Repeated Measure ANOVA for Stressor across Time-1 to 4 (N= 230)

	Time-1		Time-2		Time-3		Time-4					95 % CI	
Stressors	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	I-J	*MD*	*p*	*LL*	*UL*
Personal	1.20	.48	1.18	.04	.00	.00	.51	.05	1-3	1.19	.00	1.07	1.32
									1-4	.69	.00	.50	.87
									2-3	1.17	.00	1.05	1.28
									2-4	.67	.00	.48	.84
									3-4	.51	.00	-.65	-.37
Family	1.08	.04	.91	.04	.46	.03	.55	.04	1-2	.17	.00	.02	.32
									1-3	.63	.01	.50	.75
									1-4	.53	.00	.39	.68
									2-3	.46	.00	.33	.57
									2-4	.36	.01	.23	.49
Work	1.18	.04	.91	.04	.50	.03	.61	.05	1-2	.26	.00	.11	.42
									1-3	.68	.01	.55	.82
									1-4	.57	.00	.41	.74
									2-3	.41	.00	.28	.54
									2-4	.31	.01	.16	.46
Environmental	1.04	.04	.83	.03	.42	.03	.55	.04	1-2	.22	.00	.10	.34
									1-3	.63	.00	.51	.74
									1-4	.50	.00	.37	.63
									2-3	.41	.00	.30	.51
									2-4	.28	.00	.16	.40
									3-4	-.13	.04	-.25	-.00

The mean differences associated with stressors across time-waves are reported in the Table 36 (page, 169). As depicted above in the results majority of the comparisons showed statistically significant differences within 12-months period. A repeated-measures ANOVA determined that mean scores differed significantly across four time points for personal stressors ($F(2, 786) = 190.88$, $p < .00$), family stressors ($F(3, 1539) = 67.75$, $p < .00$), work related stressors ($F(3, 1539) = 61.60$, $p < .00$), and environmental stressors ($F(3, 1539) = 76.58$, $p < .00$).

A post hoc pairwise comparison using the Bonferroni correction showed variant scores between the initial and follow-up scores 12-months span, which were statistically nonsignificant across time-1 and 2. However, the increase in personal stressors score did reach significance when comparing the initial scores with later times waves i.e., 3 and 4 taken 8 and 12-months later. Therefore, we can conclude that the results for the ANOVA indicate a significant time effect for situational stressors. It is noteworthy that significant differences in the stressors in each timewave represent diversity of situational challenges suggesting random trends.

Objective 3: Examining latent growth curve model for study variables from Time-1 through Time-4

To investigate the changes in study variables over time-waves latent growth curve model using Mplus (version 8) were executed. The complete list of study variables was assessed in terms of quadratic and piecewise growth analysis. The main objective behind quadratic model was to capture random slopes in the linear quadratic growth while the piecewise analysis was selected to show phases of growth that depicted different slopes of growth factor within all time-waves.

The Time-4 study objectives had several considerations to meet before the any longitudinal analysis could be executed on the data. Growth models examine the development of individuals on one or more outcome variables over time. A minimum of four timepoints is recommended for growth models for two reasons, first, with less than four timepoints it is not possible to identify enough parameters in the growth model to make the model flexible. Secondly, four timepoints give more power to the findings hence the results are increasingly valid (Muthen, 2008).

Table 37.

Positive Beliefs about Worry Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Positive Beliefs about Worry	Quadratic	.44	.51	1	1.07	1.00	.00	.00	.20	.57
	Piecewise	1.1	.29	1	.93	.99	.03	.00	.23	.37

The quadratic model for positive beliefs about worry represented good model fit indices. The nonsignificant chi-square values depicted that there was no difference between observed and estimated model. The Standardized Root Mean Square Residual was .01 that met the criteria for acceptance (i.e., SRMR < .06). The slope intercept showed a nonsignificant value of covariance 17.54, $p > .05$. The mean intercept was significant at 13.13, $p < .001$ while the slope was found nonsignificant .80, $p > .05$. The quadratic model analysis showed nonsignificant growth overtime. The results for the piecewise growth model indicated linear growth from time-1 to time-2. The slopes mean represented positive increment i.e., .92, $p > .05$ and .33, $p > .72$ however the results showed a nonsignificant depiction. The Standardized Root Mean Square Residual was .01. The slope 1 and slope 2 intercept showed a nonsignificant value of covariance 11.03, $p > .05$; -9.84, $p > .05$. The second-piece from Time-3 to Time-4 represented a nonsignificant but downward trend suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4 however nonsignificant.

Table 38.

Negative Beliefs about Worry Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Negative Beliefs about Worry	Quadratic	.02	.97	1	1.00	1.00	.00	.00	.10	.97
	Piecewise	.23	.63	1	1.00	1.18	.00	.00	.18	.68

The quadratic model for negative beliefs about worry indicated a nonsignificant value of chi-square indicating no difference between observed and estimated models. The Standardized Root Mean Square Residual was .001 that met the criteria for acceptance (i.e., SRMR < .06). The mean intercept for quadratic analysis was 13.37, $p < .001$ and mean value for slope was 1.87, $p < .01$ indicating a significant positive change across time. The piecewise model showed a relatively complete explanation of change overtime. The piecewise growth model results for negative beliefs about worry indicated variant random coefficients. The Standardized Root Mean Square Residual was .01 while the slope 1 intercept showed a significant value of 11.12, $p < .05$; the slope 2 intercept showed nonsignificant negative value of -3.89, $p > .05$. The mean intercept was found to be 13.44, $p < .001$ while mean for slope 1 was 1.30, $p < .01$ and slope 2 was -.3, $p < .001$. The second-piece from Time-3 to Time-4 represented a significant negative trend suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4.

Table 39.

Cognitive Confidence Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Cognitive Confidence	Quadratic	.13	.72	1	1.07	1.00	.07	.00	.17	.76
	Piecewise	.09	.77	1	1.12	1.00	.00	.00	.16	.08

The quadratic model for cognitive confidence showed nonsignificant chi-square value indicating no difference between observed and estimated model. The Standardized Root Mean Square Residual was .03 that met the criteria for acceptance (i.e., SRMR < .06). The intercept showed a covariance value of 4.92, $p > .05$ while the slope was found significant -11.21, $p < .05$. The mean intercept showed 13.10, $p < .001$ and mean slope was also found significant at 1.80, $p < .05$. The results for the piecewise growth model showed that the Standardized Root Mean Square Residual was .02. The slope 1 intercept showed a nonsignificant value of 5.58, $p > .05$ while slope 2 intercepts also showed nonsignificant value of -9.83, $p > .05$. The mean intercept for slope 1 was found 1.30, $p < .05$ while the slope 2 was .07, $p > .05$. The variances for slope 1 (14.74, $p < .05$) and slope 2 (15.17, $p < .05$) were found to be significant. The piecewise model depicts that Time-1 to Time-2 represented a positive trend suggesting that individuals with significantly greater values at Time-1 and Time-2 tended to have lower mean scores in Time-3 and Time-4 however nonsignificant.

Table 40.

Control of Intrusive Thoughts Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Control of Intrusive Thoughts	Quadratic	1.60	.21	1	.94	.99	.07	.00	.25	.28
	Piecewise	.69	.41	1	1.00	1.03	.00	.00	.25	.48

The quadratic model for control of intrusive thoughts represented a nonsignificant chi-square value suggesting no difference between the observed and estimated model. The Standardized Root Mean Square Residual was .01 meeting criteria for acceptance (i.e., SRMR < .06). The quadratic intercept was 1.18, $p > .05$ while the slope was -6.39, p > .05. The mean for the intercept was 1.94, $p < .01$ suggesting significant decline overtime that was also supported by the significant quadratic variability 4.07, $p < .01$. The piecewise growth model results for control of intrusive thoughts showed that the Standardized Root Mean Square Residual as .01. The slope 1- intercept showed a nonsignificant value of covariance -2.34, p > .05; the slope 2 intercept also showed nonsignificant value of covariance -3.94, p > .05. The means for slope 1 was found significant i.e., 1.44, $p < .001$ and also for slope 2 i.e., -3.80, $p < .001$ suggesting an average but nonsignificant descend overtime.

Table 41.

Cognitive Self-Consciousness Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Cognitive Self-Consciousness	Quadratic	.22	.64	1	1.00	1.08	.03	.00	.19	.69
	Piecewise	1.35	.24	1	.96	.99	.05	.00	.24	.32

The quadratic analysis for cognitive self-consciousness also showed nonsignificant chi-square results suggesting no difference between observed and estimated models. The Standardized Root Mean Square Residual was .01. The quadratic intercept was found to be 9.15, $p < .01$ with slope -15.66, $p < .001$. The mean change across quadratic growth was found to be significant at 2.32, $p < .01$. The quadratic variability was significant at 6.65, $p < .001$. The results were indicative of that, individuals with higher cognitive self-consciousness at Time-1 were found to have significant increment overtime. The piecewise model showed a nonsignificant chi-square, the Standardized Root Mean Square Residual was .02. The intercept for slope 1 was -18.35, $p > .05$ and slope 2 was 6.13, $p > .05$. On the average the cognitive self-consciousness scores showed a significant increment by 1.73 ($p < .01$) from Time-1 to Time-2 and a nonsignificant decline of -.05, $p > .05$ from Time-3 to Time-4. The slope 1 (variance = 17.20, $p < .01$) and slope 2 (variance = 25.91, $p < .01$) showed significant variability in piecewise growth suggesting intragroup variability over time.

Table 42.

Table showing Model Fit Indices for Study Variables for Quadratic and Piecewise Growth Models for Positive Beliefs about Rumination.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Positive Beliefs about Rumination	Quadratic	.28	.60	1	1.00	1.00	.00	.00	.09	.81
	Piecewise	1.10	.29	1	.93	.99	.03	.00	.23	.37

The quadratic model analysis for positive beliefs about rumination suggested a nonsignificant chi-square. The quadratic intercept showed a nonsignificant negative value -12.14, $p > .05$ while the slope was 18.19, $p > .05$. However, the mean intercept was 21.02, $p < .01$ and the mean slope was observed to be 2.38, $p < .05$. The variability was found nonsignificant for both intercept and slope. Overall the quadratic analysis submitted nonsignificant change overtime. The piecewise growth model indicated that positive beliefs about rumination illustrated the Standardized Root Mean Square Residual was .02 falling within the criteria for acceptance (i.e., SRMR < .06). The slope 1 intercept showed a nonsignificant value of 11.03, p > .05; the slope 2 intercept also showed nonsignificant value of -9.84, p > .05. The mean change for slope I was found .92, $p > .05$ while the slope 2 was .33, p > .05. The variability across time for piecewise means was also observed to be nonsignificant. Concludingly both models reflected similar findings suggesting intragroup consistency overtime.

Table 43.

Negative Beliefs about Rumination Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Negative Beliefs about Rumination	Quadratic	.01	.91	1	1.00	1.00	.00	.00	.09	.92
	Piecewise	.00	.98	1	1.00	1.00	.00	.00	.00	.98

The quadratic model for negative beliefs about rumination represented the Standardized Root Mean Square Residual as .002. The quadratic intercept showed covariance of -4.89, p > .05 while the slope was -15.62, p > .05**.** The mean values for intercept were 25.55, $p < .01$ and mean slope showed -.74, $p < .05$. Overall the quadratic variability was found to be nonsignificant across times i.e., 7.60, $p > .05$. The piecewise growth model indicated growth from time-1 to time-2 represented the slope factor as positive growth representing an increase on the average in negative beliefs about rumination over time for Time-1 to Time-2. The Standardized Root Mean Square Residual was .001. The slope 1 intercept showed a nonsignificant value of covariance 9.77, p > .05; the slope 2 intercept also showed nonsignificant value of covariance -17.87, p > .05. The piecewise means for slope 1 showed -3.45, $p > .05$ and for slope 2 was 1.20, $p > .05$ suggesting that individuals with lower values at time-1 tended to have greater scores in time-4 however the increment was nonsignificant that was further verified by nonsignificant piecewise variability.

Table 44.

Distraction Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Distraction	Quadratic	3.17	.08	1	.52	.92	.13	.00	.30	.08
	Piecewise	4.59	.03	1	.21	.87	.17	.04	.33	.06

The quadratic model for distraction represented a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .04 meeting the criteria for acceptance (i.e., SRMR < .06). The intercept showed a nonsignificant covariance of -12.40, p > .05. The initial level of quadratic intercept was 4.47, *p* > .05 while the slope was -29.18, p > .05**.** The mean values for intercept were 15.92, *p* < .01 and mean slope showed .64, *p* >.05. The variance for the intercept showed 3.19, *p* >.05 while the variance for the slope was 89.70, *p* < .05. Overall the quadratic analysis depicted nonsignificant variability across time. The piecewise growth model indicated growth from time-1 to time-2 showing the slope factor as positive growth representing an increase on the average in distraction strategy over Time-1 to Time-2. The Standardized Root Mean Square Residual was .05. The slope 1 intercept showed a nonsignificant value of covariance -8.81, *p* > .05. The slope 2 intercept also showed nonsignificant but positive value of covariance 9.81, *p* > .05. The variance for the slope 1 was 39.30, *p* < .05 and variance for slope 2 was 38.85, *p* > .05 suggesting that there was significant variability from Time-1 and Time-2 but nonsignificant in Time-3 and Time-4.

Table 45.

Social Control Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Social	Quadratic	.12	.74	1	1.06	1.00	.00	.00	.16	.77
Control	Piecewise	2.16	.14	1	.93	.99	.09	.00	.27	.21

The quadratic model for social control represented a nonsignificant chi-square value with the Standardized Root Mean Square Residual as .01. The slope and intercept showed a nonsignificant covariance of -17.03, p > .05. The initial level of quadratic intercept was 4.19, $p > .05$ while the slope was -15.83, $p < .05$**.** The mean values for intercept were 13.98, $p < .01$ and mean slope showed 1.99, $p < .05$. The variance for the intercept showed 15.55, $p > .05$ while the variance for the slope was 73.24, $p < .01$. The piecewise growth model indicated growth from time-1 to time-2 represented the slope factor as positive growth representing an increase on the average in social control over time for Time-1 to Time-2. The Standardized Root Mean Square Residual was .03 that met the criteria for acceptance (i.e., SRMR < .06). The slope 1 and intercept showed a nonsignificant value of covariance -8.40, $p > .05$; the slope 2 and intercept also showed nonsignificant value of covariance 3.93, $p > .05$. The mean intercept was found to be 13.98, $p < .01$, mean of slope 1 was 1.51, $p < .05$ and mean of slope 2 was 1.56, $p <. 05$. The variance for the intercept showed 11.12, $p > .05$ while the variance for the slope 1 was 31.57, $p < .01$ and variance for slope 2 was -6.38, $p > .05$.

Table 46.

Worry Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Worry	Quadratic	.87	.35	1	1.04	1.00	.00	.00	.22	.43
	Piecewise	2.74	.10	1	.43	.91	.12	.00	.29	.15

The quadratic model for worry denoted a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .02. The quadratic intercept was 12.66, $p > .05$ while the slope was -36.94, $p > .05$**.** The mean values for intercept were 12.73, $p < .01$ and mean slope showed 2.45, $p > .05$. The variance for the intercept showed 27.20, $p > .05$ while for the slope was 105.12, $p < .05$. The Standardized Root Mean Square Residual for piecewise growth model was .04 that met the criteria for acceptance (i.e., SRMR < .06). The slope 1 for time-1 to time-2 demonstrated a nonsignificant intercept of -25.55, $p > .05$ while from time-3 to time-4 for slope 2 represented intercept of 25.70, $p > .05$. The mean intercept was found to be 12.71, $p < .01$, mean of slope 1 was 2.52, $p < .01$ and mean of slope 2 was .48, $p >$. 05. The variance for the intercept showed 27.61, $p < .01$ while the variance for the slope 1 was 44.03, $p < .05$ and variance for slope 2 was 68.55, $p > .05$ suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4.

Table 47.

Punishment Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*P*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Punishment	Quadratic	.97	.32	1	.100	1.00	.00	.00	.23	.40
	Piecewise	3.03	.05	1	.87	.98	.12	.00	.30	.13

The quadratic model for punishment represented a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .02. The slope and intercept showed a nonsignificant covariance of -8.52, $p > .05$. The quadratic intercept was 1.84, $p > .05$ while the slope was -24.39, $p > .05$**.** The mean values for intercept were 13.07, $p < .01$ and mean slope showed 3.47, $p < .01$. The variance for the intercept showed 2.45, $p > .05$ while for the slope was 109.81, $p < .01$. The Standardized Root Mean Square Residual for piecewise growth model was .04 that met the criteria for acceptance (i.e., SRMR < .06). The slope 1 for time-1 to time-2 demonstrated a nonsignificant decline on the average in worry with an intercept of -3.34, $p > .05$ while nonsignificant growth from time-3 to time-4 in slope 2 with an intercept of .43, $p > .05$. The mean intercept was found to be 13.15, $p < .01$, mean of slope 1 was 2.52, $p < .01$ and mean of slope 2 was -.40, $p > .05$. The variance for the intercept showed -.96, $p > .05$ while the variance for the slope 1 was 49.53, $p < .01$ and variance for slope 2 was -14.46, $p > .05$ suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4.

Table 48.

Reappraisal Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Reappraisal	Quadratic	1.51	.22	1	.97	.99	.06	.00	.25	.29
	Piecewise	2.55	.11	1	.90	.98	.11	.00	.28	.17

The quadratic model for reappraisal represented a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .02 that also met the criteria for acceptance (i.e., SRMR < .06). The slope and intercept showed a nonsignificant covariance of -92.38, $p > .05$. The quadratic intercept was 23.80, $p > .05$ while the slope was -86.51, $p < .01$**.** The mean values for intercept were 16.76, $p < .01$ and mean slope showed 4.05, $p < .05$. The variance for the intercept showed 114.82, $p < .01$ while for the slope was 294.39, $p < .01$. The Standardized Root Mean Square Residual for piecewise growth model was .03. The slope 1 for time-1 to time-2 demonstrated a nonsignificant decline on the average in worry with an intercept of -47.49, $p > .05$ while nonsignificant growth from time-3 to time-4 in slope 2 with an intercept of 26.55, $p > .05$. The mean intercept was found to be 16.80, $p < .01$, mean of slope 1 was 3.05, $p < .01$ and mean of slope 2 was -1.74, $p > .05$. The variance for slope 1 was 122.52, $p < .01$ and variance for slope 2 was -82.23, $p > .05$ suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4.

Table 49.

Emotion Oriented Coping Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Emotion oriented Coping	Quadratic	.15	.70	1	1.13	1.00	.00	.00	.17	.75
	Piecewise	.20	.66	1	1.12	1.00	.00	.00	.18	.71

The quadratic model for emotion oriented coping represented a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .01. The slope and intercept showed a nonsignificant covariance of -301.71, $p < .01$. The quadratic intercept was -102.55, $p < .01$ while the slope was -55.96, $p > .05$**.** The mean values for intercept were 44.13, $p < .01$ and mean slope showed -9.89, $p < .01$. The variance for the intercept showed -142.21, $p > .05$ while for the slope was 42.33, $p > .05$. The Standardized Root Mean Square Residual for piecewise growth model was .01. The intercept for slope 1 for time-1 to time-2 demonstrated a significant value on the average in worry 205.27, $p < .01$ while nonsignificant value from time-3 to time-4 in slope 2 with an intercept of -211.21, $p < .01$. The mean intercept was found to be 44.17, $p < .01$, mean of slope 1 was -6.43, $p < .01$ and mean of slope 2 was 6.81, $p < .01$. The variance for the intercept showed -148.32, $p < .05$ while the variance for the slope 1 was .06, $p > .05$ and variance for slope 2 was 272.24, $p > .05$.

Table 50.

Avoidance Oriented Coping Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Avoidance oriented Coping	Quadratic	.07	.80	1	1.12	1.00	.00	.00	.15	.83
	Piecewise	.16	.69	1	1.11	1.00	.00	.00	.17	.74

The quadratic model for avoidance oriented coping represented a nonsignificant chi-square value that suggested the observed and estimated values were not different. The Standardized Root Mean Square Residual was .01 that also met the criteria for acceptance (i.e., SRMR < .06). The slope and intercept showed a nonsignificant covariance of -843.09, $p > .05$. The quadratic intercept was -5.91, $p > .05$ while the slope was -54.03, $p > .05$**.** The mean values for intercept were 43.70, $p < .01$ and mean slope showed .93, $p > .01$. The variance for the intercept showed 26.66, $p > .05$ while for the slope was 148.16, $p > .05$. The Standardized Root Mean Square Residual for piecewise growth model was .01 that met the criteria for acceptance (i.e., SRMR < .06). The slope 1 for time-1 to time-2 demonstrated a nonsignificant mean value in worry with an intercept of 11.94, $p > .05$ while nonsignificant growth from time-3 to time-4 in slope 2 with an intercept of 13.49, $p > .05$. The mean intercept of slope 1 was -.45, $p > .05$ and slope 2 was -.82, $p < .01$. The variance for the intercept showed slope 1 was 75.96, $p < .01$ and variance for slope 2 was 85.74, $p > .05$ suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4.

Table 51.

Table showing Model Fit Indices for Study Variables for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Threat	Quadratic	.90	.34	1	1.08	1.00	.00	.00	.23	.42
	Piecewise	2.03	.15	1	.06	.84	.09	.00	.27	.22

The quadratic model for threat represented a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .02 that also met the criteria for acceptance (i.e., SRMR < .06). The slope and intercept showed a nonsignificant covariance of 5.48, $p > .05$. The quadratic intercept was .85, $p > .05$ while the slope was 17.44, $p > .05$**.** The mean values for intercept were 13.12, $p < .01$ and mean slope showed .54, $p > .05$. The variance for the intercept showed -13.14, $p > .05$ while for the slope was -20.04, $p > .05$. The Standardized Root Mean Square Residual for piecewise growth model was .03 that met the criteria for acceptance (i.e., SRMR < .06). The slope 1 for time-1 to time-2 demonstrated a nonsignificant decline on the average in worry with an intercept of -1.25, $p > .05$ while nonsignificant growth from time-3 to time-4 in slope 2 with an intercept of 9.36, $p > .05$. The mean intercept was found to be 13.16, $p < .01$, mean of slope 1 was 1.02, $p > .05$ and mean of slope 2 was 1.63, $p > .05$. The variance for the intercept showed -5.58, $p > .05$ while the variance for the slope 1 was -.90, $p > .05$ and variance for slope 2 was -87.83, $p > .05$ suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4.

Table 52.

Loss Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Loss	Quadratic	3.55	.05	1	.79	.97	.14	.00	.31	.10
	Piecewise	4.64	.03	1	.70	.95	.17	.04	.33	.06

The quadratic model for loss represented a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .04 that also met the criteria for acceptance (i.e., SRMR < .06). The slope and intercept showed a nonsignificant covariance of 15.71, $p > .05$. The quadratic intercept was -6.05, $p > .05$ while the slope was 21.09, $p > .05$**.** The mean values for intercept were 10.95, $p < .01$ and mean slope showed .74, $p > .05$. The variance for the intercept showed 24.74, $p > .05$ while for the slope was -42.32, $p > .05$. The Standardized Root Mean Square Residual for piecewise growth model was .05 that met the criteria for acceptance (i.e., SRMR < .06). The slope 1 for time-1 to time-2 demonstrated a nonsignificant decline on the average in worry with an intercept of 12.60, $p > .05$ while nonsignificant growth from time-3 to time-4 in slope 2 with an intercept of -15.03, $p > .05$. The mean intercept was found to be 10.99, $p < .01$, mean of slope 1 was .92, $p > .05$ and mean of slope 2 was .30, $p > .05$. The variance for the intercept showed 21.79, $p > .05$ while the variance for the slope 1 was -17.66, $p > .05$ and variance for slope 2 was -63.58, $p > .05$ suggesting that individuals with greater values at time-3 tended to have lower scores or decline in time-4.

Table 53.

Metaworry Model Fit Indices for Quadratic and Piecewise Growth Models.

Variables	Analysis	χ^2	*p*	*df*	TLI	CFI	RMSEA	*LL*	*UL*	*p-close*
Metaworry	Quadratic	8.44	.00	1	1.00	.00	.24	.11	.40	.01
	Piecewise	12.25	.00	1	1.00	.00	.29	.16	.45	.02

The quadratic model for metaworry represented a nonsignificant chi-square value. The Standardized Root Mean Square Residual was .12 that did not meet the criteria for acceptance (i.e., SRMR < .06). The slope and intercept showed a nonsignificant covariance of -2.71, $p > .05$. The mean values for intercept were 15.63, $p < .01$ and mean slope showed .57, $p > .01$. The variance for the intercept showed -.08, $p > .05$ while for the slope was 4.06, $p > .05$. The Standardized Root Mean Square Residual for piecewise growth model was .09 that met the criteria for acceptance (i.e., SRMR < .06). The slope 1 for time-1 to time-2 demonstrated a nonsignificant decline on the average in worry with an intercept of 6.99, $p > .05$ while nonsignificant growth from time-3 to time-4 in slope 2 with an intercept of -10.92, $p > .05$. The mean intercept was found to be 15.47, $p < .01$, mean of slope 1 was -.18, $p > .05$ and mean of slope 2 was 9.12, $p < .01$. The variance for the intercept showed -9.76, $p > .05$ while the variance for the slope 1 was 42.11, $p > .05$ and variance for slope 2 was -112.03, $p > .05$ suggesting that individuals with greater values at time-3 tended to have nonsignificant lower scores or decline in time-4.

Time-4 Discussion

The main aim of Time-4 was to explore the latent growth curve of the entire list of variables for S-REF model. The growth was assessed in terms of positive or negative change over time. The slope was evaluated for linearity and nonlinearity. The analysis was performed in terms of quadratic model to assess if the curve departed from linearity and piecewise models- particularly to be able to break the curvilinear growth trajectories in distinct linear components. The intercept was considered as a variable that projects the probable initiation of present study variables within participants. The slope represented the mean change across time span while the variance of slope enabled for the understanding of individual variation in change. For example, some participants showing more or less change across time. The slope variance further revealed the extent to which participants had dissimilar slopes. The Time-4 results represent an unconditional trajectory model via mean and variances of trajectories. The mean intercept and slope for each variable of the study allows for the estimation by using a case by case approach. It is also representative of inter time-wave differences in intra time-wave change.

Considering the above commentary on latent growth curve modeling we will now discuss our results and deduce findings in the light of previous literature. The S-REF model is an arrest of cognitive processing for emotional self-regulation. The entire model captures dispositional antecedents in terms of beliefs, situation processing in form of appraisal and coping. The latent growth curve analysis for Time-4 for the metacognitive beliefs in terms of its subscales positive and negative beliefs about worry, cognitive confidence, control of intrusive thoughts and cognitive self-consciousness showed that majority of the variables had varied points of

intercepts for participants suggesting that the beliefs varied at the initial level for participants. This was most frequently observed in the quadratic analysis however we noticed that in piecewise analysis the results showed a nonsignificant slope 2 intercept for the metacognitive subscales. The later indicated that in the second piece the initial levels were approximately similar for the participants. The second noticeable aspect was the slope that showed a varied picture within the quadratic and piecewise frame of reference for metacognitive beliefs. In addition to significance the positive change was recurrently observed for quadratic model, however the piecewise model revealed that slope 2 was mostly found to be nonsignificant negative change. Considering the quadratic model, almost entire list of metacognitive variables indicated significant variability around the mean.

Correspondingly, we found parallel findings for the positive and negative beliefs about rumination in terms of means intercepts and slopes though nonsignificant variability across time waves was frequent. This was suggestive of the intragroup stability over the time-waves. Likewise, the thought control strategies depicted both negative to positive trend that were nonsignificant for distraction subscale in piecewise model. The social control subscale showed significant variability around the means, whereas the worry represented significant variability in slope 1 around the mean. The punishment and reappraisal were found to display similar results indicating significant variability in slope 1 and negative but nonsignificant variability in slope 2. The entire model showed similar trend in their initial levels, slopes and variability across the entire time span.

The study variables represent components of S-REF model, that highlight a processing that is otherwise operating silently in all situations for a mainstream population. The processing may face fluctuations due to situational instabilities but

according to the S-REF theory the activation usually returns to normal mode of functioning typically as soon as appraisals are made and coping strategy is decided. The coping strategy is thus implemented and further monitored for goal progress and altered if necessary. The above constituents of cognitive architecture operate in a more perseverative way for emotionally dysfunctional individuals. Thus, the metacognitive beliefs, beliefs about rumination and the thought controls generally provoke an attentional bias style of thinking. The effects of attentional bias on cognitive processing are indicated by literature (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van Ijzendoorn, 2007), to elevate the perceived advantage of emotion oriented coping that triggers worry and metaworry contents (Wells, 2005). The cognitive attention bias will further result in the appraisal of threat and loss with reference to emotionally susceptible population. Hence, it can be presumed that in a normal sample the process will vary according to situational demands even after controlling for the life stressors as covariates. This would especially be explained in terms of piecewise analysis due to the separate trajectories in terms of time-waves.

In conclusion, Time-4 results confirmed that the S-REF responses may be in form of variety of consequences (Matthews & Wells, 1999; 2000). For example, the significant variability across means in study variables indicate fluctuations that are likely to be situationally bound. According to the pathological approach to emotional self-regulation theory the emotion oriented coping strategies are usually internally focused and have rebound effects that sustain negative self-beliefs (Mathews & Wells, 2004). Further the pathology is continued in functioning that arise the accessibility and or availability of negative self-knowledge through establishing a more detailed and extensive negative associations to events and concepts. This directs that the metacognitive beliefs are likely to be consistent over time and would remain

either stable or high or show a positive growth across time-waves. It must be highlighted here that the said processing is with reference to pathological ruminative sample, contrary to that our sample showed random coefficients and variations suggestive of normal self-regulatory processing.

Additionally, the authors (Wenzlaff & Wegner, 2000) suggest that worried and distressed individuals frequently use thought control strategies that may end in rebound effects of negative thoughts though the literature show inconsistent findings (Purdon, 1999). The incubation of negative thought intrusions following stressful episode (e.g., Wells & Papageorgiou, 1995) and mood disturbance preservation (Nolen-Hoeksema, 2000), that add to the growth of negative beliefs that contribute to emotional disturbances. The entire interpretation signifies brooding quality of S-REF that is contrary to our results mainly because of the nonclinical sample. Thus, we conclude that the current findings adequately fit and justify typical emotional self-regulation within normal cognitive processing.

CHAPTER 4

GENERAL DISCUSSION

The present inquiry was planned to explore the relationship between dimensions of S-REF model following 4 time-waves repeated measure research design. The time lapse between any two waves was approximately 4-months. The study systematically explored the associations on cross-sectional level as well as longitudinal framework of analysis. The model consisted of dispositional antecedents and online situational processing of information, built within cognitive infrastructure. The results for the entire 4-waves are consolidated here in accordance with the depiction represented by study variables.

The complete arrangement of present exploration entails a combination of cognitive-emotion self-regulation model. First, the cognitive elements are highlighted distinctly in individual time-waves to confer their role as a function of time.

The metacognitive beliefs formed an important premise for the S-REF antecedents. Flavell (1993) stated that, metacognition comprise of metacognitive experiences or strategies or metacognitive knowledge. The metacognitive knowledge is about when or how to practice specific strategies for solving problems (Hargrove & Nietfeld, 2015). Metacognitive knowledge represents an individuals' concepts and beliefs about their own thinking i.e., the facts one has about their cognitions. Further, they are suggestive of individual's cognitive limitations and strengths reflected in one's beliefs.

The Time-1 results ensured the psychometric soundness and construct validation for the entire list of study variables. The findings enabled in identifying variations between groups on cross-sectional level. The findings suggested that, the metacognitive knowledge variables e.g., negative beliefs about worry, anxious

thoughts (metaworry), cognitive self-consciousness, negative beliefs about rumination, reappraisal, punishment, distraction and emotion and avoidance coping strategy showed gender differences. The women were significantly higher in terms of greater emotion focused approaches that was further found to be significantly associated with worrying. These findings were suggestive of trait worrying in the women that has previous empirical support (Neudert, Stark, Kress, & Hermann, 2017). Adults spend major portion of their waking hours at work place therefore, essential source of stress or challenge may come from occupational affiliations. It was observed that within organizational contextual variations the negative beliefs about worry, cognitive self-consciousness, negative beliefs about rumination, metaworry, distraction and emotion and avoidance oriented coping were associated with significant differences between types of organizations for e.g., especially different between government and private organizations and semi-government and private ones. Further, the differences assessed with reference to the participant's family system depicted the negative beliefs about worry and metaworry in showing consistent variation within demographic factors. These findings were indicative of an accommodating or self-regulatory role played by the metacognitive beliefs. Previous inquiry supports current findings e.g., Strand, Hagen, Hjemdal, Kennair and Solem, (2018) maintains that negative beliefs and metaworry are key components that differentiate self-regulated cognitive processing from preservative and dysfunctional metacognitions.

The thought control cognitive strategies help in self-regulation by suppressing, exacerbating or altering the perception of cognitive events. The metacognitive action allows for the control and regulation of thoughts enabling one to identify and direct learning processes within experiences. This is regarded as consciousness about one's

psychological capitals. An elevated level of metacognition helps to effectively resolve tasks, arrive at solutions in shorter time with less effort. This is possible due to the planning, monitoring and altering processes of metacognitions during problem solving, the inaccuracies are improved, and individuals may ensue in a productive way. In the context of pathological metacognitive functioning an individual feels an absence of control whereas the main aim of metacognitions is control. In fact, the metacognitive experiences, knowledge and strategies are interlinked having integrated effects in psychological functioning. Any disharmony between them may lead to maladaptive pattern of thinking serving as an antecedent to mental disorder. According to Wells (2000, 2007, 2009), susceptibility and psychological maintenance are linked to a thinking style called the Cognitive-Attentional Syndrome (CAS) that forms the foundation for emotional disorders. Considering these facts, the Time-2 results were evaluated in terms of comparison of associations between variables across Time-1 and Time-2.

Time-2 findings that were tested with paired comparison between Time-1 and Time-2 suggested that, the cognitive processing varied across 4-months lapse within S-REF variables depicting either an elevation or decline. These variations are attributable to situational demands where cognitive variations are likely, in order to meet the requirements of desired state the appraisals and coping are accommodated with current demands. Specifically, the findings pointed to invariance between Time-1 and 2 within loss, reappraisal and emotion oriented coping while the rest of the study variables were significantly different. This is a representation of an enduring nature of trait coping. First, loss is an appraisal of life event that often lays lasting impact thus, it can logically show stability over time. According to literature, emotion oriented coping includes positive reappraisal, venting, self-blame, and rumination

Kelly, Tyrka, Price, & Carpenter, 2008). Although emotion oriented coping is often pronounced as less productive than problem oriented coping, however under certain circumstances, emotion oriented coping may be more fruitful than active coping e.g., when stressor cannot be altered (Garnefski & Kraaji, 2006). Empirical findings have generally shown that emotion oriented coping predicts higher levels of psychopathology and practical impairment (Kohn et al., 1994; Ravindran et al., 1996).

The cognitive perspective maintains that anxiety is caused by biased negative thinking. Depressive individuals tend to have a negative self-vision, surrounding their world and future resulting in negative cognitive triad. An important dimension of metacognitive activity in S-REF model, also contributory to mental dysfunction is the dysfunctional use of thought control strategies. Principally, thought control is employed for conscious avoidance of unwanted thoughts. Some authors have shown that thought control strategies are used differently for different types of samples e.g., Morrison and Wells (2007), Abramowitz et al. (2006) maintained that worry and punishment were more prevalent in OCD and schizophrenic patients. The author's proposed that in well-adjusted individual use of distraction and reappraisal is higher. The above literature indicates that some of these strategies are useful where as others have showed inconsistent research findings. Wells and Davies (1994) found significant correlations between punishment and worry whereas Reynolds and Wells (1999) suggests that certain thought control strategies may correlate with PTSD symptoms.

The Time-3 provided further evaluation of study variables across 12-months lapse using repeated measures ANOVA within linear and quadratic growth model and mediational analysis. The negative beliefs about rumination in the linear growth and

negative beliefs about worry in the quadratic growth showed significant medium effects of time compared to the rest of the list of variables that depicted small or negligible effect sizes. However, it is noteworthy that differences existed especially within metacognitive variables that have previously been explicitly connected with psychopathological information processing. For example, research shows that women having negative cognitive styles in response to stress have higher levels of anxiety and depressive symptoms compared to men using same cognitive styles (Blalock & Joiner, 2000; Mazure & Maciejewski, 2003; Spada, Mohiyeddini & Wells, 2008). The mediating relationship evaluated for across Time-1 to Time-3, effects indicated that despite inadequate sizes of fit indices the model presented significant paths for example, the direct effects between Time-1 positive beliefs about worry and Time-2 emotion oriented coping, and Time-2 emotion oriented coping with Time-3 positive beliefs about rumination. However, the study was cross-sectional in nature lending support to concurrent cognitive processing. The significant indirect effects observed between Time-1 positive beliefs about worry and Time-3 cognitive confidence in our current findings were suggestive of ruminative processing. The conceptual framework of S-REF model presents that rumination is the allocation of executive functioning to specific thought content that may consequently lead to cognitive overload by repetitive thought processing reducing cognitive confidence.

Interestingly, metacognitions play an important role by providing knowledge about our psychological resources. Additionally, it is responsible for the evaluation of the worth of one's own psychological states e.g., assessing threatful situations or challenges etc. In normal human cognitive functioning, metacognitions aids problem solving by evaluating, monitoring and by error correction. Wells (2000) stated that dysfunctions of metacognitions may lead to maladaptive responses for e.g.,

obsessions (Wells & Papageorgiou, 1998) or depression (Papageorgiou & Wells, 2003). Likewise, the tendency to hold advantageous beliefs about worry contribute to negative thinking especially in women hence, contributing to lowering the psychological resources necessary in active coping (Garnefski & Kraaji, 2006).

Time-4 inquiry for the longitudinal trajectory assessment marked the finale of our exploration. Each component of the study was individually assessed for growth using linear and quadratic analysis. The S-REF variables followed variant trajectory across participants especially within quadratic growth model. Overall, the entire model reflected processing variations across time. The results were suggestive of fluctuating trend at cognitive processing level. These are indicative of an activation of the system as per the situational requirements. The cognitions in SR identify, appraise, and decide the coping strategies, upon completing this sequence of cognitive action the mechanism is engaged in monitoring other potentially relevant information and progress of the challenges at hand. This cognitive activity is altered when additional planning and coping strategy change is required. The variation in the results provide evidence for cognitive flexibility. The same processing within clinical samples would have been more likely to result in stable or invariant trajectories. Some other characteristics associated with the sample are discussed below to further highlight another dimension of discussion for the present results.

Religion, Coping and Self-regulation

Religious coping is one of the most common forms of coping in difficult times, regardless of cultural and religious affiliations (Peres et al., 2007). Similarly, the culture of Pakistan is embedded into the teachings of Islam, the religion of peace. Whereby, Muslims put their fate in “God’s Hands” and accept circumstances as

"God's Will" , this provides them with support, resolve, and sense of safety to persevere through trying situations (Talik & Skowroński, 2018).

The link between religiosity and psychological constructs is more often modeled through specific religious coping strategies and behaviors (Maltby & Day, 2003). Concepts from emotion science point to possible links with specific religious coping strategies, such as cognitive reappraisal, as an emotion regulation strategy (Thomas & Savoy, 2014), and positive religious coping strategies (Cornish et al. 2017; Peres et al. 2007; Wallace & Shapiro 2006). Cognitive reappraisal involves reframing or reassessing negative cognitions to alter emotional states, which typically results in more positive control of negative situations. Positive reappraisal is considered a particularly adaptive emotion regulation strategy, as it maintains emotional stability during challenging or stressful life circumstances and provides protection against symptoms of distress typically associated with affective disorders e.g., anxiety, depression, post-traumatic stress disorder (Resick et al. 2013). Similarly, positive religious coping strategies have also been associated with positive mental health outcomes (Cornish et al. 2017; Peres et al. 2007), such as increased emotional well-being and posttraumatic growth (Talik & Skowroński, 2018).

In fact, some forms of religious coping have been referred to as emotion regulation strategies in action (Thomas & Savoy, 2014), and cognitive reappraisal is one such specific strategy. Indeed, religious individuals spontaneously engage in positive reappraisals, across a variety of religions (Garssen et al. 2015; Vishkin et al. 2016). For instance, benevolent religious reappraisal is one of the most commonly used religious coping strategies and involves redefining a stressful circumstance as a prospect for spiritual growth or as another possible beneficial outcome, such as a valuable learning opportunity (Talik & Skowroński 2018).

The current research was conducted on a population who were dominated by Pakistani culture and Islam as their religion, these affiliations are important in the view of present findings. The S-REF processing overall concluded that reappraisal and distractions were found to show intraindividual changes overtime. These are reflective of a religious coping strategy where the reframing or reassessing the circumstances and using reappraisal or distraction may enable an individual to maintain tenacity and endure the negativity induced by the circumstances. However, this is another dimension of explanation for the obtained results albeit religious coping is beyond the scope of current study objectives.

Strengths and Limitations

The existing research has methodological strengths that had been recommended by previous researches. The study displayed cognitive self-regulation process, a universal mechanism of human cognitive-emotional functioning irrespective of demographical barriers. The research design was another forte for the present research as it had been highlighted previously as an essential requirement. The longitudinal design adds to the validity of the findings while, facilitating future explorations. Furthermore, generalizability of the study results is quite conceivable and applicable to everyday self-regulatory processes.

The study also posed several limitations for example, the structured instruments of the self-report method limited collection of rich information however, that was managed to some extent through one on one interaction with the participants. Additionally, the study was time consuming and expensive. Another challenge faced by the researcher was the attrition of participants. The participants' unwillingness to

participate further resulted into almost half sample loss by the end of fourth time-wave.

Implications

The study findings implied evidence for cognitive self-regulation for effective cognitive functioning. The implications can be categorized within clinical perspective, organizational, employee health outcomes and human resource policy making.

On clinical front, the results are indicative of cognitive flexibility especially responsible for cognitive self-regulation. The role of metacognitive beliefs has been revealed to provide to emotional disorders due to the cognitive attentional syndrome, utmostly prevalent in clinical populations. The emotional dysregulation cannot be wholly captured by any diagnosis (Frewen & Lanius, 2006). Consequently, it contributes to the maintenance of emotionally maladaptive behaviors.

Currently, the findings reveal that within normal population that self-regulation activates cognitive thought control strategies in dealing with various threat and loss appraisals. Such thought suppression implies psychopathological vulnerabilities regardless of being a nonclinical population. The typical antecedent-focused reappraisal is a sustainable cognitive mechanism that can diminish the detrimental consequences. Additionally, the negative cognitions and beliefs may avert or relieve stress-related difficulties. The findings infer that regulated cognitive processing depict interchangeable use of coping with reference to circumstantial requirements. It can further be deduced that, adaptive coping requires strategies that are matched with situational demands therefore regardless of trait characteristics in self-regulation the choice of a coping strategy is predominantly situational-dependent.

According to Santosh, Roy and Kundu (2015) self-regulation is a significant correlate of psychopathology, social functioning that enable pursuing of goals within changing environments. The findings imply that behaviors or coping with situation engages cognitive control on mental strategies for better performance. An improvement in self-regulatory functioning will help improve overall socio-emotional functioning. Therefore, within organizational context where leadership requires i.e., the ability to observe, identify, comprehend, and manage one's own emotions and that of others, self-regulation plays a vital role. The current findings can be used for designing training and development programs within organizational leadership labs, specifically focusing on executive control and coping within competitive environments. Self-regulatory coping training programs can be included to improve self-regulation ability in emotionally influenced behaviors such as interpersonal relations, social competence, self-control and self-esteem and impulsivity etc., that produces remarkable variations in behaviors (Bridgett et al., 2013; Smallwood, 2013).

The situationally appropriate and regulated behaviors are essential within organizational settings. The current findings indicate a dynamic interplay between previous learning, current appraisal and choice of coping within everyday stressors irrespective of their origin. Metacognitions play a vital role in life appraisals therefore, they contribute to employees health outcomes. The effective everyday coping requires an active cognitive-emotion struggle. An emotion oriented approach may initiate rumination that has various employee health consequences for example, Gross (2006) suggested that antecedent focused approaches such as cognitive appraisals are more effective in avoiding psychological outcomes such as psychopathology, social dysfunction, and depressed mood.

The present study suggests that cognitive flexibility is a natural component of normal information processing mechanism that must be utilized and assessed in case of employees' performance erosion. Employed individuals have added strain due to additional stressors within work settings hence maintaining self-regulation balance is challenging especially during emotionally difficult times. The current findings suggest that an independent stress experience may be managed with guided cognitive appraisals and corrected with appropriate coping strategies. Cognitive thought control strategies e.g., distraction was seen in facilitating self-regulation process though running parallel to other cognitive mechanisms of threat and loss appraisals.

In challenging times for organizations, the human resource department can implement stress reducing distractions for employees that can provide to their existing psychological capital while discouraging the formation of perseverative or negative metacognitive beliefs. The exposure to thought challenging information enables information processing regulation by incorporating neutral, relevant and practical aspects of coping. Such conceptual conclusions may be incorporated into the human resource training and development regime as well as organizational policies. Sequentially, it may contribute to reduced stress and better wellbeing outcomes.

Conclusion

The findings represented that metacognitions and other S-REF strategies were inconsistent and variant over time depicting evidence for normal cognitive self-regulation. The findings further advocate evidence for cognitive processing flexibility for adaptive functioning and healthy self-regulation. The present research contributes to the existing literature in terms of research design, broadening the scope of model by validating the S-REF cognitive processing as a universal mechanism and most

importantly by identifying two most important cognitive components that enable cognitive flexibility i.e., reappraisal and distraction. These strategies can prove beneficial for both therapeutic and daily situations.

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APPENDIX A

Informed Consent

This is a research study being carried out under National Institute of Psychology. The study focuses on thought processes. We assure you of the confidentiality of the information provided and that it will only be used for academic research reasons. DO NOT LEAVE ANY ITEM UNANSWERED.

There are NO CORRECT or INCORRECT answers; you need to report your standing on each statement which best describes how you feel. There may be some words that you do not understand, feel free to question. Please ensure that you fill out all sections of the questionnaire. We are grateful for your participation.

Demographic Information

Name: _____

Age: _____

Gender: _____

Education: _____

No. of family members: _____

Marital status: _____

Children: _____

Siblings (brothers/sisters): _____

Family system: _____

Phone number: _____

Cell number: _____

Postal address:

_____

_____

Email address: _____

Organization name:

_____

Type of organization (Gvt./ Pvt/ Semi Gvt):_____

Position in the organization:

Work experience (yrs): _____

No. of working hours: _____

Salary : _____

APPENDIX B

Stressors Checklist

Listed below are some common events that may cause stress. Check off the ones that apply to you or might have been the cause of stress for you in the past three months.

PERSONAL STRESSORS

- ☐ Personal Injury/ Illness/ Handicap
- ☐ Changes in financial status
- ☐ Pregnancy (your or partner's)
- ☐ Quitting smoking or other substance
- ☐ Ending a relationship
- ☐ Dieting
- ☐ Changes in self worth
- ☐ Values conflict

Other:

FAMILY STRESSORS

- ☐ Marriage
- ☐ Spouse starting/stopping a job
- ☐ Family member(s) leaving home
- ☐ Illness/healing of a family member
- ☐ Separation/ Divorce
- ☐ Death of a close friend or family member
- ☐ Trouble with in-law/ other family members
- ☐ Parent/ child tensions

Other:

WORK STRESSORS

- ☐ Change in workload
- ☐ New supervisor
- ☐ Change in pay
- ☐ Retirement
- ☐ Starting a new job
- ☐ Change in hours
- ☐ Promotion/demotion
- ☐ Change in job security/layoff
- ☐ Change in relationships at work
- ☐ Merger or acquisition

Other:

ENVIRONMENTAL STRESSORS

- ☐ Natural disaster (earthquake, fire, flood)
- ☐ Moving to a new climate
- ☐ War/ conflict
- ☐ Moving to a new culture or country
- ☐ Moving to a new neighborhood
- ☐ Remodeling
- ☐ Moving to a new city
- ☐ Crime in neighborhood

Other:

APPENDIX C

APPRAISAL OF LIFE EVENT SCALE - (Situational version)

We would like you to rate your perceptions of your current circumstances. That is your perception of your environment right now. Use the following six point scales (where 0 = not at all to 5 = very much so) to indicate the extent to which each of the adjectives best describes your perceptions now. Do this by circling the appropriate point on the scales.

Please respond as quickly as possible as first responses are usually more accurate.
Please make a response to each adjective.
AT THE TIME IT OCCURRED THE EVENT WAS:

Threatening	Painful
0 1 2 3 4 5	**0 1 2 3 4 5**
Fearful	Depressing
0 1 2 3 4 5	**0 1 2 3 4 5**
Enjoyable	Pitiful
0 1 2 3 4 5	**0 1 2 3 4 5**
Worrying	Informative
0 1 2 3 4 5	**0 1 2 3 4 5**
Hostile	Exciting
0 1 2 3 4 5	**0 1 2 3 4 5**
Challenging	Frightening
0 1 2 3 4 5	**0 1 2 3 4 5**
Stimulating	Terrifying
0 1 2 3 4 5	**0 1 2 3 4 5**
Exhilarating	Intolerable
0 1 2 3 4 5	**0 1 2 3 4 5**

APPENDIX D

ANXIOUS THOUGHT INVENTORY- Metaworry

Now I would like to ask you some questions about worry. I am going to read out some statements and ask you to tell me how often this happened to you.

1 = Almost never
2 = Sometimes
3 = Often
4 = Almost always

	Statements				
1	I take disappointments so keenly that I cannot put them out of my mind.	**1**	**2**	**3**	**4**
2	Unpleasant thoughts enter my mind against my will.	**1**	**2**	**3**	**4**
3	I have difficulty clearing my mind of repetitive thoughts.	**1**	**2**	**3**	**4**
4	I think that I am a missing out on things in life because I worry too much.	**1**	**2**	**3**	**4**
5	I worry that I cannot control my thoughts as well as I would like to.	**1**	**2**	**3**	**4**
6	In general, how often do you worry?	**1**	**2**	**3**	**4**

APPENDIX E

METACOGNITIVE QUESTIONNAIRE (MCQ-30)

This questionnaire is concerned with beliefs people have about their thinking.
Listed below are a number of beliefs that people have expressed. Please read each item and say how much you generally agree with it by circling the appropriate number.

Please respond to all the items, there are no right or wrong answers.

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

15.	**My worrying could make me go mad**	**1**	**2**	**3**	**4**
16.	**I am constantly aware of my thinking**	**1**	**2**	**3**	**4**
17.	**I have a poor memory**	**1**	**2**	**3**	**4**
18.	**I pay close attention to the way my mind works**	**1**	**2**	**3**	**4**
19.	**Worrying helps me cope**	**1**	**2**	**3**	**4**
20.	**Not being able to control my thoughts is a sign of weakness**	**1**	**2**	**3**	**4**
21.	**When I start worrying, I cannot stop**	**1**	**2**	**3**	**4**
22.	**I will be punished for not controlling certain thoughts**	**1**	**2**	**3**	**4**
23.	**Worrying help me to solve problems**	**1**	**2**	**3**	**4**
24.	**I have little confidence in my memory for places**	**1**	**2**	**3**	**4**
25.	**It is bad to think certain thoughts**	**1**	**2**	**3**	**4**
26.	**I do not trust my memory**	**1**	**2**	**3**	**4**
27.	**If I could not control my thoughts, I would not be able to function**	**1**	**2**	**3**	**4**
28.	**I need to worry, in order to work well**	**1**	**2**	**3**	**4**
29.	**I have little confidence in my memory for actions**	**1**	**2**	**3**	**4**
30.	**I constantly examine my thoughts**	**1**	**2**	**3**	**4**

APPENDIX F

THOUGHT CONTROL QUESTIONNAIRE

Most people experience unpleasant and/or unwanted thoughts (in verbal and/or picture form). Which can be difficult to control. We are interested in the techniques that you generally use to control such thoughts. Below are a number of things that people do to control these thoughts. Please read each statement carefully, and indicate how often you use each technique by circling the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

When I experience an unpleasant / unwanted thought:

	Statements	Never	Sometimes	Often	Almost Always
1.	I call to mind positive images instead	1	2	3	4
2.	I tell myself not to be stupid	1	2	3	4
3.	I focus on the thought	1	2	3	4
4.	I replace the thought with a more trivial bad thought	1	2	3	4
5.	I don't talk about the thought to anyone	1	2	3	4
6.	I punish myself for thinking the thought	1	2	3	4
7.	I dwell on other worries	1	2	3	4
8.	I keep the thought to myself	1	2	3	4
9.	I occupy myself with work instead	1	2	3	4
10	I challenge the thought's validity	1	2	3	4
11.	I get angry at myself for having that thought	1	2	3	4
12.	I avoid discussing the thought	1	2	3	4
13.	I shout at myself for having that thought	1	2	3	4

14.	**I analyze the thought rationally**	**1**	**2**	**3**	**4**
15.	**I slap or pinch myself to stop the thought**	**1**	**2**	**3**	**4**
16.	**I think pleasant thoughts instead**	**1**	**2**	**3**	**4**
17.	**I find out how my friends deal with these thoughts**	**1**	**2**	**3**	**4**
18.	**I worry about more minor things instead**	**1**	**2**	**3**	**4**
19.	**I do something I enjoy**	**1**	**2**	**3**	**4**
20.	**I try to reinterpret the thought**	**1**	**2**	**3**	**4**
21.	**I think about something else**	**1**	**2**	**3**	**4**
22.	**I think more about the minor problems I have**	**1**	**2**	**3**	**4**
23.	**I try a different way of thinking about it**	**1**	**2**	**3**	**4**
24.	**I think about past worries instead**	**1**	**2**	**3**	**4**
25.	**I ask my friends if they have similar thoughts**	**1**	**2**	**3**	**4**
26.	**I focus on different negative thoughts**	**1**	**2**	**3**	**4**
27.	**I question the reasons for having the thought**	**1**	**2**	**3**	**4**
28.	**I tell myself that something bad will happen if I think the thought**	**1**	**2**	**3**	**4**
29.	**I talk to a friend about the thought.**	**1**	**2**	**3**	**4**
30.	**I keep myself busy**	**1**	**2**	**3**	**4**

APPENDIX G

POSITIVE BELIEFS ABOUT RUMINATION SCALE (PBRS)

Instructions: Most people experience depressive thoughts at times. When depressive thinking is prolonged and repetitive it is called *rumination*. This questionnaire is concerned about the beliefs that people have about rumination. Listed below are a number of these beliefs. Please read each belief carefully and indicate how much you *generally* agree with each one. Please circle the number that best describes your answer. Please respond to all of the items.

Statements	***Do not agree***	***Agree Slightly***	***Agree Moderately***	***Agree very much***
1. In order to understand my feelings of depression I need to ruminate about my problems	**1**	**2**	**3**	**4**
2. I need to ruminate about the bad things that have happened in the past to make sense of them	**1**	**2**	**3**	**4**
3. I need to ruminate about my problems to find the causes of my depression	**1**	**2**	**3**	**4**
4. Ruminating about my problems helps me to focus on the most important things	**1**	**2**	**3**	**4**
5. Ruminating about the past helps me to prevent future mistakes and failures	**1**	**2**	**3**	**4**
6. I need to ruminate about my problems to find answers to my depression	**1**	**2**	**3**	**4**
7. Ruminating about my feelings helps me to recognise the triggers for my depression	**1**	**2**	**3**	**4**
8. Ruminating about my depression helps me to understand past mistakes and failures	**1**	**2**	**3**	**4**
9. Ruminating about the past helps me to work out how things could have been done better	**1**	**2**	**3**	**4**

APPENDIX H

POSITIVE BELIEFS ABOUT RUMINATION SCALE (NBRS)

Instructions: **Most people experience depressive thoughts at times. When depressive thinking is prolonged and repetitive it is called *rumination***. Please read each belief carefully and indicate how much you *generally* agree with each one. Please circle the number that best describes your answer. Please respond to all of the items. RUMINATION = thinking repetitively.

Statements	***Do not agree***	***Agree Slightly***	***Agree Moderately***	***Agree very much***
10. Ruminating makes me physically ill	**1**	**2**	**3**	**4**
11. When I ruminate I can't do anything else	**1**	**2**	**3**	**4**
12. Ruminating means I'm out of control	**1**	**2**	**3**	**4**
13. Everyone would desert me if they knew how much I ruminate about myself	**1**	**2**	**3**	**4**
14. People will reject me if I ruminate	**1**	**2**	**3**	**4**
15. Ruminating about my problems is uncontrollable	**1**	**2**	**3**	**4**
16. Ruminating about my depression could make me kill myself	**1**	**2**	**3**	**4**
17. Ruminating will turn me into a failure	**1**	**2**	**3**	**4**
18. I cannot stop myself from ruminating	**1**	**2**	**3**	**4**
19. Ruminating means I'm a bad person	**1**	**2**	**3**	**4**
20. It is impossible not to ruminate about the bad things that have happened in the past	**1**	**2**	**3**	**4**
21. Only weak people ruminate	**1**	**2**	**3**	**4**
22. Ruminating can make me harm myself	**1**	**2**	**3**	**4**

APPENDIX I

COPING INVENTORY OF STRESSFUL SITUATIONS (CISS)

The following are ways people react to various difficult, stressful, or upsetting situations. Please circle a number from 1 to 5 for each item. Indicate how much you engage in these types of activities when you encounter a difficult, stressful, or upsetting situation.

	Statement	**Not at all**				**Very Much**
1	Schedule my time better.	**1**	**2**	**3**	**4**	**5**
2	Focus on the problem and see how I can solve it,	**1**	**2**	**3**	**4**	**5**
3	Think about the good times I have had.	**1**	**2**	**3**	**4**	**5**
4	Try to be with other people.	**1**	**2**	**3**	**4**	**5**
5	Blame myself for procrastinating.	**1**	**2**	**3**	**4**	**5**
6	Do what I think is best.	**1**	**2**	**3**	**4**	**5**
7	Become preoccupied with aches and pains.	**1**	**2**	**3**	**4**	**5**
8	Blame myself for having gotten into this situation.	**1**	**2**	**3**	**4**	**5**
9	Window shop.	**1**	**2**	**3**	**4**	**5**
10	Outline my priorities.	**1**	**2**	**3**	**4**	**5**
11	Try to go to sleep.	**1**	**2**	**3**	**4**	**5**
12	Treat myself to a favourite food or snack.	**1**	**2**	**3**	**4**	**5**
13	Feel anxious about not being able to cope.	**1**	**2**	**3**	**4**	**5**
14	Become very tense.	**1**	**2**	**3**	**4**	**5**
15	Think about how I solved similar problems.	**1**	**2**	**3**	**4**	**5**
16	Tell myself that it is really not happening to me.	**1**	**2**	**3**	**4**	**5**
17	Blame myself for being too emotional about the situation.	**1**	**2**	**3**	**4**	**5**

18	Go out for a snack or meal.	**1**	**2**	**3**	**4**	**5**
19	Become very upset.	**1**	**2**	**3**	**4**	**5**
20	Buy myself something.	**1**	**2**	**3**	**4**	**5**
21	Determine a course of action and follow it.	**1**	**2**	**3**	**4**	**5**
22	Blame myself for not knowing what to do.	**1**	**2**	**3**	**4**	**5**
23	Go to a party.	**1**	**2**	**3**	**4**	**5**
24	Work to understand the situation.	**1**	**2**	**3**	**4**	**5**
25	“Freeze” and not know what to do.	**1**	**2**	**3**	**4**	**5**
26	Take corrective actions immediately.	**1**	**2**	**3**	**4**	**5**
27	Think about the event and learn from my mistakes.	**1**	**2**	**3**	**4**	**5**
28	Wish that I could change what had happened or how I felt.	**1**	**2**	**3**	**4**	**5**
29	Visit a friend.	**1**	**2**	**3**	**4**	**5**
30	Worry about what I am going to do.	**1**	**2**	**3**	**4**	**5**
31	Spend time with a special person	**1**	**2**	**3**	**4**	**5**
32	Go for a walk.	**1**	**2**	**3**	**4**	**5**
33	Tell myself that it will never happen again.	**1**	**2**	**3**	**4**	**5**
34	Focus on my general inadequacies.	**1**	**2**	**3**	**4**	**5**
35	Talk to someone whose advise I value.	**1**	**2**	**3**	**4**	**5**
36	Analyse the problem before reacting.	**1**	**2**	**3**	**4**	**5**
37	Phone a friend.	**1**	**2**	**3**	**4**	**5**
38	Get angry.	**1**	**2**	**3**	**4**	**5**
39	Adjust my priorities.	**1**	**2**	**3**	**4**	**5**
40	See a movie.	**1**	**2**	**3**	**4**	**5**
41	Get control of the situation.	**1**	**2**	**3**	**4**	**5**

42	Make an extra effort to get things done.	**1**	**2**	**3**	**4**	**5**
43	Come up with several different solutions to the problem.	**1**	**2**	**3**	**4**	**5**
44	Take sometime off and get away from the situation.	**1**	**2**	**3**	**4**	**5**
45	Take it out on other people.	**1**	**2**	**3**	**4**	**5**
46	Use the situation to prove that I can do it.	**1**	**2**	**3**	**4**	**5**
47	Try to organize so I can be on top of the situation.	**1**	**2**	**3**	**4**	**5**
48	Watch TV.	**1**	**2**	**3**	**4**	**5**

Please ensure that you have responded to all items - Thank You

Gmail **psychology photo state <psychologyphotostate@gmail.com>**

permission for instruments.

1 message

Aisha Kashif <aisha.kashif@undp.org> Fri, Apr 23, 2021 at 10:08 AM
To: "psychologyphotostate@gmail.com" <psychologyphotostate@gmail.com>

From: Adrian Wells <adrian.wells@manchester.ac.uk>
Subject: RE: Research Guidance!
Date: November 17, 2015 4:46:13 PM GMT+05:00
To: Ash Kash <munash1210@gmail.com>

Dear Aisha,

I hereby confirm that i have granted you permission to use these measures in your research project. This permission does not extend to publishing these instruments in the original or translated forms and is not transferrable.

Regards

Adrian Wells

Adrian Wells, Ph.D, C.Psychol, FBPsS
Professor of Clinical and Experimental Psychopathology
University of Manchester
School of Psychological Sciences
Section of Clinical and Health Psychology
Rawnsley Building
MRI
Manchester
M13 9WL

From: Ash Kash [munash1210@gmail.com]
Sent: 17 November 2015 06:11
To: Adrian Wells
Subject: Re: Research Guidance!

Dr. Adrian. I hope you are fine. Earlier, I had exchanged that i was working on your model as part of my PhD doctoral thesis, for which you had been kind enough to provide me the guidance and measures too. I would like to request you for a one-liner that would verify that you have allowed me to use these measures:

1. Metacognitions Questionnaire (Cartwright-Hatton & Wells, 1997);
2. AnTI Anxious Thoughts Investory (Wells, 1994);
3. TCQ Thought Control Questionnaire (Wells & Davies, 1994);
4. PBRS ¼ Positive Beliefs about Rumination Scale (Papageorgiou & Wells, 2001b; NBRS Negative Beliefs about Rumination Scale.

I will be grateful for the help.

Sincerely

Aisha Muneer
PhD. (Scholar)
National Institute of Pakistan
Quaid-e-Azam University
Islamabad.