

THE NATURE AND DIMENSIONALITY OF REPETITIVE THOUGHT

by

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ABSTRACT

TARYN C. GREENE. The Nature and Dimensionality of Repetitive Thought (Under the direction of DR. CHARLIE L. REEVE)

Background: Current popular conceptualizations of the psychological process Repetitive Thought (RT) appear of limited accuracy due to construct confusion (i.e., equating RT with other similar constructs like rumination or worry), possible construct proliferation (i.e., naming the same construct twice), tautological definitions, and the construct being studied primarily in mentally disordered populations. This paper sought to unite current disparate lines of research surrounding RT, to illuminate and clarify the nature of RT.

Methods: Two studies were completed: First, a systematic literature review was conducted to develop a more comprehensive and conceptually coherent model of RT. Second, the structural validity of the model produced by the first study was empirically tested using factor analytic and multiple regression techniques.

Results: Exploratory factor analyses indicated an oblique three-factor model was empirically most appropriate, likely with a strong underlying general RT factor.

Additional validation analyses confirmed the distinctiveness of the factors and their unique effects on health outcomes. A 36-item measure corresponding to this model is presented.

Conclusions: This study contributes to our understanding of the nature of the broader concept of Repetitive Thought by clarifying its conceptual nature, refining the definition to be more in alignment with scientific principles, and demonstrating that an oblique three-factor model appears to best reflect the nature of the larger RT concept. The empirical and applied implications are discussed, and a 36-item measure is presented.

DEDICATION

I dedicate this work to my children, Aurelia Rosemary and Dakota Wilder. Being your mother has deepened my capacity for joy, love, and creativity, and these attributes have in turn become the lifeblood of my psychological research. I hope this project and my work as a Psychologist instill in you a hope for the future, as well as a steadfast inspiration that you can do anything you set your mind to. Though the road may be winding, it is always there for you, if you follow your true path.

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has kept my heart for serving others alive, and I hope to honor you both by serving others as an applied researcher.

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CHAPTER 1: INTRODUCTION

Scientists are charged with asking falsifiable questions about the constructs and theories we investigate, as well as about the way these concepts relate and interact with each other. Daily we are engaged in ongoing conversations about the phenomena we investigate, a process made possible by meticulous descriptive work which facilitates shared understanding about our conceptual areas of study. The answers uncovered via this scientific process enhance the accuracy of our cumulative knowledge set and inform decisions and interventions employed by communities and individuals involved in our construct spaces.

As such, the goals of science follow a fundamentally hierarchical order. The first aim is to *describe* phenomena being investigated through building accurate and comprehensive taxonomies that comprise appropriate theories. This practice of descriptive science is the foundation for basic agreement about what is being investigated and is a steppingstone toward more sophisticated scientific conversation. The body of knowledge that emerges then makes it possible to conduct experiments, leading to successful *predictions about* the way phenomena may behave under certain conditions. Once the foundational work is accomplished scientists can begin to *understand* the nature of the phenomena in question. Finally, through these efforts we learn to *control* our phenomena (or how we encounter the phenomena) in order to achieve desired effects (Whitley & Kite, 2013).

All these phases of science are necessary in order to yield successful innovation. The Wright Brothers, for example, did not jump right into designing a successful airplane. They first engaged in basic descriptive work, whereby they observed birds in

flight changing the angles of their wings to make their bodies roll left and right. This eventually led to sufficient knowledge that allowed productive laboratory work, building and testing non-motorized aircraft, and eventually, creating a successful motorized flying machine (Storm, Benson, Galica, & McCredie, 2003). Without a functional understanding of basic aeronautics developed through observation and testing, the Wright Brothers likely would have failed to understand and engineer successful flight. Thusly we see that the foundational descriptive work, when performed meticulously, helps us to work towards a cumulative understanding of concepts and behaviors we wish to modify or control. In this dissertation I present the concept of repetitive thought (RT) as a concept in need of stronger descriptive research before a cumulative science around repetitive thought and its associated outcomes can be possible.

1.1 The Nature of Thought

Much of our time as humans is spent engaging in mental activity, but the complex nature of our thoughts remains a persistent mystery of the universe (Evans, 2015). Formally, the term “thinking” has been under scientific scrutiny since at least the 17th Century when Descartes published his *Meditations on First Philosophy* along with their *Objections and Replies*. In these ancient texts Descartes explored the nature of thinking, observed the way thoughts fall into “classes” or “modes,” and ultimately questioned the origins of different categories of thought (Dicker, 1993). 18th and 19th century philosophers continued the discourse, describing associations between thoughts as a “gentle force” through which ideation moves along (Evans, 2015).

But what qualifies something as an “ideation” (e.g., a persistent thought) versus just a passing thought? This subject emerged as a more finite, albeit fuzzy, line of

investigation around the time that psychiatry, psychotherapy, and neurology were popularized in the late 19th and early 20th centuries (Evans, 2015; Branquinho, 2001). The search for the elements of consciousness was pushed aside as the science of behaviorism took hold, enabling a more objective (and observable) study of subjects in a lab setting (Evans, 2015). The complexities of the mind were not forgotten, however, and studies by Freud and Jung later emerged with a focus on treating issues occurring within the (primarily subconscious) minds of their patients.

Around the mid-20th century, the writings of George Kelly, which are foundational to the psychological science of cognitive behavioral interventions, reignited a focus within the greater psychological community on conscious thought (Evans, 2015). This return to the study of conscious thought gave rise to the implementation of cognitive therapies like cognitive-behavioral therapy (CBT), which emphasized the importance of thinking, and armed therapists with an arsenal of techniques to help patients gain control over and change their thoughts. The *systematic study and treatment of conscious thoughts*, however, did not become a formalized line of study until the 1970's (Evans, 2015), and a literature regarding repetitive thoughts did not emerge until the 1980's, primarily in clinical psychology (David, Cotet, Matu, Mogoase, & Stefan, 2018).

Cognitive Behavioral Therapy (CBT) and subsequent clinical approaches were popularized in the latter half of the twentieth century to address a range of *problems with thinking* such as “worry” and “rumination” that often present in overlapping disorders such as anxiety, depression, posttraumatic stress disorder (Barlow, 2014). Research fueling these therapeutic techniques consistently identifies a need to help clients modify thought content, termed “ruminations,” to yield more productive and adaptive lines of

thinking. Indeed, rumination, also known as repetitive thought, is considered by many as a trans-diagnostic factor that plays a role in the maintenance of numerous mental disorders (Samtani, & Moulds, 2017; Lawrence et al., 2020; Kaplan et al., 2018).

More recently investigators have increasingly focused on a range of repetitive thinking styles which would seemingly allow for an expanded conceptualization of RT beyond the types known to contribute to maladaptive outcomes. Some of the lesser known styles of RT that have been studied in this line of research include mind-wandering (Welhaf et al., 2020; Seli, Carriere, & Smilek, 2015; Smallwood, & Andrews-Hanna, 2013), reminiscing (Lawrence et al, 2020), daydreaming (Stawarczyk, Majerus, Van der Linden, & D'Argembeau, 2012), among others (Kaplan et al., 2018). However, instead of emerging into a comprehensive taxonomy surrounding RT, there has been a splintering effect whereby researchers studying these phenomena remain narrowly focused on their topics of interest, without investigating the taxonomic network surrounding particular phenomena. Indeed, it is challenging to locate literature linking these ideas to the overarching concept of RT.

Additionally, there are relatively few studies investigating associations between RT and *adaptive* outcomes. A preliminary literature review conducted for this paper revealed that the bulk of studies investigating RT focus on styles of RT known to lead to maladaptive psychosocial outcomes. This is unfortunate, since thought processes and thought contents are a main target for most psychotherapeutic interventions; practitioners could likely benefit from additional research identifying adaptive styles of RT that they could assist clients with implementing. Instead, only part of the landscape surrounding the nature of repetitive thinking has been formalized and operationalized, and this has

precluded a comprehensive conceptualization of the nature of thought.

1.2 Studying Repetitive Thought as Rumination

The term for repetitive thought most often cited in scientific conversation and research is “rumination.” Indeed, rumination is a style of repetitive thought, but this term actually refers to a class of repetitive thought typically associated with clinically diagnosed depression, anxiety, and posttraumatic stress disorder (Kirkegaard, 2006; Garcia, Duque, & Cova, 2017; Cann, Calhoun, Tedeschi, Triplett, Vishnevsky, Lindstrom 2011; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Let’s review what has been empirically uncovered about rumination, the most well-known and studied style of RT in psychological literature.

The exact number of dimensions underlying ruminative thought is not entirely clear, but the literature tends to reference two different models that are accepted as complementary. One model stems from literature investigating the role of rumination as a maintaining factor of depression, and posits a two-factor model consisting of *brooding* and *reflective* rumination (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Brooding is described as passively engaging in cognitively distorted thoughts about ones’ situation and is generally considered maladaptive. Reflective rumination is described as purposefully analyzing events and one’s feelings about events, and this style of rumination is generally considered adaptive. The other two-factor model stems from research based on studies of ruminative thought in the aftermath of traumatic events, termed *intrusive* and *deliberate* rumination (Cann et al., 2011). Intrusive rumination is defined as uncontrolled or automatic thoughts associated with very stressful or traumatic events and is generally considered maladaptive. Deliberate rumination, like reflective

rumination, is characterized as a purposeful analysis of a particularly stressful or traumatic event and is generally considered adaptive.

Conceptually, these are proposed to be four distinct types of rumination, implying a four-factor model which has been empirically tested (Garcia, Duque, & Cova, 2017). Recently, however, one study concluded that it is unclear to what degree the four proposed styles of rumination are distinct, and in fact a three-factor model (*deliberate rumination, intrusive rumination, and brooding*) or two-factor model (*deliberate reflection, vs. intrusive brooding*), may be more appropriate conceptualizations (Greene & Reeve, 2020). If confirmed, the latter two models would seemingly free rumination of its ties to clinical disorders and maladaptive outcomes. Thus, there remains work ahead of researchers who wish to understand the variance underlying ruminative styles of repetitive thought. Ample empirical literature examines rumination and its various dimensions, but this construct represents only a slice of the overarching landscape of repetitive thought.

1.3 The Need for a Reconceptualization

Currently, only a small amount of literature exists concerning ways in which repetitive thought can lead to constructive and adaptive outcomes compared to clinically focused literature investigating problematic forms of RT. Herein lies the first problem surrounding existing RT literature. Since this concept has primarily been researched and popularized by clinical psychologists, as “rumination,” most conceptualizations and models of RT were developed by researching populations who presented with diagnosable mental disorders (Lawrence et al., 2020; Kaplan et al., 2018; Watkins 2008). Resulting conceptualizations of RT encompass a highly restricted range of exposure to

the full construct and are not representative of the range of RT possible across the general population.

Second, clinical definitions of repetitive thought tend to use certain consequences that have been shown to be associated with particular styles of RT (e.g. depression, anxiety, maladaptive outcomes, etc.) to define the construct. In doing so researchers have forced labels (e.g., adaptive and maladaptive) onto specific dimensions of RT. The culmination of this phenomenon is apparent in a recent study by Lawrence et al. (2020), where the common practice of conflating the RT construct with some of its outcomes is synthesized into a visual model of repetitive thought. In this figure it is possible to see the way that RT dimensions are categorized into specific buckets associated exclusively with “adaptive” or “maladaptive” outcomes. Using this model, negative thought content is labeled as an attribute of “maladaptive RT.” However, one might argue that staying with negative thoughts about an event is adaptive as this is a necessary part of the coping process, and without it posttraumatic growth or thriving may not occur (Cann, et al., 2011). Additionally, RT focused on the past or future is labelled as maladaptive, while focusing on the present is labelled adaptive. Research regarding concepts like daydreaming and planning would likely stand in opposition to these claims, as these past or future focused styles of RT can sometimes be helpful. There is clearly a need for non-tautological conceptualizations of RT which can fundamentally describe the landscape of this construct without including associated outcomes.

Lastly, RT literature is awash with construct proliferation, whereby concepts related to styles of RT, like anticipatory processing, worry, perseveration, etc., are considered as separate constructs by the researchers who study them (Le, Schmidt,

Harter, & Lauver, 2010). Although many of these constructs appear to differ from one another at first glance a recent study suggests most of them, even ones associated with “opposite” (e.g., adaptive vs maladaptive) outcomes, are positively correlated (Segerstrom, Hardy, Evans, Boggero, Alden, & Stanton, 2016). Concepts such as these would likely be classified more accurately as part of a comprehensive taxonomy surrounding RT. This construct proliferation, or failure to attend to redundancy between similar terms, has muddled the scientific conversation around RT and led to the splintering effect described earlier.

Considering the three issues identified above it is apparent that current popular conceptualizations of RT are of limited accuracy. Thus, the foundational descriptive work of conceptualizing repetitive thought needs greater attention before a cumulative understanding of RT related behaviors and outcomes can be possible. Without a solid conceptualization of RT, an accurate standard system of measurement is also not possible. It is likely that current standard systems of measure (SSM’s) for RT do not denote the construct in its entirety, and attention is needed to modifying existing SSM’s (or creating new ones) before it can be assumed that this construct is being accurately measured. When it becomes possible to construct a scale that can accurately quantify and classify a person’s tendencies towards specific styles of repetitive thought it will become possible for clinicians to provide precisely accurate, tailored interventions to clients, with an aim at modifying repetitive thought patterns for therapeutic purposes.

1.4 A Broader View of Repetitive Thought

Fortunately, in recent decades a line of RT focused research has emerged where researchers have made an effort to address construct proliferation and to purposefully

expand the definition of RT to include various concepts regardless of associated outcomes. These studies have been conducted with a broader population than previous studies, which has served to better to represent the general public. In these papers, primarily authored by Dr. Suzanne Segerstrom and colleagues, RT is usually defined as “thinking attentively, repetitively, and/or frequently about oneself and one’s world,” and is acknowledged for its trans-diagnostic significance in mental and physical wellbeing (Segerstrom et al. 2016). The authors cite evidence demonstrating that RT, depressive rumination, reflection, planning, emotional processing, and reminiscing, are positively correlated concepts that may comprise one taxonomic network (Segerstrom et al. 2016).

Several of these studies have employed multidimensional scaling (MDS) based on data collected using batteries of RT questionnaires in efforts to clearly identify the dimensions underlying RT (Segerstrom et al. 2016; Evans & Segerstrom, 2011; Segerstrom, Stanton, Flynn, Roach, Testa, & Hardy, 2012). Findings so far support three dimensions accounting for the variance in RT across studies: a) *valence*: a dimension of RT characterized by a range of thought content that includes positive content (e.g., anticipating, daydreaming) and negative content (e.g., self-criticism, brooding), b) *purpose*: a dimension of RT that ranges from thoughts centered on uncertainty or searching (e.g., mind wandering, reminiscing) to thoughts that are grounded in certainty/certainty-seeking/solving (e.g., worry, planning) and c) *total repetitive thinking*: encompasses an individual’s overall tendency to engage in RT (Segerstrom et al. 2016).

The most recent study in this series aimed to develop a brief measure of RT and to test whether this brief measure could tap each of the three previously demonstrated dimensions (Segerstrom et al., 2016). To accomplish this, researchers administered a

“full RT questionnaire battery” to four separate samples meant to represent the adult life span (ages 18-94 years). This battery consisted of nine measures originally meant to tap: Emotion Focused Thinking, Worry, Positive Thinking, Brooding and Reflection, Rehearsal, Uncontrollable RT, Remembering Positive Things, Rumination, Magnification, Helplessness, and RT with Negative Content. Researchers then attempted to create a circumplex model of RT based on the data collected across the four samples.

Circumplex models were tested on data from each of the four samples separately, and then tested on the aggregate sample. From the aggregate model, individual-model and mean-item positions and item–total correlations were used to select specific, face valid items (manifest indicators) that represent eight equal and symmetric sectors of the multidimensional space. These eight items alone successfully created a circumplex structure, and these items comprise the Brief Measure of RT yielded by this study. The circumplex produced using only these eight items produced all 3 dimensions of RT and accounted for 80-92% of the variance in RT scores across samples. As expected, in addition to the general RT dimension (i.e., “level of RT”), the results corresponded to a valence dimension where items reflecting negative or positive thought content generally fell nearer to the poles of the dimension (e.g., items A and E respectively), and a purpose dimension where content reflecting uncertainty or questioning (e.g., item C) and content reflecting planning or solving (e.g., item G) defined the poles.

Validity was assessed by evaluating whether individual item scores correlated to the hypothesized underlying dimension scores. Correlations of items with the overarching construct of RT were also assessed, so that all items should positively correlate with one another. Findings indicated acceptable correlations in both respects. Additionally, items

opposite each other in the circumplex were found to be uncorrelated, a positive indicator of item-level construct validity. Convergent and discriminant validity were assessed by comparing brief assessment dimension scores with scores on other rumination measures. For example, when comparing scores from the brief assessment against scores on the Pain Catastrophizing Scale, the propensity to ruminate over pain was associated with higher scores on items endorsing negatively valenced RT, but not with high scores on items meant to tap searching and solving (Segerstrom et al. 2016).

Reliability was assessed by calculating comparative fit indices for the general RT factor (total) and axes (valence and purpose) and comparing these against a model with item weights of 1.0 on the general factor (representing the ideal circumplex position on the axes). The comparative fit index was .90 (root mean square error of approximation = .049, confidence interval [.033, .066]) and therefore the model was considered a good fit. Reliability of the total score was .61, while reliability of the valence and purpose axes was .52, both proving consistent with reliabilities reported for most other circumplex measures (Segerstrom et al. 2016).

The authors further assessed stability (test-retest reliability) of the model, expecting to find a balance between stability and change. To examine stability, longitudinal data using the full RT battery was collected at periods of every six months for up to 13 time intervals (varied by sample). Findings indicated that for the valence dimension, 49% of the variance was attributable to stable individual differences over 1 year. For the purpose dimension, 42% of the variance was attributable to stable individual differences over 1 year. Lastly, for total amount of RT, 70% of the variance was attributable to stable individual differences over 1 year. Based on this information

reliability was judged as adequate. Stability was further assessed by examining correlations between dimension scores at time one as well as five to six years later (using the same full RT battery). Taking the reliability and stability assessments together, the authors judged their brief eight-item assessment of RT as demonstrating adequate stability overall while still allowing for the possibility of change (Segerstrom et al. 2016).

Conclusions

The Segerstrom line of research surrounding RT appears to be a more inclusive line of study that attempts to critically describe the concept of RT and its dimensions, uses a broader sample representative of the general population than previous studies, and aims to address the construct proliferation present in RT literature. To this end it lends itself to expansion of the RT conceptualization, including various concepts that are empirically correlated with RT, and has done so regardless of their demonstrated outcomes. Additionally, multidimensional scaling is a complimentary methodology used by these researchers that is not commonly seen in this literature.

These findings are valuable and have begun to move our thinking on the nature of RT. However, there are some limitations and issues that remain to be investigated. First, as is always the case, there is the issue of content deficiency in the pool of indicators selected. Though the authors did cover a broad range of concepts, it appears certain concepts may not have been assessed at all. A notable example is the well-known Event Related Rumination Inventory, which has been shown to assess two critical aspects of rumination: deliberative and intrusive rumination. As any statistical model is specific to the data on which it was based, a deficient item pool can lead to a skewed understanding of the construct itself. Thus, additional replications of their findings using alternative

mixtures of items from a broader array of measures are needed. Further, there is also the concern of measurement contamination in the set of indicators used for their analyses. Inspection of the items chosen for inclusion in the brief measure of RT, based on the argument they are the most pure indicators of this construct, raises questions about content validity. Though these items are meant to be face valid, several of them appear to have little to do with repetitive thought (e.g., Item D: “*When I am under a lot of stress, I acknowledge my emotions*”).

Second, Segerstrom et al sought to engage in the confirmation of their proposed two-dimensional model and did not seek to explore alternative models. This is important as work prior (e.g., Watkins, 2008) and subsequent to their research has postulated between three and seven underlying dimensions. For example, more recently, Kaplan et al. (2017) offered a descriptive model which includes three dimensions: a) valence, b) purpose, and c) temporal orientation of the repetitive thought. Likewise, Lawrence et al. (2020) described seven possible dimensions of RT: a) valence, b) purpose, c) temporal orientation, d) controllability, e) perspective taking, f) level of processing, and g) consequences. These authors present compelling evidence to suggest considering additional or alternative dimensions of RT.

Third, although MDS is appropriate, it is not the only way to model multidimensional, hierarchical structures. In fact, given the numerous possible dimensions identified above, coupled with a lack of consensus within the scientific community regarding what factors underly repetitive thought, a partially exploratory factor analytic approach is likely a more appropriate methodology for examining the structure of RT. A partially exploratory factor analysis could serve to accommodate for

anticipated and/or unexpected domains and could illuminate our current conceptualization of RT. The following section describes specific goals for this dissertation as it relates to exploring the construct of repetitive thought.

1.5 The Current Study

The purpose of this dissertation is to unite current disparate lines of research surrounding repetitive thought (RT) to illuminate and clarify the nature of RT, thereby making a cumulative science on RT more feasible. Although not a nascent field from an empirical perspective, from the perspective of construct conceptualization there is a need to step back and develop a clear taxonomy and conceptualization of repetitive thought which will enable further work on scale development and assessment techniques for RT. To accomplish this the current dissertation had two aims:

1. Conduct a systematic review of current literature to develop a more comprehensive and conceptually coherent model of RT (i.e., a model that captures all manifestations of RT; avoids tautological problems).
2. Empirically test the structural validity of the model produced by the first aim via implementation of factor analytic methodologies.

CHAPTER 2: STUDY ONE

2.1 Purpose

A systematic review of current literature and synthesis of the results was conducted to (a) confirm the claims regarding existing conceptualizations of RT presented in the introduction, (b) ensure the proposed model of RT was not deficient, and (c) develop a more comprehensive and conceptually coherent model of RT that captures all manifestations of RT.

2.2 Methods

Inclusion Criteria. To meet criteria for inclusion in this literature review articles had to: a) offer clear concept definitions, conceptualizations, and/or reviews of the targeted concept(s) (repetitive thought and/or rumination), b) identify repetitive thought/rumination as a primary focal variable of the study/paper (e.g., an article primarily about “coping” which included a definition of rumination but did not identify rumination as a primary focal variable would not be included), c) be published since 1996, and d) be available in English.

Search and Selection Strategy. The *PsychInfo* database was queried for peer reviewed articles and book chapters including keywords “repetitive thinking/thought” and/or “rumination.” An initial search returned 370 articles. A filter was applied to identify articles within this pool with the major subject heading “rumination” and/or “thinking,” resulting in a return of 216 articles. A final filter was applied to identify articles within the pool containing the subject “cognitive process” and “thinking,” resulting in 36 total articles for review. All relevant references were exported to an external database and evaluated against the study’s inclusion criteria. A total of nine

articles were excluded; three did not offer a definition of either term, three were not of the appropriate type (e.g., they were book reviews or opinion articles), and three were not available in English. The final sample for this study included 27 papers.

Secondary Search. Keywords harvested from each article in the final sample were inspected to establish a pool of terms for a secondary literature review. Only one keyword, “worry,” appeared multiple times within the pool of keywords associated with the final sample. A secondary search was not conducted to query articles using this term, as “worry” was sufficiently reflected in the original sample pool.

Data Extraction. Data from papers in the sample pool were entered into an excel spreadsheet populated with the following fields: Citation of Paper, Definition(s) of Target Term(s), Suggested Dimensions Comprising RT/Rumination, Associated Keywords, and Associated Scales.

Data Analysis. Two researchers separately analyzed the table of results, making independent conclusions regarding the focal content analyses (definition of target terms and suggested dimensions comprising RT/Rumination). The two researchers then discussed discrepancies until consensus was reached.

2.3 Results

Results of the content analysis are shown in Tables 1 and 2. Definitions of repetitive thought observed in the literature (Table 1) are referred to by four main terms: Repetitive Thought (RT), Repetitive Negative Thought (RNT), Rumination, and Worry. These terms were used interchangeably within much of the literature, reflecting the construct proliferation noted in the introduction. Additionally, several articles defined RNT as a combination of rumination and worry – further demonstrating confusion over

the hierarchical structure of RT and these associated terms.

Synthesis of these studies revealed that most studies exclusively described “problematic” forms of RT. Most articles specifically examined the influence of repetitive thinking on maintenance of particular disorders including generalized anxiety disorder, depressive disorder, posttraumatic stress disorder, suicide, various sleep disorders, paranoid ideation, schizophrenia, alcohol use disorder, and emotional eating associated with obesity. Only one paper, which explored the underlying structure of rumination, considered RT in the context of something other than a psychopathological outcome, although this paper was framed within the existing model of rumination stemming from depression literature (Tanner et al., 2013). These results indicate that current definitions do, in fact, encompass a highly restricted range of exposure to the full construct. In fact, except for three articles, all studies described RT as a primarily negative and intrusive style of thinking.

Additionally, a majority of current definitions of RT used maladaptive outcomes that have been associated with RT to define the construct, rather than describing the nature of RT in more detail. As an example, several of the definitions consisted *solely of a description of maladaptive consequences studied in association with RT* (e.g., repetitive thought is “a common feature across depressive and anxiety disorders, suggesting that it is a transdiagnostic factor that may be involved in the onset and maintenance of these disorders”; Spinhoven, Drost, Hemert, & Penninx, 2019). Most other definitions included maladaptive consequences *as part of the definition of RT* (e.g., RT is “an established transdiagnostic phenomenon, with the specific content of thoughts reflecting particular emotional disorders”; McEvoy, Thibodeauc, & Asmundson, 2014).

Concerning possible dimensions that underly RT, based on the review of the literature collected, both researchers agreed four dimensions emerged as most commonly discussed dimensions of the construct. These results are shown in Table 2. Two of the dimensions, Valence and Purpose, overlap with those in the Segerstrom et al (2016) model. A third dimension, tentatively labeled Temporal Orientation, appears well supported by the anxiety and depression literatures (Spinhoven, Drost, van Hemert, & Penninx, 2015; Kingston, Watkins, & O'Mahen, 2013). A fourth dimension, Control, is well known and empirically supported via posttraumatic growth based research (Cann et al., 2011). No other dimensions were apparent across the sample of literature.

2.4 Discussion

Overall these results appear to confirm the concerns regarding existing conceptualizations of RT across the literature. First, the majority of current literature on RT is based on a potentially flawed definition of the construct. One that is both too narrow, and in a sense too broad. For example, almost all definitions specify that repetitive thought encompasses only negatively valenced content, inherently limiting the construct from encompassing a more broad range of content that could include positive or neutral thoughts. Similarly, almost all definitions specify that RT is experienced as intrusive or uncontrollable, restricting the possibility for deliberate or intentional repetitive thoughts to occur or to be measured. It is obviously possible to think repetitively in a positive manner, and sometimes to do this intentionally. There are many anecdotal examples of scientists, poets, and artists who ponder on an exciting idea obsessively for long periods. As scientists we cannot accept the existing definition of repetitive thought, which ironically limits the way we think about RT.

Second, current definitions of RT use mental health consequences related to RT *as part of the definition of the construct*, which violates a fundamental principle of science (i.e., non-tautological definitions). Lastly, data uncovered during this review point to a potential deficiency in the Segerstrom et al model with two additional dimensions possible.

To date the most precise definition available appears to be from Segerstrom et al. (2016), who offer “Repetitive Thought is the process of thinking attentively, repetitively, or frequently about oneself and one’s world.” This definition appears to allow for inclusion of a range of thought content (e.g. positive, neutral, negative valence; past, present, future oriented), as well as for the process of the thoughts to be experienced as intrusive and/or deliberate or both. Because of the more broad nature of this definition it, it is the one adopted here.

CHAPTER 3: STUDY TWO

3.1 Purpose

The purpose of study two was to empirically evaluate the emergent structure underlying a broad representative pool of indicators of repetitive thought via factor analytic and regression techniques.

3.2 Methods

Participants. Recruitment was accomplished via Amazon's *Cloud Research* (formerly Mechanical Turk or "MTurk"), an online crowdsourcing tool that enables recruitment of large and diverse samples (Harms & DeSimone, 2015). Crowdsourcing tools like Amazon's *Cloud Research* are useful for seeking members of the general public to complete online research studies, an important methodological factor for this study as it aimed to be generalizable to a diverse audience. Indeed, samples recruited through MTurk are usually more representative of the national population than typical American college samples and other internet samples (Buhrmester et al., 2011). To meet minimum sample requirements for the planned analyses 400 participants were recruited. Participants were required to be at least 18 years of age, registered and confirmed as a Master Worker, and reside in the United States.

Procedure. Participants completed study measures once through the *Cloud Research* portal and were paid a fee of \$1.50 for completing the survey. Participants were informed they could withdraw from participation at any time, but that withdrawing would forfeit their payment. Informed consent was obtained via participants clicking an electronic box indicating "I agree" to the presented consent form. Following consent, participants completed study measures and received a validation code for payment.

Approval for this study was obtained from the Office of Research Protections and Integrity Institutional Review Board (Study #IRB-22-0355).

Measures. A preliminary standard system of measure (SSM) of repetitive thought was developed for use in this study. The aim was to create a survey capable of capturing the breadth of factors in the proposed model as well as capturing the general underlying RT factor. To begin development of this SSM, eight potentially “pure” items were initially generated using a rational-deductive approach. In order to generate these items, the authors created items that logically reflected the proposed dimensions. To generate additional items for inclusion in the SSM, 13 separate RT-related measurement scales were examined, and 217 items were extracted from these scales for evaluation. These 217 items were combined with the 8 items generated by the authors for a total of 225 items.

Consistent with standard protocols for SSM development and evaluation, this pool of items was then examined for quality and content contamination. Specifically, the authors sought to (a) eliminate items with basic problems (e.g., double-barreled) or obvious contamination (e.g., “*Thoughts about the event came to mind and I could not stop thinking about them*”; “*My thoughts are not much help to me*”), (b) ensure the proposed dimensions were covered by a relatively balanced number of items, (c) remove highly complex items (i.e., items that attempted to tap more than two potential dimensions), and (d) eliminate redundancies among items (e.g., “*I can’t stop dwelling on certain thoughts or ideas*” and “*I can’t stop thinking about some things*”).

To accomplish this, two senior authors separately evaluated all 217 items, indicating any of the issues noted above, and making a rating with respect to its associated dimension (note, general repetitive thinking items were retained as well).

Results were compared and any discrepancies were subsequently discussed until agreement was reached. Finally, items from overrepresented domains were eliminated until a relative balance was reached so that the factor analyses would not be biased by the over-sampling of a specific domain. In addition, participant fatigue and attention span were taken into consideration. Thusly, in total 54 items from 11 different RT scales, and 8 author-generated items were selected for inclusion in the measure of RT used here. The final instrument included 62 total items.

In addition to the primary set of RT items, the Patient-Reported Outcomes Measurement Information System (PROMIS) measure of overall health was administered for additional validity analyses (Cella et al., 2010). The PROMIS is a set of seven individual items assessing various aspects of one's overall health (i.e., quality of life, physical health, mental health, social health, etc.). Finally, a demographics questionnaire was also administered to collect information about age, gender, ethnicity/race, level of education attainment, and occupational status.

Data Analyses. A series of exploratory factor analyses were conducted to empirically examine the emergent structure of RT as reflected by the balanced, representative sample of indicators selected. Additional regression-based analyses were conducted to further examine the construct validity of the emergent factors.

3.3 Results

Data were collected from a total of $N = 416$ participants. Prior to any substantive analyses, the dataset was cleaned of questionable or incomplete cases. First, 16 participants were removed for completing less than ninety percent of the survey, and 7 more participants were removed due to completing the survey in under two minutes (the

minimum established time to read the survey items). Finally, listwise deletion across the 62 RT items was performed as is required for factor analyses, removing an additional 39 cases. Thus, the resulting operational sample was $N = 354$. The average duration for completion was just under eight minutes ($M = 466.25$ seconds, $SD = 520.56$).

Demographics for the operational sample are shown in Table 4. Overall, the sample appears reasonably diverse and consistent with populations using online research portals. Approximately half of participants identified as male (54%), were predominately White (62%) or White-Hispanic/Latinx (22%) and they ranged in age from 22-76 years with a mean around 42 years of age. Overall, the sample was moderately educated (67% of the sample reported completing at least some college), and a majority of the sample was employed.

Item-Level Analyses.

Items were assessed for endorsement rates (i.e., mean), variability (i.e., standard deviation), item discrimination (item-total correlations). Endorsement rate reflects how difficult or “extreme” items are, and can be evaluated by examining the mean response value for each item (Clark & Watson, 1995; Crocker & Algina, 2008). Mean values of approximately 3.0 are typically expected for moderately endorsed items when using a five-point Likert scale. A mean near 3.0 would suggest that an item is reasonably relevant for a typical person and that the item is not so extreme that few people are willing to endorse it (or so common that almost everyone endorses it). Both extreme (rare) and very common endorsement rates can have impacts on item variability, which can cause floor or ceiling effects. Further, variability in the distribution of scores was examined to ensure they were appropriate for the planned analyses. Standard deviations around 1.0 are

considered acceptable when utilizing a typical five-point Likert-scale (Crocker & Algina, 2008). If variability is low, items on the survey are unable to convey useful information about individual differences in the sample of respondents. Finally, a matrix of intercorrelations between item scores was examined to discern and exclude redundant items (i.e., pairs of items with $r > .90$).

The basic item-level descriptive statistics and table of item intercorrelations are not shown here due to size of the matrix (a PDF of the matrix is available from the author). Examination of the survey items indicated that all items had moderate endorsement rates (i.e., means between 2.0 and 4.0), and therefore floor and/or ceiling effects were judged not of concern for this set of responses. An examination of standard deviations indicated acceptable variability in responses to all items as well. Further, no items displayed corrected item-total correlations (r_{it}) below the 0.2 cutoff, and thus none were excluded for this reason. Finally, an assessment was made of item-level internal consistency, yielding an overall Cronbach's alpha of .97 across the entire pool of items. This suggests the items are certainly all assessing the same source(s) of variance; however, in this case it may suggest a strong general factor saturating all items given the pool should be somewhat multidimensional. Based on the aggregate of these preliminary results, all 62 items were retained for subsequent analyses.

Exploratory Factor Analyses.

To examine the emergent factor structure underlying these items, the data were analyzed via exploratory factor analysis (EFA) using maximum likelihood extraction with an oblique rotation (oblique rotations allow for the possibility of correlated factors which were expected here). Traditional empirical stopping rules for factor extraction

were used based on initial extraction procedures. Kaiser-Guttman criteria specify that the highest number of factors is determined by the number of eigenvalues greater than 1.0 (DeVellis, 2003; Guttman, 1954; Kaiser, 1960).

In the current data, six eigenvalues greater than 1.0 emerged, indicating 6 is the maximum number of possible factors. Next, the scree plot was examined to visually inspect the relative amount of information captured by each successive factor (DeVellis, 2003; Floyd & Widaman, 1995). Traditionally, only factors to the left of the elbow in a scree plot are considered substantial in terms of the amount of additional or unique information they explain. In the current data, an inflection point was identified after the third factor, suggesting three factors may be appropriate. Finally, the total percent variance accounted for by the set of factors was examined. A traditional rule of thumb is to extract as many factors as necessary to account for at least 50% of the observed item variance. By this criterion, an absolute minimum of two factors are required. Based on these criteria, a total of four models specifying three to six factors were examined for viability. The resultant pattern matrices were examined for appropriateness (e.g., properly identified by at least three clean items), approximation to a simple structure, obvious patterns and consistencies in item performance across models, and interpretability.

The results from the initial run of these four factor models indicated the six-factor model could be rejected immediately on statistical grounds. One factor was not properly identified, it had the most cross-loading items, and two factors were clearly ‘method’ or ‘artifact’ factors caused by specific item wording. One of these was caused by the only three items out of 62 that specifically used the word “future” in the stem, and the other was caused by the four brooding items that used quotes rather than direct statements.

Additionally, across the set of EFAs, it was noted that five items consistently had negative factor loadings and caused factors to “flip” directions from one analysis to the next but did not align conceptually.

Having dropped the six-factor model from consideration and removing the five questionable items, the EFAs were run again for the three, four and five-factor models. The rotated pattern matrices for all three models are shown in Table 5. Several key features stand out as critical to the purpose of this analysis. First, it can be observed that the three-factor model is the cleanest and most closely approximates simple structure. Second, both the four and five-factor models contain one factor that is not well identified (i.e., do not have at least three clean items defining loading on them), placing these models in question. The fifth factor is defined by only two items both of which load saliently and cleanly on the second factor in both the four and three-factor models (again, both items simply contained the word “future”), and the fourth factor is also only identified by two items both of which load saliently and cleaning on the first factor in the three-factor model. Second, across all models fitted to the data the same eight items cross-loaded. This strongly indicates those items are in fact complex (i.e., not factor pure), rather than the cross-loadings indicating an improper model (as the loadings would move if the wrong number of factors were the issue).

Third, and perhaps most informative with respect to the focal question, significant consistency was observed in the structure and item loadings on the first three factors across all four models tested. As shown in Table 5, across all three models tested, it is essentially the same set of items that strongly define the three primary factors. For the first factor, with one exception, the same 15 items are the strongest and most cleanly

loading items across all three models. For the second factor, 17 of 19 items cleanly and consistently define that factor mostly strongly (the only two that don't are the two that define the artificial 5th factor). And for the third factor, the same 12 items saliently define that factor across all models tested. Taken as a whole, this pattern of evidence strongly indicates the 3-factor model is the best fitting model for this set of items.

To interpret or infer the nature of the factors, the content of the top 12 items for each of the three factors were examined. For the first factor, the items tended to reflect the tendency to have uncontrolled thoughts that intrude or continue to stay in one's mind. For example, the three most defining items are "*My thoughts are difficult to control*", "*I find it hard to shut off certain thoughts,*" and "*the same thoughts keep going through my mind again and again.*" This factor appears to also capture the narrower aspect of rumination referred to by Treynor, Gonzalez, and Nolen-Hoeksema (2003) as "Brooding", which focuses generally on unpleasant aspects of oneself and one's life. Thusly, this factor is labeled *Intrusive Repetitive Thought*.

The second factor was defined primarily by items reflecting deliberate or intentional attempts to think about experiences and to search for, better understand, or gain meaning from these experiences (both past and future, including inner experiences and feelings). This factor captures the tendency to reflect upon experiences to understand, process, and make meaning from them. For example, "*I think about whether I can find meaning from an experience,*" "*I think about whether I can find meaning from past experiences,*" and "*I analyze recent events to try to understand how I feel.*" Thusly, this factor is labeled *Deliberate Processing*.

Finally, the third factor is defined by items that reflect upon one's own specific

behavior or performance mostly in the past, and sometimes in the future. For example, “*I rehash in my mind recent things I’ve said or done,*” “*I think about a recent situation, wishing it had gone better,*” and “*I tend to replay past events as I would have liked them to have happened.*” Unlike the first factor, this factor reflects the tendency to specifically rehash personal experiences and actions in one’s mind, envisioning alternate outcomes, and/or wishing for unachieved outcomes. Though some of the items may imply a degree of intrusiveness, this type of repetitive thinking is not necessarily uncontrolled or intrusive, further distinguishing it from the first factor. As such, this factor is labeled *Self-Conscious Repetitive Thought*.

Additional Validation Analyses.

Although an EFA produces a model to explain the item variance-covariance matrix as best as possible, it does not necessarily mean those statistically distinguishable factors are substantively different. That is, there remains the question of whether the EFA model is making a distinction without a difference (c.f., Peterman et al., 2014). Thus, to establish additional validity evidence regarding the three RT factors discovered here, factor scores were computed and then used as predictors of various global health outcomes measures. This differential predictive validity analysis allows one to test individual criterion-related hypotheses, but also allows the researcher to examine the extent to which the statistical factors are meaningfully different from each other. To the extent they are meaningfully distinct, differential patterns of validity coefficients should emerge. Importantly, because the three factors (i.e., predictors) are positively correlated, it is critical to examine the magnitude of unique variance explained by each predictor. To do so requires the use of multiple regression. Because there is no logical or theoretical

reason to posit an ordering of effects of RT types (in fact, they likely co-occur), it is best to use simultaneous entry and examine all three unique effects.

Based on the extant literature regarding effects of various types and styles of rumination and RT, it was expected that Intrusive RT would be associated with worse health, whereas Deliberate Processing should be associated with better health (Cann et al., 2011; Segerstrom, Roach, Evans, Schipper, & Darville, 2010). The association between Self-Conscious RT and health was less clear, as it is not necessarily focused on negative self-thoughts, though often it can be. Thus, it was expected that Self-Conscious RT would also demonstrate inverse relations with health but to a lesser magnitude than Intrusive RT.

The pattern of zero-order correlations, shown in Table 6, initially supports these predictions. Intrusive RT (IRT), and to a lesser degree, Self-Conscious RT (SCRT) were negatively related to all aspects of health as measured by PROMIS. Deliberate Processing (DP) was also negatively related to all aspects of health, but the magnitude of these relationships was generally small to nil. However, because the RT factors are correlated, the zero-order correlations can be misleading. Thus, each of the health items were regressed onto the set of factor scores to examine each factor's *unique* effect net the other factors. The results of the seven regression analyses are shown in Table 7.

Overall, these unique effects demonstrate a pattern consistent with the expected relationships stated above. Intrusive RT demonstrates a large magnitude unique effect on each outcome, whereas SCRT demonstrates much weaker negative unique effects across the set of outcomes. Also, critically, the regression analyses reveal that Deliberate Processing does in fact have a *positive* unique impact on all health outcomes. These

positive impacts are mostly in the range of medium effect sizes, with small effects on physical health. In addition, all three dimensions of RT each demonstrated the strongest relationship with the mental and social health indicators, and the weakest relations with physical health indicators.

These differential patterns of criterion-related coefficients further support the overall construct validity of the three factors. While they may be positively correlated with each other, implying a potential general RT factor may be present (i.e., general tendency to engage in any form of RT), it is the unique effect of each type of RT that drives the association with health outcomes. It is therefore not possible to make a statement about the “overall effect” of RT on any health outcome. These results make clear that each primary dimension of RT should be simultaneously assessed, and their unique effects must be examined.

Confirmatory Factor Analyses on Short Form

Finally, following Segerstrom’s lead, we sought to reduce the item pool to a reasonable, short form that could be used to quickly and accurately assess the three factors found here. To do so, we took the best 12 items from each factor (see three-factor model in Table 6) and submitted that reduced item set to a CFA using AMOS. Overall, the model demonstrated good fit according to standard indicators of model fit (Chi-square = 1282.37 with $df = 591$; $Chi/df = 2.17$; CFI = .933, TLI = .93, RSMEA = .058 [.053 -- .062]). The resultant factor solution for this CFA is shown in Table 8. All the manifest indicators loaded saliently and heavily on their respective factors. As expected, the factors are all positively correlated (see bottom of Table 8). These correlations are somewhat high, particularly IRT and SCRT, suggesting some caution in interpreting

these as truly distinct factors. However, again, the criterion related validity analysis did demonstrate that SCRT carries important information unique and is independent from IRT, albeit somewhat limited.

3.4 Discussion

Several iterations of an exploratory factor analyses demonstrated a three-factor model of RT comprising Intrusive Repetitive Thought, Deliberate Processing, and Self-Conscious Repetitive Thought, to be the best fitting and most interpretable model. A confirmatory factor analysis on a reduced set of 36 items replicated the same conceptual factors with a clean simple solution. Further, differential predictive validity analyses using multiple regression indicate Intrusive RT, and to a lesser degree, Self-Conscious RT are negatively related to all aspects of health, while Deliberate Processing appears to have a positive effect on all health outcomes assessed here. Overall, the strongest impacts of RT on health were observed in the areas of Mental Health, followed by Social Functionality, Social Health, and Quality of Life. These results provide strong evidence for the overall construct validity of the factor model. Notably, the factor solution obtained here is conceptually quite similar to the best fitting model reported by Greene and Reeve (2020).

CHAPTER 4: GENERAL DISCUSSION

4.1 General Discussion

Although Repetitive Thought (RT) is a cognitive phenomenon that is widely acknowledged for its significant contributions to mental and physical health, current conceptualizations of RT are of limited accuracy and have been primarily concerned with describing problematic forms of RT. Thus, this dissertation aimed to address a significant gap in psychological research, by illuminating the full landscape surrounding the nature of RT and its dimensions. Foundationally, this is the first known study of repetitive thought based on a systematic literature review that surveys the range of existing RT conceptualizations. Results of this review confirmed that current RT-related literature is based on a potentially flawed definition of the construct.

The systematic literature review undertaken for this study confirmed that a majority of definitions and models of RT do, in fact, focus on styles of RT associated with specific maladaptive or undesirable outcomes (e.g. intrusive rumination, repetitive negative thought, etc.). Further, it confirmed that existing models of RT, with one exception (Segerstrom et al., 2016), use mental health consequences related to RT as part of the definition of the construct. This violates a fundamental principle of science whereby scientists are charged with using and circulating non-tautological definitions of our focal constructs. As such, current definitions of RT inherently limit the way we think about this cognitive phenomenon by restricting the way we conceptualize the process of RT, as well as restricting the content we use to assess repetitive thought patterns. This almost certainly stems from the tendency for this construct to be examined primarily by clinical psychological researchers focused on adults with diagnosable mental illnesses.

Fortunately, this review did illuminate a definition of RT that appears to capture the breadth of the concept, and does not suffer the flaws and limitations of the most widely used definitions. This was the definition offered by Segerstrom and her colleagues, whereby RT is defined as *the process of thinking attentively, repetitively, or frequently about oneself and one's world* (Segerstrom et al., 2016). Unlike the current most used definitions, Segerstrom's definition does allow for inclusion of a broad range of thought content (e.g. positive, neutral, negative valence; past, present, future oriented), as well as for the process of the thoughts to be experienced in a range of ways (e.g. intrusive and/or deliberate or both.) It is recommended that this definition be widely adopted and used in future research.

The second aim of this dissertation was to empirically examine the emergent factor structure of RT as assessed by the most expansive set of indicators used to date. A series of exploratory and confirmatory analyses confirmed that a three-factor model of RT, as defined here, was the best fit. The factors (displayed in Figure 1) were identified as Intrusive Repetitive Thought (IRT), Deliberate Processing (DP), and Self-Conscious Repetitive Thought (SCRT). Intrusive RT appears to be characterized by a tendency to have uncontrolled thoughts that intrude or continue to stay in one's mind and sometimes encompasses a focus on unpleasant aspects of oneself and one's life. Deliberate Processing encompasses a tendency to reflect on experiences and emotions to better understand or gain meaning from one's experiences. Lastly, Self-Conscious RT encompasses a tendency to rehash one's personal experiences and actions in one's mind, envisioning alternate outcomes, and/or wishing for unachieved or more desirable outcomes.

Of note, this three-factor solution conceptually replicates to a large degree the three-factor solution reported by Greene and Reeve (2020). Specifically, IRT appears conceptually quite similar to the “intrusive rumination” factor from the previous study, and DP appears to conceptually replicate the “deliberate rumination” factor. The third factor in the prior study was less clean and mostly comprised brooding ruminations, which were subsumed by the first factor in the current study. Emergence of a third SCRT factor here is likely attributed to the more diverse item pool used in an effort to collect a broad array of styles of RT. The conceptual replication of factors across these two independent studies using separate data samples collected via different pools of items, as well as different administration instructions, supports the construct validity of the RT factors obtained by this study.

To confirm these three factors are meaningfully distinct, differential predictive validity analyses were conducted using multiple regression techniques. Critically, each of the factors demonstrated a distinct pattern of relationships with a set of seven health indicators. Specifically, Intrusive RT, and to a lesser degree, Self-Conscious RT were each uniquely negatively related to all aspects of health measured. In contrast to IRT and SCRT, Deliberate Processing had a positive unique effect on all health outcomes assessed, net the effect of IRT and SCRT. Furthermore, all three styles of RT had their strongest effects on indicators of psycho-social health (e.g., mental health, social functionality, quality of life), and weakest on indicators of physical and general health. Importantly, these differential patterns support the construct validity of the three individual factors. First, each factor demonstrates a unique pattern of relations with a set of outcomes which confirms they are reflecting something substantively distinct from one

another, and second, they all yielded a pattern of impacts in the theoretically expected direction *and magnitude*. Given the rarity of magnitude-based hypotheses in the social sciences, this is taken as strong evidence for construct validity. Finally, despite the oblique nature of the factors, which indicates the likelihood of an underlying general RT factor that differentiates on overall amount of RT, the pattern of unique effects indicates that it is not appropriate to make statements about the “overall effect” of RT on any health outcome(s). Rather, the *unique effects* of each of the three styles of RT, net the effect of the other two, should be examined for any health outcome in question. This requires that all three factors be reliably assessed to examine the effects of any one of them.

To this end, a third aim was undertaken. Using the item pool gathered for this primary study, a brief 36-item measure was assembled and tested via confirmatory factor analysis. This measure appears to assess the factors of IRT, DP and SCRT cleanly and reliably, and thus researchers are encouraged to use this measure in future research on substantive questions regarding the role of RT in various psychological experiences. However, as this is the initial study using this tool, subsequent research is needed to further establish validity and reliability of this measurement device as well.

4.2 Implications

There are implications for research, theory, measurement, and practice based on the model of RT developed through this dissertation. First, the model of RT provided here offers a strong theoretically and empirically supported framework that is pertinent to researchers across psychological specialty areas. This model can assist those concerned with research related to psychological struggles and illnesses, as well as those concerned

with positive psychology, thriving, and growth. As such, this framework can be adopted to conduct future research, and as it continues to be refined, it will assist researchers as they work to integrate the seemingly disparate areas of knowledge related to repetitive thought (e.g., traumatic ruminations, depressive ruminations, worry and anxiety-related RT, etc.) Further, the present conceptualization encourages us to conceptualize RT beyond just its role as a problematic form of thought, and to imagine the possibilities for RT to unfold in various ways. In addition to contributing an updated theory and conceptualization of repetitive thought to existing psychological literature, this dissertation provides an empirically tested preliminary measure, of RT, that can be developed and refined for use in research and practice.

Regarding applied work, the foundational descriptive science around the nature of RT provided by this model, as well as by future research using this model, can aid mental health practitioners in gaining a cumulative understanding of the nuances underlying this significant cognitive process. My hope is that this type of foundational understanding will contribute to efforts towards developing, adapting, and/or updating interventions that aim to modify tendencies towards particular styles of RT. Additionally, the brief measure of RT stemming from these analyses may enable practitioners to ascertain with a degree of confidence, the extent to which someone engages in the three styles of RT, and to observe how these independent dimensions may be associated with each other or with helpful or problematic behavioral outcomes.

The present research points to several interventions that may be useful for practitioners who wish to facilitate increased DP, and/or to help clients reduce the occurrence of SCRT or IRT. Mindfulness and acceptance-based therapy interventions

like Acceptance and Commitment Therapy (ACT) are known to significantly decrease intrusive and brooding ruminations associated with PTSD and Depression, two styles of rumination subsumed within the IRT factor (Perestelo-Perez et al., 2017; Cladder-Micus, Becker, Spijker, Speckens, & Vrijnsen, 2019). These techniques aim to directly help clients modify both the content and process of RT, aiming to support clients in adopting non-combative postures towards negative thoughts which may offset the self-critical focus of SCRT (Hayes, 2004). Further, these therapies encourage a focus on aspects of life that can be tangibly changed or controlled, which may offset the intrusive nature of IRT (Hayes, 2004). Cognitive behavioral therapy (CBT) is also known to ease the forms of rumination represented by IRT/SCRT, particularly via use of the collaborative empiricism approach where clients and therapists work together to elicit, challenge, and modify automatic negative thoughts (Watkins, 2008). Lastly, self-compassion based techniques are implicated for practitioners who wish to aid clients in increasing DP, as these therapies encourage intentional introspection that focuses on using multiple ways of viewing oneself and one's experiences (encourages both intentional processing and acceptance; Ferrari, Hunt, Harrysunker, Abbott, Beath, & Einstein, 2019; Dahm, Meyer, Neff, Kimbrel, Gulliver, & Morissette, 2015).

One final implication lies in the simple fact that the first two RT factors from these analyses basically replicate the two-factor model of rumination studied by posttraumatic growth-based psychologists. Indeed, DP and IRT appear slightly more robust than the intrusive and deliberate ruminations that have so far been shown to characterize posttraumatic processes (IRT is much like intrusive rumination but includes the possibility for brooding; deliberate processing encompasses the meaning making

aspect of deliberate rumination and includes a general internal focus on one's emotions and experiences). Given these similarities, it is possible that the measure of RT developed for this study may be useful for assessing RT in all kinds of populations, including populations experiencing trauma. Additionally, since the dimensions underlying RT as described in this dissertation appear so similar to those that underly posttraumatic growth-based research, it is possible that PTG-based interventions could be used for individuals struggling with all kinds of problems related to RT (e.g., depression, anxiety, etc.), especially given the trans-diagnostic significance of RT.

4.3 Limitations and Future Directions

Despite the strengths of this study, there are several important limitations and future directions to be acknowledged. Although this study purposefully used crowdsourcing techniques to recruit members of the lay public to make results generalizable to a diverse audience, the analyses were conducted with data from a single sample. Additional analyses with other culturally diverse samples should be conducted to provide further evidence of the generalizability of this construct conceptualization as well as to further examine psychometric properties of the brief assessment tool presented with other populations.

Potential areas of further study aimed at validating both the model of RT and its dimensions, and the assessment measure might consist of additional CFA and differential predictive validity analyses using the same measurement tools with different samples and a much broader range of outcomes. Researchers should also specifically examine reliability and validity, including test-retest analyses, and assessments of concurrent or predictive validity, of the brief assessment of RT. Further scale development work also

can be done to show the relations between manifest indicators from the brief measurement tool with personality instruments, emotional regulation scales, and other measures of health and well-being.

Lastly, the current study did not investigate the ordering of effects of RT types, and it remains unclear to what extent these RT processes co-occur. There is some literature to support the idea of both intrusive and deliberate ruminations (specific to processing after traumatic events) co-occurring, but the process by which this unfolds is not well understood (Calhoun, Cann, Tedeschi, McMillan, 2000). Given that most of the literature surrounding an ordering of effects is specific to the trauma psychology literature, this represents an understudied avenue for future research – specifically investigating processes by which individual facets of RT occur and how they occur in unison or separately.

4.4 Conclusions

Overall, the model RT and corresponding scale developed in this dissertation contribute to existing literature by creating a more precise conceptualization of RT than was previously available, as well as by offering a robust preliminary measure that can capture the dimensions of this important cognitive process. Prior to this project, the only broadly inclusive conceptualization of RT was mostly lost in a gulf of literature focused on psychopathologies. The present research brings into focus this under recognized way of conceptualizing RT as empirically accurate and fills the gap where an expansive measurement tool capable of capturing the nuanced dimensions of RT was needed. The three-factor model and scale presented here should serve to facilitate future transdiagnostic empirical examinations of RT, its causes, and its impacts on health.

Lastly, because of this work, it is my hope that future studies of RT can be generalizable to a much wider audience than before.

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TABLES

Table 1. *Definitions of Repetitive Thought*

Term	Definition
Repetitive Thought	Thinking attentively, repetitively, or frequently about oneself and one's world.
Repetitive Negative Thought	A style of thinking abstractly and repetitively about negative events and emotions that is experienced as difficult to control. (Sometimes defined as a combination of rumination and worry).
Rumination	A perseverative thinking style that occurs in the absence of immediate environmental demands and is focused on personal depressive symptoms and their consequences.
Worry	A series of relatively uncontrollable negative thoughts and images that is focused on future uncertainties, potential risks, and negative outcomes.

Table 2. *Refined Dimensions of Repetitive Thought*

Proposed Dimension	Definition	Example	Reference
Valence	Content considered pleasant/attractive (positive) versus Content considered unpleasant/aversive (negative)	Daydreaming versus Brooding	Tanner, Voon, Hasking, & Martin, 2013; Spinhoven, Drost, van Hemert, & Penninx, 2015; McEvoy & Brans, 2013
Purpose	Grounded in uncertainty versus Seeking certainty	Searching, Mind Wandering versus Problem Solving, Planning	Tanner et al. 2013; Segerstrom et al., 2016
Temporal Orientation	Thinking on what occurred in the past versus Thinking on what may occur in the future	Anticipating versus Reflecting	Knabb, Vazquez, Wang, & Bates, 2018; Spinhoven et al., 2015; Kingston, Watkins, & O'Mahen, 2013
Controllability	Thoughts are intrusive or difficult to control versus Deliberately and intentionally recalled	Ruminating versus Reflecting	Raes 2012; Ehring, Raes, Weidacker, & Emmelkamp, 2012; Spinhoven et al., 2015; McEvoy & Brans, 2013

Table 3. *Scales used to harvest items for current study*

Scale Name	Stated Purpose of Scale	# Items Used
Rumination-Reflection Questionnaire (Trapnell & Campbell, 1999)	Measures rumination and reflection as part of private self-consciousness	9
Event Related Rumination Inventory (Cann et al., 2011)	Assesses intrusive and deliberate rumination associated with traumatic events	8
Repetitive Thought Style Questionnaire (Tanner et al., 2013)	Assesses the tendency to think repetitively, recurrently, uncontrollably, and intrusively, including counterfactual thinking.	7
Ruminative Responses Scale – Revised (Treyner, Gonzalez, & Nolen-Hoeksema, 2003)	Measures reflective rumination and brooding within the context of depression	6
Why Ruminates Scale (Watkins & Baracaia, 2001)	Assesses individual reasons for rumination in the context of depression	6
Brief Assessment of RT Dimensions (Seegerstrom et al., 2016)	Brief measure of general RT tendency, Valence and Purpose	5
Perseverative Thinking Questionnaire (Ehring, Zetsche, Weidacker, Wahl, Schönfeld, & Ehlers, 2011)	Measures repetitive negative thinking	5
Goal Rumination Scale (Schultheiss, Jones, Davis, & Kley, 2008)	Measures tendency to ruminate about goals	4
Attention to Positive and Negative Information Scale (Noguchi, Gohm, & Dalsky, 2006)	Measures tendency to attend to, think about, and focus on positive (or negative) information	2
Repetitive Thinking Questionnaire (Mahoney, McEvoy, & Moulds, 2012)	A transdiagnostic measure of RNT	1

Maladaptive Daydreaming Scale (Somer, Lehrfeld, Bigelsen, & Jopp, 2016)	Measures pathological fantasizing along five dimensions including content, control, distress, benefits, and interference with life.	1
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Table 4. *Sample Demographics*

Characteristic	%
Age (in years)	
<i>M</i>	41.83
<i>SD</i>	11.46
Gender (%)	
Male	54.5
Female	45.2
Non-binary	0.3
Race (%)	
American Indian/Alaska Native	0.3
Asian/Asian-American	5.7
Black/African American	5.9
Hispanic/Latinx – Nonwhite	2.8
White Hispanic/Latinx	22.1
White – NonHispanic	61.8
Other	1.4
Education Level (%)	
< High School	.3
High School Graduate	11.9
Some College (no degree)	15.6
Trade or Vocational Cert	4.5
Associate’s Degree	7.6
Bachelor’s Degree	44.2
Master’s Degree	13.0
Doctorate Degree	2.8
Occupational Status	
Employed Part-Time	7.1
Employed Full-Time	64.4
Unemployed (not a student)	6.8
Self-Employed	13.8
Retired	4.8
Other	3.1

Note. $N = 354$.

Table 5. Factor solutions for the Three, Four and Five Factor Models.

Items	3 Factors			Items	4 Factors				Items	5 Factors				
	1	2	3		1	2	3	4		1	2	3	4	5
<i>X7</i>	.94			<i>G4</i>	.83				<i>G4</i>	.89				
<i>G4</i>	.89			<i>X7</i>	.81				<i>X7</i>	.87				
<i>Q3</i>	.84			<i>P2</i>	.80				<i>SQ12</i>	.86				
<i>P2</i>	.81			<i>Q3</i>	.77				<i>P1</i>	.84				
<i>G3</i>	.80			<i>E5</i>	.77				<i>P2</i>	.83				
<i>P1</i>	.77			<i>SQ12</i>	.76				<i>Q3</i>	.82				
<i>SQ2</i>	.77			<i>P1</i>	.75				<i>E8</i>	.81				
<i>Q1</i>	.76			<i>G3</i>	.72				<i>E5</i>	.81				
<i>E5</i>	.75			<i>E8</i>	.69				<i>G3</i>	.75				
<i>E1</i>	.75			<i>Q1</i>	.68				<i>G2</i>	.75				
<i>RR10</i>	.73			<i>G2</i>	.67				<i>Q1</i>	.70				
<i>E8</i>	.73			<i>P6</i>	.61				<i>E1</i>	.68				
<i>SQ12</i>	.71			<i>E1</i>	.60				<i>P6</i>	.66				
<i>M3</i>	.68			<i>SQ2</i>	.59				<i>SQ2</i>	.65				
<i>RR7</i>	.64			<i>SQ10</i>	.53		.39		<i>SQ10</i>	.58		.33		
<i>G2</i>	.62			<i>X2</i>	.49				<i>M3</i>	.54				
<i>B8</i>	.58		.36	<i>M3</i>	.48				<i>B8</i>	.54		.34		
<i>X2</i>	.57			<i>B8</i>	.45		.39		<i>RR10</i>	.53			.37	
<i>P6</i>	.57			<i>RR10</i>	.45		.43		<i>RR7</i>	.52				
<i>RR9</i>	.56			<i>RR7</i>	.45				<i>X2</i>	.48				
<i>P9</i>	.52			<i>P13</i>	.41		.34		<i>P13</i>	.43				
<i>P13</i>	.51		.32	<i>P9</i>	.40				<i>SQ8</i>	.42		.31		
<i>SQ10</i>	.50		.39	<i>E14</i>		.75			<i>P9</i>	.40				
<i>RR6</i>	.47			<i>E11</i>		.73			<i>E14</i>	.84				
<i>SQ8</i>	.39		.33	<i>RR1</i>		.70			<i>RR1</i>	.76				
<i>E14</i>		.75		<i>E20</i>		.68			<i>E11</i>	.75				
<i>E11</i>		.73		<i>B3</i>		.66			<i>E20</i>	.71				
<i>RR1</i>		.70		<i>X4</i>		.62			<i>W1</i>	.71				
<i>E20</i>		.67		<i>W1</i>		.58			<i>B3</i>	.69				
<i>B3</i>		.66		<i>Q12</i>		.57			<i>E13</i>	.67				
<i>X4</i>		.61		<i>X6</i>		.57			<i>E19</i>	.60				
<i>W1</i>		.58		<i>W14</i>		.57			<i>W5</i>	.59				
<i>X6</i>		.57		<i>E19</i>		.55			<i>W14</i>	.59				
<i>Q12</i>		.57		<i>B7</i>		.55			<i>B2</i>	.54				
<i>W14</i>		.56		<i>W4</i>		.54			<i>W2</i>	.53				
<i>B7</i>		.55		<i>W5</i>		.51			<i>W4</i>	.52				
<i>E19</i>		.54		<i>E13</i>		.51			<i>X3</i>	.45				
<i>W4</i>		.53		<i>X3</i>		.49			<i>X4</i>	.42				
<i>E13</i>		.51		<i>W2</i>		.48			<i>Q12</i>	.36				.32

W5		.51		B2		.48		Q8		.35	.35		
X3	.33	.48		W8		.36		W8		.35			
B2		.48		Q2		.79		Q2			.73		
W2		.48		SQ7		.69		SQ7			.65		
W8	.31	.35		RR8		.69		RR8			.64		
Q2			.81	Q4		.64		Q4			.60		
RR8			.69	B1		.63		B1			.59		
SQ7			.68	SQ15		.63		SQ15			.59		
Q4			.66	Q7		.61		Q7			.55		
SQ15			.64	SQ6		.55		SQ6			.51		
Q7			.63	A10		.47		A10			.43		
B1			.63	Q5	.34	.45		X5			.41		
SQ6			.53	X5		.45		Q5	.36		.40		
Q5	.36		.45	Q8	.30	.39		RR9	.30			.49	
A10	.37		.45	SQ8	.32	.35		RR6				.47	
X5			.44	RR9			.54	B7					.83
Q8			.40	RR6			.52	X6					.66

Note. $N = 354$. Rotated factor loadings shown. Items shown in bold are the items retained for the final 36-item measure.

Table 6. *Descriptive statistics and zero-order correlations among primary variables in study two.*

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12
1. Intrusive RT	0.0	.99												
2. Deliberate Processing	0.0	.99	.50											
3. Self-Conscious RT	0.0	.99	.88	.54										
4. Sex	.55	.498	-.13	-.02	-.11									
5. Age	41.83	11.46	-.13	-.08	-.09	-.18								
6. Education	6.06	1.73	.04	.06	-.02	-.05	.02							
7. General Health	3.39	1.05	-.39	-.05	-.36	.07	-.02	.12						
8. Q.O.L.	3.34	1.05	-.51	-.13	-.50	-.01	.07	.16	.68					
9. Physical Health	3.40	1.05	-.38	-.08	-.35	.11	-.04	.11	.89	.61				
10. Mental Health	3.34	1.19	-.68	-.20	-.62	.08	.13	.08	.59	.72	.53			
11. Social Health	3.14	1.19	-.51	-.08	-.51	-.02	.07	.09	.53	.75	.50	.70		

12. Social Functionality	3.64	1.09	-0.54	-0.11	-0.49	.07	.03	.08	.60	.67	.57	.68	.66	
13. Physical Functioning	4.20	1.01	-0.34	-0.09	-0.27	.09	-.14	.05	.60	.47	.62	.42	.39	.60

Note. $N = 354$. Correlations between factors and health outcomes highlighted by rectangular box.

RT = Repetitive Thought.

Table 7. Analysis of unique direct effects of RT factors on general health outcomes.

Outcomes		RT Factors		
		IRT	DP	SCRT
General Health	$R^2 = .19$			
	β	-.39	.21	-.13
		p	.00	.22
Q.O.L.	$R^2 = .30$			
	β	-.36	.21	-.29
		p	.00	.00
Physical Health	$R^2 = .16$			
	β	-.33	.17	-.15
		p	.00	.16
Mental Health	$R^2 = .50$			
	β	-.62	.22	-.19
		p	.00	.02
Social Health	$R^2 = .33$			
	β	-.3	.28	-.40
		p	.00	.00
Social Functionality	$R^2 = .33$			
	β	-.52	.23	-.16
		p	.00	.09
Physical Functioning	$R^2 = .12$			
	β	-.44	.10	.06
		p	.00	.58

Note. $N = 354$. IRT = Intrusive RT, DP = Deliberate Processing, SCRT = Self-Conscious RT.

Table 8. CFA results for the 36-item measure of repetitive thought styles.

<i>Items</i>	RT Factors		
	<i>IRT</i>	<i>DP</i>	<i>SCRT</i>
1. My thoughts are difficult to control.	.88		
2. Thoughts intrude into my mind.	.89		
3. Sometimes it is hard for me to shut off thoughts about myself.	.86		
4. Thoughts intrude into my mind.	.86		
5. I obsess about things.	.85		
6. The same thoughts keep going through my mind again and again	.88		
7. I am unable to distract myself from the unwanted thoughts.	.78		
8. My attention is focused on things I wish I'd stop thinking about.	.84		
9. Thoughts, memories, or images come to mind even when I do not want them.	.82		
10. I think about important events when I do not mean to.	.79		
11. I think, "Why can't I handle things better?"	.77		
12. I find myself automatically thinking about certain things.	.75		
13. I think about whether I can find meaning from an experience.		.77	
14. I think about whether I can find meaning from past experiences.		.81	
15. I analyze recent events to try to understand how I feel.		.82	
16. I think about events and try to understand them.		.73	
17. I meditate on the nature and meaning of things.		.70	
18. I think about how to solve problems that occur in my life.		.51	
19. I ruminate on things to find some meaning in my life.		.80	
20. I think about the future.		.42	
21. I spend a great deal of time thinking back over positive moments.		.52	
22. I dwell on issues in order to help solve problems.		.69	
23. I often think about what my life will be like in the future.		.50	
24. I deliberately think about how an event or experience affected me.		.79	
25. I rehash in my mind recent things I've said or done.			.85
26. I think about a recent situation, wishing it had gone better.			.84
27. I tend to replay past events as I would have liked them to have happened.			.78
28. Long after an argument, my thoughts keep going back to what happened.			.81
29. If I have an important event coming up, I can't stop thinking about it.			.65
30. I play back over in my mind how I acted in a past situation.			.84
31. I spend a great deal of time thinking about embarrassing or disappointing moments.			.82
32. When I am expecting to meet someone, I will imagine every possible scenario and conversation.			.67

33. I tend to ruminate or dwell over things that happen to me for a really long time afterward.		.83
34. I think about trivial things that are not going well.		.79
35. I think about the past.		.70
36. I find myself reevaluating something I've done.		.79

Factor correlations

	IRT	
	DP	.64
	SCRT	.89
		.72

Note. $N = 354$. IRT = Intrusive RT, DP = Deliberate Processing, SCRT = Self-Conscious RT.

FIGURES

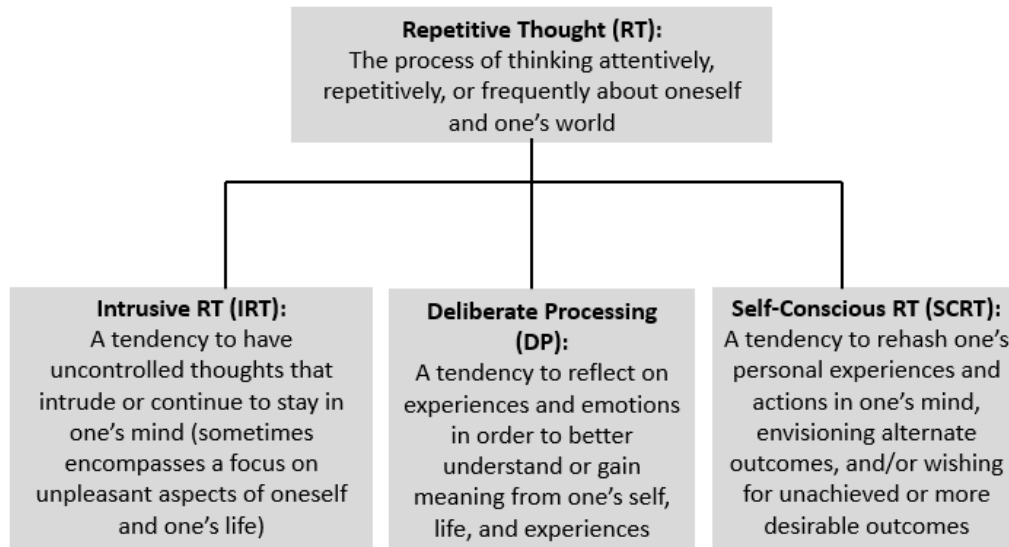


Figure 1. Model of Repetitive Thought

APPENDIX: REPETITIVE THOUGHT STUDY SURVEY

Consent

Study of Repetitive Thought

Principal Investigator: Taryn Greene, M.A., University of North Carolina – Charlotte

Faculty Advisor: Charlie Reeve, Ph.D., University of North Carolina – Charlotte

Important Information You Need to Know

The purpose of this study is to better understand different styles of repetitive thinking in adults. Please read this form before you decide whether to participate in this research study. If you have any questions, please contact the principal investigator.

Why are we doing this study?

The purpose of this study is to better understand different styles of repetitive thinking in adults and to examine how these cognitive processes might impact mental health. Responses to this survey will be used to examine differences in individual styles of repetitive thought.

What will happen if I take part in this study?

If you choose to participate in this study, you will be asked to complete an online survey. Your time commitment will be about 15 minutes. During the survey you will be asked questions about typical thoughts and feelings that you experience. You will also be asked questions about your health history and mental health.

What benefits or risks might I experience?

You will receive no direct benefits from participating in this research study. However, your responses may help us gain a better understanding of how individual repetitive thought patterns influence wellbeing. There are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life.

How will my information be protected?

Your responses to this survey will be confidential. We will not ask any questions that can be used to identify you. All study data will be stored electronically in password-protected files by trained staff; only the research team will have access to the data. In any publications of this study, we will not include any information that will make it possible to identify you.

Will I be paid for taking part in this study?

You will earn \$1.50 for the completion of this study.

What are my rights if I take part in this study?

It is up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer. If you decide to withdraw from this study, your responses will not be retained.

Who can answer my questions about this study and my rights as a participant?

For questions about this research, contact the principal investigator: Taryn Greene by email at taryn.greene@uncc.edu or contact my Faculty Advisor, Dr. Charlie Reeve by email at clreeve@uncc.edu.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researchers, please contact the Office of Research Compliance at 704-687-1871 or uncc-irb@uncc.edu.

Consent to Participate

Clicking on the "Agree" button indicates that:

- You have read the above information and understand what the study is about.
- You voluntarily agree to participate You are 18 years of age or older

Please select one of the following:

- Agree
- Disagree

Welcome to the survey**Welcome!**

Just a few notes before you get started:

1. This survey will ask you a variety of questions about your typical thought processes. It contains about 60 items.
2. We recommend that you complete the entire survey in one sitting, without distraction.
3. There are no right or wrong answers to any of these questions! We are sincerely interested in your personal experiences.
4. If a particular question does not make sense to you, just interpret it as best as you can.
5. You may also skip any questions you do not feel comfortable answering.

Please click the Arrow to begin the Survey

Repetitive Thought Questionnaire

In general, how frequently is each of the following true of you?

	Never	Rarely	Occasionally	Often	Almost Always
I think about trivial things that are not going well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I rehash in my mind recent things I've said or done.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Rarely	Occasionally	Often	Almost Always
I don't waste time rethinking things that are over and done with.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I dwell on things to try and find the answer to my problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ruminate on things to find some meaning in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I have an important event coming up, I can't stop thinking about it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about things others did that hurt me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thoughts go round and round in my mind.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never	Rarely	Occasionally	Often	Almost Always
I find that my mind goes over things again and again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about unpleasant things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think "Why do I have problems other people don't have?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spend a great deal of time thinking back over positive moments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I play back over in my mind how I acted in a past situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes it is hard for me to shut off thoughts about myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself daydreaming about things I wish I had done.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is difficult to control the amount I daydream.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never	Rarely	Occasionally	Often	Almost Always
I think about important events when I do not mean to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I feel sad, down, or depressed, I think about the reasons why.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about the past.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about pleasant things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to replay past events as I would have liked them to have happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think "What am I doing to deserve this?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I deliberately ruminate on difficulties to try to find solutions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I dwell on issues in order to help solve problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never	Rarely	Occasionally	Often	Almost Always
The same thoughts keep going through my mind again and again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find that some thoughts come to my mind over and over throughout the day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think "Why can't I handle things better?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I repeatedly think about things because I need to know why things happen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I obsess about things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about why problems occur in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I deliberately think about how an event or experience affected me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Rarely	Occasionally	Often	Almost Always
I tend to ruminate or dwell over things that happen to me for a really long time afterward.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it easy to dismiss my thoughts about distressing situations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think "Why do I always react this way?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I meditate on the nature and meaning of things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am expecting to meet someone, I will imagine every possible scenario and conversation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about events and try to understand them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Long after an argument, my thoughts keep going back to what happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thoughts, memories, or images come to mind even when I do not want them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself reevaluating something I've done.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I force myself to think about my feelings about an experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find myself automatically thinking about certain things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often think about what my life will be like in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My thoughts are difficult to control.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My thoughts are easy to control.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Even if I don't want to worry about things, I just cannot help it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spend a great deal of time thinking about embarrassing or disappointing moments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about whether I can find meaning from an experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about whether I can find meaning from past experiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I keep asking myself questions without finding an answer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My thoughts repeat themselves.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I analyze recent events to try to understand how I feel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about how to solve problems that occur in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can easily put thoughts out of my mind.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find it hard to shut off certain thoughts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about a recent situation, wishing it had gone better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thoughts intrude into my mind.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ruminate in the hope of knowing what to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Rarely	Occasionally	Often	Almost Always
I feel driven to continue dwelling on the same issue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am unable to distract myself from the unwanted thoughts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My attention is focused on things I wish I'd stop thinking about.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PROMIS

For each of the following statements, select the response that best describes your health.

	Excellent	Very Good	Good	Fair	Poor
In general, how would you rate your satisfaction with your social activities and relationships?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, how would you rate your mental health, including your mood and your ability to think?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, would you say your health is:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, how would you rate your physical health?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, to what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, would you say your quality of life is:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

DEMOGRAPHICS

The follow demographic questions are for informational purposes only.

What sex were you assigned at birth?

- Male
 Female

Please select the gender identity that you most identify with:

- Female
 Male
 Transgender Female
 Transgender Male
 Gender Non-binary/Non-Conforming
 Preferred Identity Not Listed
 Prefer Not To Answer

Please select the racial or ethnic identify most descriptive of you

- American Indian/Alaska Native
- Asian/Asian-American
- Black/African-American
- Hispanic/Latinx
- White Hispanic/Latinx
- White (Non-Hispanic)
- Preferred Identity Not Listed
- Prefer Not to Answer

Please enter the **Year you were born** using 4 digits (e.g, 1986, 2002)

Please indicate your highest level of educational attainment.

- Less Than 8th Grade
- Some High School (9-12th grade, no degree)
- High School Graduate (or equivalent)
- Some College (no degree)
- Trade or Vocational Certificate/Degree
- Associate's Degree
- Bachelor's Degree
- Master's Degree
- Doctorate Degree

What is your current occupation status?

- Student
- Employed Part-Time
- Employed Full-Time
- Unemployed (not a student)
- Self-Employed
- Retired
- Other

End of Survey Page

You have completed the study! Thank you for your participation.

Please email Taryn Greene (taryn.greene@uncc.edu) with your questions or concerns.

Your validation code is: BVGH773

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