



Ageing and thought suppression performance: Its relationship with working memory capacity, habitual thought suppression and mindfulness

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ABSTRACT

A study investigated how the ability to suppress thoughts in the laboratory was affected by type of thought suppressed (positive, negative, neutral), participants' age and working memory capacity (WMC). Linked variables (Use of thought suppression, social desirability, and mindfulness) were measured to assess whether they modified susceptibility to thought intrusion.

Younger, middle aged and older adults suppressed three different valenced thoughts in a counterbalanced order for 5-min per thought. Participants then completed a WMC task and questionnaire measures of the linked variables.

Valence had no effect on intrusions. WMC was positively related to intrusions; higher WMC corresponded to greater intrusions. Age was negatively related to intrusions; with increasing age intrusions decreased. Hierarchical regression showed only age and backward digit span (WMC) significantly predicted intrusions. The relationship between WMC and intrusions was not moderated by age. WMC and age both independently predict level of intrusion, and no synergistic effect was found.

1. Introduction

Intrusive thoughts are a familiar experience for almost all individuals (Rachman & de Silva, 1978; Radomsky et al., 2014; Uleman & Bargh, 1989; Wegner, 1989). Furthermore, as these thoughts are frequently unwanted, a common reaction is the use of thought suppression as a means of removing them from awareness (Wenzlaff & Wegner, 2000).

However, research has demonstrated that suppressing thoughts can often cause them to subsequently intrude more frequently; a phenomenon termed the post-suppression rebound effect (Wegner, Schneider, Carter, & White, 1987). In addition, some studies have shown an increase in intrusions about the concept one is trying to suppress during active suppression, termed the immediate enhancement effect (Lavy & van den Hout, 1990); although this effect appears to be rarer (Abramowitz, Tolin, & Street, 2001). Therefore, using thought suppression often results in counterproductive consequences. Most of the subsequent thought suppression research has explored the dimension of post-suppression rebound effects. Therefore, early thought suppression research focused almost exclusively on examining the boundary conditions of the classic post-suppression thought rebound and demonstrating its robustness (Abramowitz et al., 2001; Magee, Harden, & Teachman, 2012; Wenzlaff & Wegner, 2000). However, recently there has

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been a burgeoning of interest in thought suppression and behaviour. For example, Erskine and colleagues, among others, have demonstrated that if one avoids thoughts about specific behaviours, they subsequently come to undertake those behaviours to a greater degree following suppression (Denzler, Förster, Liberman, & Rozenman, 2010; Erskine, 2008; Erskine & Georgiou, 2010; Follenfant & Ric, 2010; – See Erskine & Georgiou, 2011 for a review).

Despite this volume of work, one aspect of thought suppression that has received little attention concerns why levels of thought intrusion during active suppression vary between individuals (Wenzlaff & Wegner, 2000) and which factors may account for this variability, such as working memory capacity, intelligence, and valence (Brewin & Beaton, 2002; Brewin & Smart, 2005; Wenzlaff & Wegner, 2000). For example, in most thought suppression studies individuals are commonly asked to sit quietly in a room while verbalising all of their thoughts for a period of about 5 min; critically they are also simultaneously asked not to think about a certain concept, classically a white bear which is viewed as a neutral target for most individuals. The rates of intrusive thoughts are recorded during this period, e.g. Erskine and Georgiou (2010). Across studies, Wegner et al. (1987) and Wenzlaff and Wegner (2000) demonstrate that the average number of intrusive thoughts during active suppression is found to be approximately 1 intrusion per minute in young adult samples (however, the variability in intrusion between individuals is very high). In addition, intrusions during active suppression have yet to be studied in older samples. Intrusion frequency has been the most widely investigated variable in thought suppression research, although some studies have investigated intrusion duration (Koster, Rassin, Crombez, & Näring, 2003; Lambert, Hu, Magee, Beadel, & Teachman, 2014) and behaviour (Erskine, Georgiou, & Kvavilashvili, 2010). The current study sought to assess intrusion frequency during active suppression as the outcome measure of interest. In addition, it is worth noting that virtually all thought suppression studies to date have been conducted using samples of young adults, whereas the current study will examine intrusions across the lifespan. The present study will therefore investigate the impact of ageing, working memory capacity and other associated variables on the susceptibility to intrusive thoughts during active suppression.

Despite the average level of intrusion during active suppression usually being around one thought per minute (Wenzlaff & Wegner, 2000), it is clear that there is a large variability in the number of thought intrusions during active suppression across individuals. Some participants report few intrusions during active suppression and others report considerably more. The extent to which these can be viewed as dependent on individual differences remains largely unanswered. Some studies have started to examine this question, with two key studies conducted by Brewin and colleagues (Brewin & Beaton, 2002; Brewin & Smart, 2005).

Brewin and Beaton (2002) investigated the relationships between intrusions during active suppression and expression (actively thinking about a concept) and individual difference measures in a young adult sample. For example, they report significant negative correlations between intrusions occurring during suppression and working memory capacity and fluid intelligence. They also examined the relationships between thought expression and working memory and fluid intelligence but found no significant relationships. However, there are issues with the study that limit its generalisability, for example the mean number of intrusions reported during a five minute active suppression period was 15.53 (SD = 11.27), which is much higher than the usual frequency reported across studies and suggests that an immediate enhancement effect may have occurred (however in the absence of a control condition one can only speculate). The study provides no explanation for the heightened level of intrusions in the suppression group and therefore limits the conclusions that can be drawn from the data. Another issue with the study of Brewin and Beaton (2002) concerns the mean fluid intelligence scores reported (Raven's matrices $M = 53.66$, $SD = 4.59$) suggesting that the average participant had a corresponding IQ score of 119. Once again, this value is very high relative to the average European IQ range (95–100; Gelade, 2008) and it is above one standard deviation from the general population mean. This is potentially problematic as IQ is positively related to working memory capacity and this may affect the levels of thought intrusions (Ackerman, Beier, & Boyle, 2005). It is of course possible that the reason for the high level of intrusions reported by Brewin and Beaton (2002) concerns the sample participants having higher IQ's than the average population IQ and also higher working memory capacity, although this would require further study. Finally in relation to the results for their expression condition, interpretation of this is compromised by the fact that their expression group scores were all from participants expressing after prior suppression. Given that these participants should have been experiencing thought rebound (Wegner et al., 1987) it is again difficult to say that this group's performance would represent a pure measure of expression performance.

A follow-up study by Brewin and Smart (2005) also investigated working memory capacity and thought intrusion and reported a negative relationship between intrusions during active suppression and working memory capacity ($r = -0.23$) again in a young adult sample. Indicating that as working memory increased intrusions decreased. This is in line with Brewin and Beaton (2002) but the size of the correlation is much diminished. The work of Brewin and colleagues is instructive as it suggests that there is a negative relationship between working memory and suppression ability.

A study by Nixon, Flood, and Jackson (2007) also investigated the extent to which thought suppression may be an ability that varies between individuals in a sample of young adults. Critically, they measured participants' suppression ability; defined as the number and duration of intrusions experienced during active suppression. Participants that experienced fewer intrusions were classed as 'good' suppressors and those that experienced many were classed as 'poor' suppressors. Nixon and colleagues had participants suppress three types of thought; a personally relevant negative autobiographical memory, a novel traumatic event and the classic neutral thought – white bear. Furthermore, all participants were assessed on measures of working memory capacity and crystallised intelligence. Results indicated that good suppressors reported lower intrusions during active suppression across all three types of thoughts in contrast to poor suppressors who had more intrusions across all three thoughts. This suggests that suppression ability was stable across subsequent suppression periods and even when suppressing different thoughts. Of relevance to the current work, those classed as good suppressors showed no difference in working memory capacity or intelligence from those classed as poor suppressors.

In a similar study, Klein and Boals (2001) report that unwanted thought intrusions regarding a negative experience were negatively correlated ($r = -0.22$) with working memory performance. However, the measure of intrusions used was the Impact of

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