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Unconscious thought reduces intrusion development: A replication and extension

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ABSTRACT

Background and Objectives: Intrusive images after a traumatic event, a hallmark feature of post-traumatic stress disorder, are suggested to develop because the trauma memory is disorganized and not integrated into autobiographical memory. Unconscious Thought Theory predicts that information can be conceptually organized after a period of unconscious thought (UT), more so than after conscious thought (CT). We aimed to test the hypothesis that UT decreases intrusions and increases conceptual organization in memory.
Methods: Participants were shown a stressful film and were required to perform an UT task, a CT task, or a distraction task. Intrusions of the film, intrusion qualities, and sequence memory were measured afterwards.
Results: We confirmed our hypothesis that UT (versus CT or mere distraction) leads to fewer intrusions, thereby replicating earlier research. Contrary to prediction, we found no difference between the conditions on sequence memory. In addition, conscious thought appeared to increase intrusion nowness and arousal.
Limitations: The analogue design and healthy participant sample prevent from generalizing results to other populations. Intrusion frequency and qualities were assessed immediately after the film thereby prohibiting us from drawing conclusions about any long-term effects.
Conclusions: Engaging in unconscious thought after a stressful film can reduce intrusion frequency. This has potential implications for clinical interventions to prevent initial stress symptoms. The underlying mechanism remains unclear for now and provides an avenue for future research.

1. Introduction

Intrusive images are a hallmark feature of posttraumatic stress disorder (PTSD; American Psychiatric Association, 2000) and are increasingly recognized as being a significant symptom of other disorders, such as depression (Newby & Moulds, 2011). Effective treatment options are available for chronic PTSD. However, there is a lack of successful interventions that can effectively prevent the initial development of symptoms by acting immediately after the trauma (National Institute for Clinical Excellence, 2005; Sijbrandij et al., 2007). The present study tested a theory-driven manipulation immediately after an analogue traumatic event specifically targeted at intrusions.

Intrusive images are suggested to develop because the trauma memory is disorganized and not readily integrated into autobiographical memory (Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000). A memory that is disorganized may be fragmented and not adhering to chronological order. This can make it difficult for the trauma survivor to make sense of what happened and can lead to recurring intrusive images that have a sense of 'nowness' (Ehlers & Clark, 2000). It can thus be hypothesized that a better organized memory would not be intrusive as often, and would not be as vivid, experienced as being here-and-now, and arousing.

There is previous research aimed at developing evidence-based interventions to prevent initial post-traumatic stress symptoms. Several studies found an ameliorating effect of performing a visuospatial task after viewing a 'trauma' film compared to a verbal task or a no task control condition (Deeprose, Zhang, DeJong, Dalgleish, & Holmes, 2012; Holmes, James, Coode-Bate, &

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Deeprose, 2009; Holmes, James, Kilford, & Deeprose, 2010). A cognitive training towards more positive self-efficacy and meta-cognitive beliefs about stress symptoms after a trauma film was shown to reduce intrusion development compared to a training towards more negative self-efficacy beliefs (Woud, Holmes, Postma, Dalgleish, & Mackintosh, 2011). Other studies have shown that worrying or ruminating after a distressing film increased intrusions (Butler, Wells, & Dewick, 1995; Wells & Papageorgiou, 1995) although others have found no significant effects (Ehring, Szeimies, & Schaffrick, 2009; Williams & Moulds, 2007).

Few studies have directly targeted the hypothesis that intrusions develop from a lack of memory organization although this is an important claim made by models of PTSD and intrusive memory (Brewin et al., 1996; Ehlers & Clark, 2000). Zetsche, Ehring, and Ehlers (2009) presented participants with a distressing film after which they were assigned to a rumination, memory organization or distraction condition. Intrusions were measured during a first session and reported in a one-week diary following the film. Overall, the experimental conditions did not have a significant effect on intrusion development, although, when split by gender, men in the rumination condition reported more intrusions in the first session than men in the memory organization condition. Men (but not women) in the memory organization condition, in turn, reported fewer intrusions than men in the distraction condition. Despite the unexpected gender effect, this gives some credence to the idea that memory organization has an influence on intrusion frequency.

In another study using an analogue trauma design, participants were shown a film with traffic accidents, and then received a cued-recognition memory test about the film. The items were presented in chronological order (Krans, Näring, Becker, & Holmes, 2009). Participants then reported the recurrence of intrusive images of the film in a diary during the following week. After one week they returned and completed a cued-recall test for the film. The results showed that intrusion frequency was lower for the part of the film for which they had received the recognition memory test. Furthermore, distress associated with the intrusive images showed a trend towards being lower for that part of the film. This suggests that imposing a chronological structure to a traumatic event could reduce the occurrence of intrusions and possibly distress associated with the intrusions.

The studies described above are part of a recent surge in efforts to discover effective experimental interventions to prevent the initial development of intrusions. There is, however, still a lack of studies targeting memory organization as a possible beneficial factor. Interestingly, organization of new information in memory has been described by Unconscious Thought Theory (UTT; Dijksterhuis & Nordgren, 2006). UTT distinguishes between conscious and unconscious thought, where conscious thought processes are defined as schematic and top-down thinking about an object or task using conscious attention allocated to that task or object. It is thought to be of limited capacity, meaning that only few chunks of information can be handled simultaneously (Dijksterhuis & Nordgren, 2006). Unconscious thought processes, on the other hand, are defined as thought processes that operate while conscious attention is directed elsewhere. For example, if people are faced with a problem that requires a large amount of information to be processed, they are often advised to 'sleep on it' (Bos, Dijksterhuis, & Van Baaren, 2011; Dijksterhuis, 2004; Dijksterhuis, Bos, Nordgren, & van Baaren, 2006a, 2006b, 2006c). This mode of thought is suggested to be of high capacity and using a bottom-up approach (Bos & Dijksterhuis, 2011). Importantly, unconscious thought is assumed to be a goal-dependent process, which distinguishes it from a mere distraction effect. This assumption has been recently supported with experimental evidence (e.g., Bos, Dijksterhuis, & Van Baaren, 2008, 2011).

Most UTT research has focused on decision-making. The common finding is that unconscious thought leads to better decisions (Bos et al., 2008; Dijksterhuis, 2004; Dijksterhuis, Bos, Nordgren, & Van Baaren, 2006; Dijksterhuis & Meurs, 2006; Ham, Van den Bos, & Van Doorn, 2009; Lerouge, 2009), although some research reports failures to replicate these effects (Acker, 2008; Calvillo & Penaloza, 2009; Gonzalez-Vallejo, Lassiter, Bellezza, & Lindberg, 2008; Newell, Wong, Cheung, & Rakow, 2009; Payne, Samper, Bettman, & Luce, 2008; Thorsteinson & Withrow, 2009; Waroquier, Marchiori, Klein, & Cleeremans, 2009). However, a recent meta-analysis including more than 80 studies indicated that, overall, there is a benefit for unconscious thought in decision-making although the overall effect size is small (for more information, please see Strick et al., 2011).

Importantly for the research at hand, several experiments have shown that unconscious thought can aid in organizing, clustering and restructuring previously unorganized information in a meaningful way (Bos et al., 2008; Dijksterhuis, 2004). For example, in the experiment of Dijksterhuis (2004, Experiment 5; see also Bos et al., 2008; Experiment 2), participants read 18 sentences describing behaviors (for instance: "Jeroen usually gets high grades in school") that related to three overarching traits (intelligence, idealism and extraversion) of a hypothetical person, presented in random order. They were then instructed to recall these behaviors. Sequence memory scores showed that participants in the unconscious thought condition, more so than in the conscious thought condition, recalled the behaviors in the order according to the overarching traits rather than in the order in which they were presented. That is, memory appeared to be more conceptually organized after unconscious thought than after conscious thought.

Unconscious thought theoretically has the potential to organize traumatic information in a more conceptual way than dealing with many overwhelming details of the event by thinking it over consciously. Having a more structured memory of an event may reduce the negative effects of trauma (Ehlers & Clark, 2000). Although there have been efforts at finding conscious strategies to aid the integration of information in memory (e.g. Michael & Ehlers, 2007), this requires one to consciously revisit the negative events. Unconscious thought potentially offers a way to aid the integration of information in memory without consciously focusing on the negative event. Krans and Bos (2012) tested whether unconscious thought after a trauma film would be successful at reducing intrusion frequency. Participants were shown a negative film clip known for inducing intrusive images and were then given the instruction to think about the film before a memory test (conscious thought condition), or performed an unrelated cognitively demanding task, which prevented conscious processing. Of the participants who received this distraction task, half were told that the experiment was over (mere distraction condition), whereas the other half were told that a memory test of the film would be presented afterwards (unconscious thought condition). Comparing the latter two conditions shows that unconscious thought is a goal-dependent process.[2] After the memory test (presented in all conditions), participants reported their intrusive images of the film during an intrusion provocation task. This involved presenting the participants with still frames from the film that did not depict anything negative. After this presentation, participants monitored

[2] When participants are told the task is over, they no longer have a goal to process information, whereas telling the participants that the experiment will continue after the distraction task introduces the goal to unconsciously process the information (Bos et al., 2008).