Maladaptive repetitive thought as a transdiagnostic phenomenon and treatment target: An integrative review

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Abstract
Objective Maladaptive repetitive thought (RT), the frequent and repetitive revisiting of thoughts or internal experiences, is associated with a range of psychopathological processes and disorders. We present a synthesis of prior research on maladaptive RT and develop a framework for elucidating and distinguishing between five forms of maladaptive RT.

Method In addition to the previously studied maladaptive RT (worry, rumination, and obsession), this framework is used to identify two additional forms of maladaptive RT (yearning and interoceptive RT). We then present a review of extant psychotherapy intervention research targeting maladaptive RT, focusing both on specific empirically based treatment strategies, and also constructs within treatments that impact maladaptive RT.

Conclusion The paper concludes with recommendations for future basic and intervention research on maladaptive RT and related psychopathologies.

KEYWORDS anxiety, depression, psychotherapy, repetitive thought, rumination

1 | INTRODUCTION

The search for underlying mechanisms that cut across different forms of psychopathology has garnered increased support in mental health research (Cuthbert & Insel, 2013). Maladaptive repetitive thought (RT) has the characteristics of such a mechanism through its association with etiological and maintenance factors of psychopathology, and as a potential treatment target. Maladaptive RT occurs when negative thoughts become maintained in consciousness in a frequent and prolonged manner, and is central to the etiology and maintenance of several types of psychopathology.
Maladaptive Repetitive Thought Type | Valence | Purpose | Temporal Orientation | Depressive Disorders | Anxiety Disorders | Somatic Symptom Disorders | Obsessive Compulsive Disorder | Complicated Grief
--- | --- | --- | --- | --- | --- | --- | --- | ---
Worry | Positive | Negative | Seeking | Solving | Past | Present | Future | | |
Rumination | | | | | | | | |
Obsession | | | | | | | | |
Yearning | | | | | | | | |
Interceptive | | | | | | | | |

**FIGURE 1** Characteristics of maladaptive repetitive thought and associated psychopathology

(Segerstrom, Stanton, Alden, & Shortridge, 2003). Maladaptive RT also is associated with broader negative outcomes, including sleep disturbance (Takano, Sakamoto, & Tanno, 2014) and greater physiological reactivity (Brosschot, Gerin, & Thayer, 2006).

To date, most research focuses on specific types of RT or specific psychopathology diagnoses. For example, there is substantial evidence for the association of rumination with depression and anxiety (McLaughlin & Nolen-Hoeksema, 2011). Recent reviews suggest, however, that the broader construct of RT is an important transdiagnostic phenomenon that is present in numerous psychological disorders and may partially account for comorbidity between anxiety and depressive disorders (McEvoy, Watson, Watkins, & Nathan, 2013). Although certain types of RT are prominent in specific disorders (e.g., worry in anxiety disorders or obsessions in obsessive-compulsive disorder), RT may also occur in a wide range of psychopathologies. Applying a transdiagnostic lens to RT therefore has important treatment implications for a range of psychological conditions. In this review, we develop a framework (Fig. 1) that distinguishes types of maladaptive RT and their associations with psychopathology, and we identify therapeutic methods that target this phenomenon. In doing so, we argue that different psychotherapies employ a variety of strategies for treating RT symptoms and postulate that treatment for one type of RT may be useful in treating other types of maladaptive RT.

**2 | THE DEFINING FEATURES OF MALADAPTIVE RT**

To identify and catalog the varied, transdiagnostic forms of maladaptive RT, our review follows criteria introduced by Segerstrom et al. (2003). These include three characteristics of RT: negative content/valence, seeking (vs. solving) purpose, and uncontrollability. We additionally include temporal orientation (past vs. future) as a determining characteristic of RT. A common thread among the phenomena recognized as RT is their identifiable contribution to psychopathology, which we explicate in this section.

We present five types of RT and their associations with psychopathology: rumination, worry, obsessions, yearning, and RT focused on bodily sensations. The characteristics of negative valence, seeking purpose (vs. solving), and uncontrollability fit three well-recognized forms of RT: rumination, worry, and obsessions. Our survey of the literature on potential phenomena meeting the above criteria also suggests that the two additional constructs of yearning and RT focused on bodily sensations (interoceptive RT) should also be considered forms of RT. Yearning and interoceptive
RT share many similarities with well-recognized forms of RT and similarly play an important role in psychopathology. Figure 1 provides a comparison and overview of these five types of RT. (An expanded version of Fig. 1, with an extended list of references, is available online through the Open Science Framework at: https://osf.io/yzqrt/)

2.1 | Rumination

Rumination is a negatively valenced, uncontrollable RT process, typically focused on the self-experience and past experiences, which occurs in excess of environmental demands (Martin & Tesser, 2012; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Common examples of rumination include focusing on prior unmet goals or concerns related to past events. This cognitive response to negative mood contributes to maintenance of depression (Nolen-Hoeksema et al., 2008). Rumination narrows attention, which may also exacerbate negative mood (Grol, Hertel, Koster, & De Raedt, 2015). Experimentally induced rumination increases self-reported negative mood in people with major depressive disorder (Donaldson & Lam, 2004; Lavender & Watkins, 2004) and in people without psychopathology (Huffziger, Ebner-Priemer, Koudela, Reinhard, & Kuehner, 2012). Rumination is present in a range of psychopathologies beyond major depressive disorder. It contributes to posttraumatic stress symptom severity (Murray, Ehlers, & Mayou, 2002), social phobia symptoms (Lundh & Sperling, 2002), and grief-specific rumination in complicated grief, which is discussed in detail next. Rumination is also implicated in higher levels of generalized anxiety disorder, although people with major depressive disorder report significantly more rumination than those with anxiety disorders (Olatunji, Naragon-Gainey, & Wolitzky-Taylor, 2013).

2.2 | Worry

Worry is a negatively valenced and uncontrollable RT process focused on future potential problems or uncertain outcomes (Brosschot et al., 2006). Worry functions as a cognitive avoidance strategy by allocating mental resources to a problem rather than finding and implementing solutions for it (Spinhoven, Drost, van Hemert, & Penninx, 2015). Although worry is regarded as a common human experience independent of psychopathology (Spinhoven et al., 2015), excessive worry is a characteristic feature of many anxiety disorders, especially generalized anxiety disorder, and can also be a feature of mood disorders. Worry, in those with anxiety disorders, is predicted by an interaction of both high probability bias (i.e., this is likely to happen) and anticipated cost (and it will be catastrophic; Berenbaum, Thompson, & Pomerantz, 2007). Worriers endorse the use of worry in coping with negative emotional events because it alleviates the affective intensity associated with them, and is thus powerfully negatively reinforced.

2.3 | Obsessions

Obsessions comprise recurrent, intrusive, and disturbing thoughts (Julien, O’Connor, & Aardema, 2007). Typically associated with, though not restricted to obsessive-compulsive disorder, obsessions often conflict with a person’s values, beliefs or self-appraisal (Julien et al., 2007). For example, obsessive thoughts may feature taboo behavior (e.g., sexual or violent transgressions), or imagined catastrophic possibilities, (e.g., developing cancer). Because the content of obsessions is typically associated with anxiety about present or future exigencies (Wahl et al., 2011), we identify a present and future temporal focus in this mode of RT. Obsessions may be accompanied by compulsions, or behaviors that diminish distress associated with the obsessions (e.g., washing one’s hands to undo contamination, or performing a task a specific number of times until it is “just right”; Julien et al., 2007). Due to their distressing nature, obsessions carry negative content valence. This distress is often exacerbated by uncontrollability, characterizing obsessions as a form of RT. Obsessions often include a cognitive bias, in which a person’s thoughts or behaviors are believed to exert an exaggerated degree of control or causal influence over the world (Hezel & McNally, 2015). This control is exemplified by magical thinking (e.g., “Engaging in this ritual will undoubtedly prevent any illness in my family”) and thought–action fusion, in which a person believes that thinking something will cause it to happen (e.g., “If I imagine that my home will be burglarized, then it will definitely happen”; Berle & Starcevic, 2005).
2.4 | Yearning

Yearning is the unbidden, repetitive desire for a cherished person from the past, described as an “affectively laden cognitive event” (Robinaugh et al., 2016). Yearning is widely experienced in acute grief among bereaved individuals. However, yearning is a hallmark symptom of complicated grief (Shear et al., 2011), persisting with high frequency as long as 48 months after the death event (Robinaugh, Leblanc, Vuletich, & McNally, 2014). Complicated grief is a disorder included in the DSM-5 for future research (termed persistent complex bereavement disorder; APA DSM-5), and will be included in the International Classification of Diseases 11th Revision (ICD-11; Maercker et al., 2013).

Yearning is not typically defined as a type of RT (with the exception of O’Connor & Sussman, 2014), but the construct fits well within the larger framework we have outlined here. Yearning and rumination both contain counterfactual thinking (i.e., unfavorably contrasting the present reality with a counterfactual reality with the deceased loved one; Robinaugh et al., 2016), but yearning extends beyond counterfactual thinking to imagery-based content of conjuring the deceased in the present (e.g., reveries). In the present moment, yearning have a positive valence. However, when the painful reality of the loss comes into stark contrast with the reverie, the negative valence of this form of RT is revealed (Kavanagh, Andrade, & May, 2005). People may also believe that these reveries maintain their ties to the deceased (Nolen-Hoeksema, 2001).

2.5 | Interoceptive repetitive thought

Phenomena such as interoceptive awareness and somatic hypervigilance are widely investigated in somatoform and anxiety disorders (Ginzburg et al., 2015; White, Craft, & Gervino, 2010; Wittthöft, Basfeld, Steinhoff, & Gerlach, 2012). The proposed framework leads us to suggest that these somatic phenomena may be best characterized as a type of maladaptive RT. This “interoceptive repetitive thought” is characterized by uncontrollable and repeated attending to one’s bodily sensations and maladaptive appraisal of these sensations. These sensations may include pain or discomfort, visceral sensations associated with bodily processes like breathing or digestion, or sensations associated with physiological arousal. As with the other forms of RT, uncontrollability, negative valence, and seeking (vs. solving) purpose characterize interoceptive RT (Ginzburg et al., 2015; Wittthöft et al., 2012). Temporally, we would expect interoceptive RT to be present focused, with an orientation toward current bodily sensations (Wittmann, 2015).

Interoceptive RT focuses on somatosensory experience and is triggered by somatic stimuli. It may also interact with other forms of RT. For example, the fear of having a panic attack may lead to other panic symptoms such as paresthesias, chest pain, and dizziness (Arch, Landy, & Craske, 2008), ostensibly justifying the initial worry. White et al. (2010) observed that somatic hypervigilance interacts with anxiety among patients with noncardiogenic chest pain complaints, such that attentiveness toward potentially threatening symptoms in the presence of anxiety disorders contributes to somatic symptoms. More generally, sensitivity and vigilance toward interoceptive sensations is proposed as mechanisms in anxiety (Domschke, Stevens, Pfeiderer, & Gerlach, 2010) and depressive (Barrett, Quigley, & Hamilton, 2016) disorders. Although interoceptive RT can occur across contexts, it may be most likely to occur in anxiety or somatic psychopathologies. A review of interoception in mental disorders found a strong association between panic attacks and visceral symptoms, and that clients with anxiety disorders demonstrate more cardiac and gastrointestinal awareness than nonanxious controls (Scarella, Laferton, Ahern, Fallon, & Barsky, 2016). Some etiological models of anxiety disorders (e.g., the triple vulnerability framework) suggest that certain experiences of learning about danger to oneself during development may elicit heightened vulnerability to anxiety disorders (Suarez, Bennett, Goldstein, & Barlow, 2008).

3 | THERAPEUTIC INTERVENTIONS TARGETING MALADAPTIVE RT ACROSS DISORDERS

A variety of therapeutic methods and techniques are used for maladaptive RT in specific disorders, with implications for transdiagnostic treatment of maladaptive RT. In this section, we discuss the empirically based psychotherapy
treatments (e.g., cognitive behavioral therapy [CBT]) as well as specific methods used within treatments (e.g., interoceptive exposure) to reduce RT.

### 3.1 Cognitive and behavioral therapies

CBT is an umbrella term for a number of different treatments that place primacy on helping people change the ways they think and behave in order to ultimately alleviate symptom distress (Lorenzo-Luaces, Keefe, & DeRubeis, 2016). Many different versions of CBT are manualized for specific psychopathologies or models of psychopathology. Although there are differences between protocols, CBT treatments typically address RT by (a) modifying thoughts by teaching clients to examine the evidence for a thought’s veracity and consequences, or (b) through intentional exposure to distressing RT in a therapeutic context. Although a complete review of cognitive and behavioral therapies is beyond the scope of this review, we describe some commonly employed methods and techniques, and how these may address RT specifically.

#### 3.1.1 Evaluating and challenging thoughts

This method of cognitive therapy involves teaching clients to identify maladaptive thoughts, evaluate the truthfulness of these thoughts, and change these thoughts in a way that corrects for cognitive errors and incorporates a more balanced view. For example, in CBT for obsessive-compulsive disorder, clients are guided to alter their negative appraisals of intrusive thoughts by examining the cognitive errors and flawed logic contained in obsessive thoughts (Wilhelm et al., 2005). This treatment improves both depressive and obsessive-compulsive symptoms in people with obsessive-compulsive disorder (Wilhelm et al., 2005). In the treatment of generalized anxiety disorder, using similar techniques to teach clients to replace negatively valenced attributions for worry with benign attributions reduces the occurrence of negative thought intrusions (Hayes, Hirsch, Krebs, & Mathews, 2010). We propose that these techniques may directly affect the core features of RT: controllability, purposiveness, and valence (Fig. 1). The act of modifying a thought offers clients the experience of control over their thinking, and shifts the purpose of thinking from seeking to solving. By correcting for cognitive errors such as negativity bias, the content of the modified thought impacts valence.

#### 3.1.2 Cognitive bias modification

Cognitive bias modification is a cognitive therapy method that specifically targets all cognitive forms of maladaptive RT by modifying clients’ cognitive biases. Cognitive bias modification uses systematic practice to alter automatic attentional or appraisal processes. This often includes concreteness training, which aims to decrease maladaptive, abstract thinking by increasing adaptive, concrete thinking. For example, in cognitive bias modification for rumination, clients identify personal rumination triggers and repeatedly focus on concrete, sensory details of these events in addition to learning general concrete thinking strategies. Concreteness training compared to placebo decreased rumination and depressive symptoms (Watkins, Baeyens, & Read, 2009). A randomized controlled trial found that concreteness training significantly improved depressive symptoms and rumination compared to treatment as usual, and significantly improved rumination compared to relaxation training (Watkins et al., 2012). As with the cognitive therapy strategy described above, we suggest that the act of modifying thinking changes the purposiveness and controllability of ruminative thoughts, whereas the content of the modified thoughts affects valence.

#### 3.1.3 Exposure and response prevention

Another widely used CBT intervention is exposure and response prevention. Exposure and response prevention is most commonly used in the treatment of obsessive-compulsive disorder, which involves exposing clients to the stimuli that elicit their compulsions and then preventing compulsive behavior. This intervention significantly reduces obsessive-compulsive symptoms in a large number of trials (for a recent meta-analysis, see Olatunji et al., 2013). Relatedly, the cognitive avoidance model for treating anxiety disorders takes a similar approach by suggesting that clients with anxiety disorders should be therapeutically exposed to their worries. CBT based on the cognitive avoidance model
significantly reduces anxiety and worry when compared to short-term psychodynamic psychotherapy (Leichsenring, 2009). Planned exposure within a therapeutic environment may reduce the client’s experience of uncontrollability, and additionally may reduce the negative valence of the thoughts through the repeated experience of having catastrophic thinking disconfirmed.

3.1.4 | Interoceptive exposure

In interoceptive exposure, a cognitive behavioral treatment for panic disorder, somatic symptoms associated with panic such as accelerated heart rate and shortness of breath are safely induced through exercises such as hyperventilation. Through repeated exposure to troubling interoceptive symptoms, clients begin to view these symptoms as normal bodily processes rather than as threatening and dangerous (Boswell et al., 2013). For example, in a trial of exposure therapy in patients with hypochondriasis, exposure reduced dysfunctional evaluations of somatic symptoms (Weck, Neng, Schwind, & Höfling, 2015). We suggest that interoceptive exposure may be a particularly effective treatment approach for interoceptive RT; as with exposure and response prevention, repeated exposure in a therapeutic environment may impact the valence and perceived controllability of the RT.

3.2 | Mindfulness and acceptance-based therapies

In contrast to therapies that involve analyzing and challenging maladaptive RT, other therapies instead teach clients to simply notice these thoughts without responding or reacting to them. Third-wave psychotherapies such as acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 2012) and dialectical behavior therapy (Koerner, 2012) take the perspective that maladaptive RT itself is not harmful, and that it is reacting to or overidentification with these thoughts that becomes distressing or problematic. Treatment using this approach typically includes teaching clients mindfulness and/or decentering skills.

3.2.1 | Mindfulness

Mindfulness-based interventions emphasize maintaining awareness on one’s immediate experience with an attitude of equanimity or nonjudgment. As described above, third-wave psychotherapies such as acceptance and commitment therapy and dialectical behavior therapy incorporate mindfulness. Other mindfulness-based interventions include mindfulness-based stress reduction (Sharma & Rush, 2014) and mindfulness-based cognitive therapy (Segal, Teasdale, & Williams, 2004). Mindfulness-based treatment approaches are effective for a range of psychological disorders that commonly involve maladaptive RT (for a review, see Hofmann, Sawyer, Witt, & Oh, 2010). Although preliminary, there is evidence to suggest that mindfulness training may reduce maladaptive RT in clinical and nonclinical populations (Feldman, Greeson, & Senville, 2010; Short & Mazmanian, 2013).

We suggest three possible mechanisms of mindfulness-based interventions as they relate to maladaptive RT. First, the focus on accepting present-moment experience may be an important component of these interventions. Research suggests that thought or emotional suppression and experiential avoidance maintain RT (Llera & Newman, 2014). By asking the client to observe RT without judgment, suppression, or engagement, mindfulness-based methods may act on psychopathology maintenance factors such as avoidance and suppression. Relatedly, the emphasis on present-moment experience may address the temporal features of types of maladaptive RT that have a past or future focus, such as rumination and worry. Third, mindfulness practice involves attempting to sustain one’s attention, which may represent another important mechanism of change by addressing the perceived uncontrollability of RT through attentional modification.

3.2.2 | Decentering

Decentering has been proposed as a mechanism that may differentiate mindfulness training from relaxation training or other stress-management approaches (Feldman et al., 2010; Vago & Silbersweig, 2012). Decentering comprises three facets: (a) seeing oneself as nonidentical with one’s thoughts, (b) the ability to not react to one’s experiences
habitually, and (c) a capacity for self-compassion (Fresco et al., 2007). Fresco and colleagues found an inverse rela-
tionship between decentering and depression symptoms, including rumination. Mindfulness-based cognitive therapy
also increases decentering (Bieling et al., 2012; Teasdale et al., 2002). Additional terms for mechanisms that lead
mindfulness-based psychotherapies to reduce psychopathology have been proposed (e.g., reperceiving, cognitive defu-
sion, metacognitive awareness). The literature would benefit from testing the discriminant validity of these concepts
and integrating them where possible.

3.3 Therapeutic methods targeting multiple forms of maladaptive RT

Metacognitive therapy is a psychotherapy developed specifically to treat multiple forms of maladaptive RT. Metacog-
nitive therapy uses attention training, detached mindfulness, rumination postponement, and modification of
metacognitive beliefs to transform RT. It reduces anxiety and depressive symptoms in individuals with generalized
anxiety disorder (Wells & King, 2006), recurrent depression (Wells et al., 2007), and treatment-resistant depres-
sion (Wells et al., 2012). By modifying beliefs, attentional processes, and implementing problem-solving strategies,
metacognitive therapy may naturally lend itself to ameliorating the four characteristics of maladaptive RT: negative
valence, uncontrollability, seeking purpose, and temporal orientation.

4 FUTURE DIRECTIONS AND RESEARCH AGENDA

Maladaptive RT is a transdiagnostic phenomenon that has an etiological and/or maintenance role in a wide range of psy-
chological disorders, including mood disorders, anxiety disorders, and somatic disorders. In this review, we focused on
five types of maladaptive RT: rumination, worry, obsessions, yearning, and RT focusing on bodily sensations, which we
call interoceptive RT. In bringing together five unique yet characteristically similar psychological phenomena, we offer
a framework that proposes that although maladaptive RT has many different expressions, given the phenomenological
similarities that they share and their co-occurrence across psychological disorders, understanding the basic phenom-
ena of maladaptive RT itself is likely to have important implications. We suggest that focusing on the umbrella phe-
nomenon of maladaptive RT itself, rather than examining different manifestations of RT in isolation, can yield key gains
in understanding and improving treatment for psychopathologies characterized by maladaptive RT. We therefore con-
clude by highlighting three areas within psychopathology that may benefit from additional research about RT: etiology,
maintenance, and treatment.

Future research should focus on the etiology of the phenomenon of RT itself. This research should include an investi-
gation of biological risk factors for RT such as genetic heritability as well as dispositional risk factors. For example, is RT
a cognitive style—a way of perceiving and processing information—that some people develop or to which they are nat-
urally predisposed? Explicating the etiology of RT itself may yield novel insights into the etiology of mood, anxiety and
somatic disorders. Further, given that RT may be a risk factor for psychopathology, further research should investigate
interventions targeting RT as preventative strategies for vulnerable populations.

Future research should also focus on understanding the maintenance of RT. RT itself may be a maintenance factor
in psychological disorders; for example, rumination maintains depression (Nolen-Hoeksema et al., 2008). Aside from
lines of research that focus on specific forms of RT (e.g., worry), little is known about maintenance factors for the
overarching construct of maladaptive RT. Our review proposes that in some cases, the co-occurring, synergistic
effects of multiple types of RT may maintain RT. The extent to which the comorbidity of multiple forms of RT maintain
one another or synergistically maintain their associated psychological disorders is an empirically testable question.
For example, in the context of medical comorbidities such as chronic pain, does interoceptive RT co-occurring
with rumination serve to maintain pain-related ruminative thinking, and consequently, depression? In the context
of obsessive-compulsive disorder, does worry co-occurring with obsessions serve to maintain and reinforce the
obsessions, and consequently, the disorder? Given the putatively important role of RT in maintaining psychological
disorders, understanding the maintenance of the RT process itself may yield important treatment implications.
Finally, our review raises a number of questions about the treatment of psychological disorders that involve RT. We present several therapeutic approaches that demonstrate efficacy in treating RT and/or its associated psychopathologies, and yet little is known about why or how these disparate interventions work. This illuminates several targets for future research. First, which therapies or methods within therapies are most efficacious for treating RT, and what methods are efficacious for which types of RT? More specifically, does the temporal orientation of the RT, or the number of RT types present, indicate a specific intervention? Second, RT may also be a key mediating variable in research investigating the mechanisms of psychotherapy. For example, certain therapeutic methods may promote adaptive RT (e.g., mindfulness-based therapies aim to cultivate present-moment savoring; CBT often includes problem solving). Do such methods offer an accessible and more adaptive thought-replacement strategy for a person dealing with maladaptive RT? Finally, our review raises the question of whether any psychotherapeutic methods are contraindicated for clients with RT. Just as thought suppression is discouraged in the treatment of obsessive-compulsive disorder and emotional suppression is discouraged in the treatment of anxiety and mood disorders (Campbell-Sills, Barlow, Brown, & Hofmann, 2006), certain interventions could be contraindicated when RT is present.

Notably, a growing number of psychotherapy treatment manuals aim to be transdiagnostic rather than disorder specific. For example, the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders is designed as a treatment for all anxiety and mood disorders. This treatment protocol is based on research demonstrating that these groups of disorders are at least partially maintained by excessive emotional responses and a sense that one’s emotions are out of control (Wilamowska et al., 2010). As this review has demonstrated, maladaptive RT may similarly be a key transdiagnostic phenomenon. Maladaptive RT is both a maintenance factor and etiological mechanism in many anxiety and mood disorders, and not merely a symptom of these psychopathologies. The phenomena of maladaptive RT may be an important future target for transdiagnostic treatment protocols.

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