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Swearing Voices: An Experimental Investigation of the Suppression of Hostile Hallucinations

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Abstract. Generally, the suppression of unwanted thoughts is found to be ineffective. Moreover, in the longer run, suppression attempts may backfire in that they produce a delayed increase in unwanted thoughts (i.e. a rebound effect). This ineffectiveness and paradox have been observed in various studies, and with various targets, such as neutral thoughts, obsessive intrusions, worries, addictive urges, and phobia-related cognitions. The present study sought to explore the effect of suppression of a different intrusion, namely a hallucination. Healthy undergraduates were exposed to a laboratory procedure that was to provoke hallucinations. Half of the participants were additionally given instructions to suppress the hallucinations. Results indicated that suppression was somewhat effective in the short run, but ineffective in the long run. However, no rebound effect was observed.

Keywords: Hostile hallucinations, thought suppression.

Introduction

Auditory hallucinations are core symptoms of psychotic disorders like schizophrenia (American Psychiatric Association, 2000). Approximately 60% of the schizophrenia patients report suffering from hallucinations (Slade and Bentall, 1988). Interestingly, however, hallucinations are also prevalent in the general population. It seems that at least 10% of the healthy individuals experience hallucinations from time to time (e.g. Bentall and Slade, 1985). This latter finding suggests that there is a continuum with everyday non-clinical hallucinatory experiences on the one hand, and disturbing clinical hallucinations at the other end of the spectrum.

A similar dynamic has been observed with another kind of intrusion, namely obsession, as occurring in obsessive-compulsive disorder (OCD). While it had long been believed that the experience of obsessions was exclusive to OCD, Rachman and De Silva in 1978 found that no less than 80% of their healthy participants admitted experiencing obsessions on a regular basis. Moreover, the content of these "normal" obsessions could hardly be distinguished from those reported by OCD patients. Clinically relevant obsessions were merely different from everyday obsessions in that they occurred more often, were longer lasting, and were experienced as more adverse, compared to their everyday equivalents. Consequently, the question arose which factors contribute to the transformation of everyday obsessions into clinically relevant proportions. One explanation of how everyday intrusions

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can become inflated is that suppression of unwanted thoughts (i.e. trying to ban the thought from consciousness) paradoxically results in an increase of thought frequency. Thus, while it is a logical and common reaction to avoid having unwanted thoughts, such avoidance will in the longer run have the paradoxical effect of even more unwanted thoughts. This idea was tested by Wegner, Schneider, Carter and White (1987), who invited their participants to try not to think of a white bear for 5 minutes. Their findings suggested that suppression was not only ineffective, in that participants could not prevent themselves from thinking approximately seven times of white bears in spite of their suppression attempts, but that afterwards, when the suppression instruction no longer applied, suppression participants thought more often of white bears than did those who had previously not been instructed to engage in suppression. Hence, suppression seemed to be ineffective in the short run, and even counterproductive in the longer run. The latter finding is referred to as the rebound effect.

By now, several studies have delivered results indicating that the paradoxical effect of suppression is not limited to obsessions, but also occurs with other intrusions like flashbacks, worries, addiction-related urges, and phobia-related cognitions (for reviews, see Abramowitz, Tolin and Street, 2001; Purdon, 1999; Rassin, Merckelbach and Muris, 2000). The present study sought to explore whether suppression of hallucinations (i.e. externally attributed intrusions) is comparably ineffective as the suppression of other intrusive thoughts. However, unlike obsessive intrusions, hallucinations are difficult to elicit in a laboratory. In order to produce hallucinations in healthy undergraduates, we employed a paradigm described by Merckelbach and Van de Ven (2001), which is based on the work of Barber and Calverey (1964). In that paradigm participants are invited to listen to white noise under the instruction that the noise might contain a specific stimulus (e.g. the famous "White Christmas" song by Bing Crosby). This simple induction caused 32% of the participants in the Merckelbach and Van de Ven (2001) study to report hearing the pertinent song, which was in fact not included in the noise tape.

In the present study, participants underwent a similar procedure of auditory stimulation. Half of the participants were given the additional instruction to suppress the target stimulus. It was hypothesized that suppression would not reduce the number of perceived targets in the short run, and would even result in an increase of hallucinations in the longer run.

Method

Participants

Fifty undergraduates (38 women) participated in the experiment. The mean age in the sample was 21.2 years ($SD = 2.6$, range: 18–28). Participants were randomly assigned to a suppression or control condition ($n = 25$ each). There were no age ($t[48] < 1.0$) or sex ($\chi^2[1, 50) < 1.0$) differences between the two groups. All participants received course credits or a small financial compensation.

Materials

The auditory stimulus that was to provoke hallucinations was a 3-minute file of brown noise (i.e. white noise with lowered pitch). In order to increase the number of hallucinations, two additional auditory stimuli were intertwined: Party noise from an early Roxy Music song (Ferry, 1972) and conversation clips from a song by Cabaret Voltaire (Kirk and Mallinder, 1992).

In the course of the experiment, participants completed a suppression effort visual analogue scale (VAS) twice pertaining to the item "To what extent have you engaged in suppression of the target word during the past period?" (0 = not at all; 100 = to a very large extent).

The dependent variable was the number of reported hallucinations, that is, the number of times that the participants thought to have heard the word "fucker". This target was chosen because it models adverse, hostile hallucinations more closely than the cheerful White Christmas song used in previous studies. Participants were instructed to put a tally mark for every perceived target.

Procedure

All participants were tested individually. They underwent two 3-minute periods of auditory stimulation. During these periods, the noise was presented through stereo headphones in a sound-free room. Participants in the control condition were given the following written instruction: "The coming 3 minutes, you will hear noise. It is possible that you will hear a voice that will call you bad names. Particularly, you may be called 'fucker'. If there is any cursing in the noise fragment, it will not be really clearly distinguishable, because the volume of the voices is about auditory threshold. Do not worry about whether or not you hear the word 'fucker'. If you do hear the word 'fucker', put a tally mark on this piece of paper". For the participants in the suppression condition the instruction was the same, except for the penultimate sentence, which was replaced by: "What you should do is to try to suppress the word 'fucker', if any".

After the 3 minutes had passed, participants completed a first suppression effort VAS. Next, participants were told that they would again be exposed to a randomly composed 3-minute noise file. This time there were no suppression instructions in either condition. Participants in the suppression condition were explicitly told that the suppression instruction no longer applied. After the second period, participants completed a second suppression effort VAS.

At the end of the experiment, participants were told that the two noise files were actually identical, and that they in fact did not contain the target word. Participants were asked not to talk about this with colleagues who were to participate in the study.

Results

As to the manipulation, participants in the suppression condition scored 56.4 ($SD = 28.4$) on the first suppression effort VAS, and 12.0 ($SD = 19.2$) on the second. The corresponding scores in the control group were 14.2 ($SD = 14.8$) and 11.3 ($SD = 13.4$). Repeated measurement 2 (periods) x 2 (groups) ANOVA yielded significant time ($F[1] = 49.6$, $p < .001$), group ($F[1] = 22.9$, $p < .001$), and interaction ($F[1, 48] = 38.3$, $p < .001$) effects.

Before analysing the effect of suppression on hallucination frequency, the actual occurrence of hallucinations was explored. During the first period, 37 participants (i.e. 74%) reported hearing the target word at least once. These hallucinators were evenly divided over the two groups (18 controls and 19 suppressors, respectively; $\chi^2[1, 50] < 1.0$). During the second period, the number of hallucinators even increased to 42 (i.e. 84%). Interestingly, nine participants even reported having heard additional swearwords (mainly "piece of shit", "bitch", and "damn"). Again, these participants were evenly divided over the control ($n = 4$) and suppression ($n = 5$) groups ($\chi^2[1, 50] < 1.0$).

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Table 1. Number of hallucinations (and SD) as a function of period and condition ($N = 50$)

	Period 1	Period 2
Control ($n = 25$)	3.8 (3.7)	4.6 (4.6)
Suppression ($n = 25$)	2.1 (2.2)	7.7 (10.3)

The number of reported target words as a function of period and group is displayed in Table 1. For this variable, the repeated measurement 2 (periods) × 2 (groups) ANOVA yielded significant time ($F[1] = 9.3$, $p = .004$), and interaction ($F[1, 48] = 5.4$, $p = .02$) effects, but no group effect ($F[1] < 1.0$). Next, group differences in hallucination frequency were analysed per period. During the first period, the difference reached significance: $t(48) = 1.9$, $p = .05$. During the second period, no significant difference occurred: $t(48) = 1.4$, $p = .17$. Lastly, changes in hallucination frequency from period 1 to period 2 were analysed per group. These analyses indicated that suppression delivered an increase of hallucinations from the first to the second period (paired $t[24] = 2.8$, $p = .01$). By comparison, hallucination frequency did not change in the control condition from period 1 to period 2 (paired $t[24] = 1.4$, $p = .17$).

Discussion

This study was set out to explore the (in)effectiveness of attempts to suppress auditory hallucinations. From previous studies it is known that suppression is generally an ineffective or even counterproductive control strategy (see Rassin, 2005; Wegner, 1994). However, the effects of suppression on hallucination frequency have not been investigated previously. Given the literature on thought suppression, it was expected that suppression would be ineffective in the short run and even counterproductive in the longer run (cf. rebound effect). The data barely delivered support for these hypotheses. During period 1, suppression instructions decreased hallucination frequency compared to control instructions. This decrease had to be paid with an increase in period 2. Given the absence of a main effect of group (i.e. intrusion frequencies of both periods combined), suppression seemed to be ineffective in the longer run, but not counterproductive. The latter would have required an increased frequency in the suppression group. Thus, one might even argue that suppression was successful in temporarily decreasing hallucination frequency without resulting in a rebound effect.

Whereas the present findings are in line with the notion that suppression is an ineffective control strategy when looking at intrusion frequency, suppression effects may also manifest differentially. For example, Allen, Halperin and Friend (1985) argued, based on a case study, that removal (cf. suppression) of hallucinations does not affect their frequency but does decrease their duration. In another vein, Purdon (1999) argued that individuals who engage in suppression attempts may consequently become hypersensitive to the occurrence of the target, which in turn makes the target even more intrusive and adverse to these individuals. In short, it must be acknowledged that suppression may have effects on hallucinations beyond frequency. One interesting study in this area was reported by García-Montes, Pérez-Álvarez and Fidalgo (2003). These authors built on previous work by, among others, Morrison and Baker (2000), suggesting that hallucinations are related to internally attributed intrusions such as worries and obsessions. Participants in this study were first instructed to suppress thoughts

about their personal imperfections. In the second phase of the study, participants were exposed to a hallucination-inducing procedure similar to that in the present experiment. They were instructed to rate the vividness of every word they thought to hear in the noise tape. Results suggested that participants who had previously engaged in suppression experienced more vivid hallucinations (as indexed on a 10-point Likert scale) pertaining to their imperfections than did control participants. Apparently, suppression of intrusive thoughts ultimately led to increased clarity of hallucinations. Future studies are needed to determine the effects of suppression of hallucinations on a variety of outcome variables. Evidently, exploration of possible differences in suppression efficacy between various populations (e.g. healthy volunteers vs. clinical samples) is another challenge for further study.

It is noteworthy that the paradigm succeeded in generating hallucinations in the first place, and may thus indeed serve as a laboratory model of hallucinations. The percentages of participants reporting hallucinations in the current study (i.e. 74% in the first and 84% in the second period) exceeded that reported by Van de Ven and Merckelbach (2003; viz. 35%). This difference is likely due to the fact that we included conversation fragments in the noise file. A major limitation of the present paradigm is that it relied on self-reported hallucination frequency. Hence, the findings are subject to possible reporter bias such as experimental demand effects. For example, it can not be excluded that participants in the suppression condition reported few hallucinations during period 1, merely because they thought that they were expected to do so. However, it must be acknowledged that the occurrence of hallucinations is not measurable by means other than self-report (see McNally, 2001).

As to the clinical implications, the findings suggest that people suffering from auditory hallucinations should be advised to refrain from suppressing their hallucinations. It seems that suppression may temporarily reduce the number of hallucinations, but this immediate decrease has to be paid for with a delayed increase, which ultimately results in the same number of hallucinations as when no suppression attempts are made. Although probably fruitless, many hallucinators report ignoring (cf. suppressing) their hallucinations, or distracting themselves from them. Estimates indicate that between 24% to 52% of the individuals who suffer from hallucinations regularly employ these control strategies (see Shergill, Murray and McGuire, 1998). Interestingly, research suggests that therapeutic interventions, in which distraction (cf. suppression) from hallucinations is the key ingredient, are less fruitful than those in which patients are instructed to focus on and re-appraise their hallucinations. Haddock, Slade, Bentall, Reid and Faragher (1998) interviewed hallucinators at the beginning of treatment, at the end, and at 2-years follow-up. While none of the patients were hallucination-free at follow-up, those who had received focusing therapy recognised more that their hallucinations were the product of their own mind, and had greater self-esteem, than those who had undergone distraction therapy.

Meanwhile, whereas Shergill et al. conclude that "non-psychiatric subjects have greater control over the experience than those with psychosis" (1998, p. 137), the current findings suggest that this control over hallucinations is not manifested as a capability to successfully suppress hallucinations for, say, 6 minutes.

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