Journal of Obsessive-Compulsive and Related Disorders 3 (2014) 21–28

Contents lists available at ScienceDirect

Journal of Obsessive-Compulsive and Related Disorders

journal homepage: www.elsevier.com/locate/jocrd

Thought suppression across time: Change in frequency and duration of thought recurrence ☆

Ann E. Lambert *, Yueqin Hu, Joshua C. Magee, Jessica R. Beadel, Bethany A. Teachman

University of Virginia, Box 400400, Charlottesville, VA 22904, USA

ARTICLE INFO

Article history:
Received 16 September 2013
Received in revised form
15 November 2013
Accepted 18 November 2013
Available online 28 November 2013

Keywords:
Thought suppression
Intrusive thoughts
Frequency
Duration
Time
Recurrence

ABSTRACT

Some studies have found that trying to suppress thoughts increases their long-term recurrence, a phenomenon associated with psychopathology, particularly obsessive-compulsive disorder. However, effect sizes in thought suppression studies have often been small and inconsistent. The present study sought to improve thought suppression conceptualization and measurement by examining two distinct dimensions of thought recurrence – frequency and duration of a thought's return – and how they evolve over time. After a thought focus period, 100 adults were assigned to either suppress or monitor the recurrence of an unpleasant thought for 4 min. Then, during a second four-minute period, *all* participants were asked to monitor the thought's recurrence. Hierarchical linear modeling indicated that thought *frequency* declined across time and the rate of decline slowed as time went on. Initially, the extent of thought *duration* remained short and stable for those asked to suppress, and increased linearly over time for those asked to monitor. Later, this pattern reversed. Duration increased linearly for those initially asked to suppress but was short and stable for those who initially monitored. Accounting for change over time and means of measuring recurrence (frequency vs. duration) may help elucidate past mixed findings, and improve thought suppression research methodology.

1. Introduction

Thought suppression across time: Change in frequency and duration of thought recurrence.

Intrusive, unwanted thoughts are common occurrences, experienced by approximately 90% of the population (Clark & Purdon, 1995). Often, individuals react to these thoughts by attempting to suppress them (Barnes, Klein-Sosa, Renk, & Tantleff-Dunn, 2010; Salkovskis & Campbell, 1994). In the short term, this strategy can be effective (Magee, Harden, & Teachman, 2012); however, in the long term, thought suppression attempts may lead to a relative increase in thought recurrence. This phenomenon is known as *rebound* (Wegner, 1994). In part because of this ironic rebound effect, thought suppression has been linked to various forms of psychopathology, particularly emotional disorders, like obsessive-compulsive disorder, that involve the persistent return of unwanted thoughts (Purdon, 1999). Meta-analyses (Abramowitz, Tolin, & Street, 2001; Magee et al., 2012) have confirmed the thought suppression rebound effect, but the overall size of the effect is small and not reliably present across studies. Many studies have explored possible moderating variables to explain these mixed results, including the presence of psychopathology (see Magee et al., 2012), thought valence (Harvey & Bryant, 1998), and personal relevance of the thought (Kelly & Kahn, 1994), among others. While these investigations have been useful, the moderators examined to date have not been able to account for much of the variance in recurrence (e.g., Magee et al., did not find that clinical populations experienced greater rebound than non-clinical populations). In the present study, we examine two variables, time (i.e., how the extent of thought recurrence changes over the course of a thinking period) and thought recurrence measurement (i.e., frequency of recurrence vs. duration of recurrence), that are theoretically likely to improve our understanding of when and how thought suppression attempts lead to the ironic return of unwanted thoughts.

1.1. Thought suppression outcomes across time

Thought suppression has been extensively studied using a modified thought suppression paradigm developed by Wegner, Schneider, Carter, and White (1987). While variation in the paradigm exists, the method typically begins by asking participants to focus on a thought. Next, participants are randomly assigned to either intentionally suppress (i.e., try *not* to think about the thought) or to simply monitor the occurrence of the thought (i.e., think about whatever they want)

☆The authors are thankful for the feedback provided by members of the Teachman Program for Anxiety, Cognition and Treatment lab and the Dodson Cognition lab. This research was supported in part by an NIA R01AG033033 grant to Bethany Teachman.

* Corresponding author. Tel.: +1 434 243 7646; fax: +1 434 982 4766.
E-mail address: ael4n@virginia.edu (A.E. Lambert).

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http://dx.doi.org/10.1016/j.jocrd.2013.11.004

for a period of time. Finally, both groups undergo a thought monitoring period where thought recurrence is freely monitored (with no suppression instructions). During these two sequential thinking periods, both groups are asked to record whether the thought comes to mind. A common finding is a rebound effect whereby participants who were asked to initially suppress the thought tend to experience more thought recurrence during the final thought monitoring period relative to the control monitoring group. This rebound effect is theorized to be the result of two cognitive processes: a volitionally controlled operating process that intentionally tries to suppress occurrences of unwanted thoughts (possibly by searching for unrelated distractor thoughts), and an unconscious, uncontrollable monitoring process that scans thought content for suppression failures, bringing these failures into conscious awareness when encountered (Wegner, 1994). Ironically, the activity of the operating process can increase the likelihood of later recurrence by taxing controlled processing resources, making subsequent suppression more difficult (Gordijn, Hindriks, Koomen, Dijksterhuis, & Van Knippenberg, 2004; Wegner, 1994). Because the operating process is thought to be resource dependent, thought suppression attempts are expected to be less successful when cognitive resources are low.

Within this thought suppression paradigm, thought recurrence and the cognitive processes responsible for this recurrence play out continuously across time; however, most studies examine the total or mean frequency of thought recurrence per period, collapsing across time. This potentially obscures critical information. Examining thought suppression failures across time provides a more ecologically valid approach that may help reveal the processes underlying suppression success and failure, such as by identifying the point during thinking periods when suppression vs. monitor instructional condition differences emerge or detecting when recurrence is likely to peak during thinking periods. For example, it is known that active thought suppression attempts place demands on working memory capacity (see Brewin & Beaton, 2002) and deplete cognitive resources (Gailliot et al., 2007; Muraven, Tice, & Baumeister, 1998; Muraven, Collins, & Neinhaus, 2002). As a result, longer thought suppression periods may lead to stronger rebound effects that incrementally escalate over time, a pattern that could only be observed when analyses examine patterns of change across time.

1.2. Thought suppression outcome measurement: frequency vs. duration

If and when a rebound effect is observed may vary based on how thought recurrence is measured. Frequency of thought recurrence has been the most commonly used outcome variable to determine the impact of thought suppression instructions on subsequent unwanted thoughts (see Magee et al., 2012). Using thought frequency to study recurrence makes intuitive sense and may be the simplest dimension of recurrence to measure, but it is not the only potentially important measure of recurrence. Once an unwanted thought has entered awareness, the duration of time it remains in awareness may also be important (Purdon, 2004). As Purdon points out, evaluating thought recurrence based solely on the frequency of thought return is problematic because it is confounded with the duration of the thought's recurrence. For example, an individual may experience a single instance of a thought that persists for an entire thinking period, thus resulting in a very high duration and a very low frequency. While Wegner et al. (1987) discussed the duration of thought recurrence in their seminal paper, the variable has since received minimal attention. In a meta-analysis spanning 33 studies, Magee et al. identified just two studies that measured thought duration as it occurred (as opposed to by retrospective report). The present study examines both thought frequency and thought duration as they occur continuously across time because, as we will argue, the cognitive processes that give rise to the frequency of thought recurrence may be very different than those that sustain or limit the thought's duration.

We argue that frequency can be conceptualized as thought *onset* because, regardless of the length of time the thought remains active in consciousness, the onset of each thought will be counted as one instance of recurrence. In this way, thought frequency can be conceptualized as the tendency of a thought to enter conscious awareness. Within the cognitive literature, when a thought is retrieved from memory and brought to conscious awareness, it is generally considered to be a function of automatic spreading activation (though it is likely not a purely automatic process; see Bargh, 1994; Jacoby, 1991; Logan & Cowan, 1984), which dissipates as time goes on unless reactivation occurs (Anderson, 1983). In particular, activation of intrusive thoughts seems to largely reflect unintentional processing (a core feature of automaticity; Bargh, 1994), given that intention reflects "whether one is in control over the instigation or 'start up' of processes" (Bargh, 1994, p. 16). Notably, within the thought suppression paradigm, whether the onset of a thought is considered to occur unintentionally presumably depends on the assigned instructions. Under thought suppression instructions, onset of the thought is partly, by definition, unintentional because the participant is explicitly attempting to prevent activation of the thought using suppression (assuming the participant followed instructions). However, under thought monitoring instructions, it is unclear whether the onset of the thought is unintentional because no activation goal was assigned. In summary, when participants are actively attempting to suppress, thought frequency may reflect primarily automatic cognitive processing.

The few studies that have examined duration have used different measurement approaches, including retrospective self-report; however, methods that allow thought duration to be measured as it occurs presumably confer greater accuracy because they assess online thought duration. If measured in this way, thought duration during suppression can be conceptualized as a thought's *ease of disengagement* or, in other words, indication of an individual's ability to alter or halt processing once the thought is activated (Purdon, 2004). During suppression, we expect that the duration of time it takes to eliminate a thought from awareness likely occurs in large part as a function of controllability, which reflects the ability to counteract (e.g., alter or stop) the influence of an accessible construct (Bargh, 1994). However, as with frequency, controllability is less clear when participants are given monitoring instructions because the instructions do not set a goal to stop processing the thought. Under thought monitoring instructions, we cannot assume participants are motivated to eliminate the thought from conscious awareness, so it is less clear that duration reflects controllability. Thus, when participants are actively attempting to suppress, thought frequency may reflect primarily controlled cognitive processing.

Construing thought frequency and duration as, in part, indicators of unintentional processing and controlled processing, respectively, can help guide predictions about when we should expect rebound effects and how the variables might change over time. Depletion of controlled processing resources during thought suppression is theorized to lead to rebound effects (Wenzlaff & Wegner, 2000). Because we conceptualize frequency as being driven less by controlled processing than duration, we expect that frequency will not be as influenced by resource depletion as duration. Thus, we predict an absent or reduced rebound effect for frequency, relative to duration. Further, because thought frequency may be partially driven by automatic spreading activation, we predict that frequency of recurrence for those participants assigned to suppress will decline across time as activation naturally dissipates due to habituation. In contrast, because we believe