CASE HISTORIES AND SHORTER COMMUNICATIONS

Suppression of emotional and neutral material

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Summary—Previous studies have indicated that suppression of a thought results in an immediate increase of the frequency of this thought and/or in a rebound effect, i.e. in a heightened frequency of this thought later on. The present study (n = 53) examined the relationship between suppression and emotiality of the to-be-suppressed material. More specifically, it was investigated whether suppression of an emotional story results in stronger immediate enhancement or thought rebounds than suppression of a neutral story. There was a clear initial enhancement effect in the group suppressing a neutral story: subjects who tried to suppress experienced more target thoughts than subjects who did not try to suppress. In the neutral-story conditions, no rebound effect occurred. In the groups exposed to an emotional story, there was neither evidence of initial enhancement nor of a rebound. As most obsessions are related to emotional themes, the present findings cast doubt on the claim that the rebound phenomenon represents a valid laboratory model for clinical obsessions.

INTRODUCTION

The rebound effect of thought suppression refers to the phenomenon that when people try to suppress a certain thought, they will think about it more frequently later on. It was first documented by Wegner and colleagues in their 'white bear' experiments (Wegner, Schneider, Carter & White, 1987; experiment 1 and 2). The general outline of this experiment was as follows: normal Ss were assigned to one of two groups. The first group was an initial suppression group. Ss in this group were instructed to suppress the thought of a 'white bear' for a 5 min period. Following this, Ss were given expression instructions, i.e. they were invited to think about the white bear during a 5 min period. In the second group termed the initial expression group, the order of instructions was reversed. That is to say, initial expression Ss first engaged in expression and later in suppression. All Ss were asked to ring a bell whenever the thought of a white bear occurred to them. Wegner and associates found that Ss report a heightened frequency of white bear thoughts during expression when they have previously been engaged in suppression. Wegner (1988, 1989) argues that this rebound effect of thought suppression represents a laboratory model for the etiology of real life obsessions: suppression of a thought would promote the subsequent occurrence of this thought in the stream of consciousness. In accordance with this, clinical studies have shown that abnormal obsessions are accompanied by an urge to resist ('supress') obsessive thought (e.g. Rachman & de Silva, 1978; study 2).

Although several investigators replicated the rebound effect (Clark, Bull & Pape, 1991; Wegner, Schneider, Knutson & McMahon, 1991; but see Merckelbach, Muris, van den Hout & de Jong, 1991) the parallel between the rebound effect and real life obsessions is far from perfect. Firstly, in most thought suppression studies, Ss were asked to suppress an irrelevant, non-emotional thought-item (Wegner et al., 1987: 'white bear'; Clark et al., 1991: 'Emma and the green rabbit'). Yet, clinical studies (e.g. Rachman & Hodgson, 1980) indicate that obsessions mostly concern religious, sexual or aggressive themes, i.e. emotional topics. In their retrospective study, Muris and Merckelbach (1991) found data to suggest that suppression of emotional material produces strong rebound effects. The normal Ss (n = 20) in this study read a transcription of Freud's Ratman obsession. Half of the Ss were then instructed to suppress all thoughts about this transcription, while the other half were given no instructions. After 1 week, Ss were interviewed about the frequency of thoughts concerning the transcription that they had had in the past week. Ss who had been engaged in suppression reported more 'intrusions' than control Ss. The question arises whether under more formal test conditions, emotionality can be shown to potentiate the paradoxical effects of thought suppression.

Secondly, some authors (e.g. Lavy & van den Hout, 1990) have argued that the important thing about suppression is its immediate counterproductive effect rather than a subsequent rebound effect. In line with this suggestion are experimental data showing that thought suppression can produce an immediate enhancement of the to be suppressed target item (Lavy & van den Hout, 1990; but see Clark et al., 1991). As the rebound effect is tied to a highly specific order of manipulations (suppression followed by expression), it can be argued that this effect is more difficult to incorporate in a clinical theory of obsessions than the initial enhancement effect.

Thirdly, an important characteristic of obsessions is their discomfort-eliciting nature, which is reflected in all sorts of psychophysiological measurements (e.g. Rachman & Hodgson, 1980). A previous study by Merckelbach et al. (1991) has shown that suppression results in an immediate and stable increase of intrusion-related electrodermal fluctuations. A replication of this would indicate that effects of thought suppression are accompanied by heightened arousal, a finding that would strengthen the parallel between these effects and abnormal obsessions.

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With these issues in mind, the present laboratory study was conducted. More specifically, the following questions were addressed: (1) Does thought suppression result in an immediate enhancement and/or a rebound effect of the to-be-suppressed material and, most importantly, what is the role of emotionality (of the to-be-suppressed material) in this context? (2) Does suppression result in intrusion-linked electrodermal activity?

**METHOD**

**Subjects**

Ss were 53 undergraduate students (32 women). Their mean age was 21.8 yr (range: 18–27 yr). They were offered a small financial reward.

**Apparatus and assessment**

Skin conductance was measured with two Beckman Ag-AgCl electrodes (8 mm dia) that were fastened to the medial phalanges of the S’s second and third finger (non-dominant hand). The electrodes were connected to a Beckman Skin Conductance Coupler (type 9844). Respiration was measured with a strain gauge fastened around the S’s chest. The strain gauge was connected to a Beckman Voltage/Pulse/Pressure Coupler. Both skin conductance and respiration were continuously recorded on paper (5 mm/sec) by a Beckman Polygraph (type R 711). Ss held a Beckman event marker in their dominant hand. They were instructed to push the button of the event marker whenever thoughts about the story (see below) came to their minds. The event marker was connected to the polygraph chart.

**Design**

A 2 (emotionality) × 2 (instruction) factorial design was used, with both factors being between-Ss factors. For statistical analyses, a time factor (‘phase’; with three levels) was added. The emotionality factor refers to the fact that one group of Ss was confronted with emotional material, while the other group was confronted with neutral material. The instruction factor pertains to the (initial) instructions that were given to the Ss. Half of the Ss received suppression instructions, while the other half received expression instructions (see below). Thus, there were four groups: a suppression-emotional group (n = 14), a suppression-neutral group (n = 13), an expression-emotional group (n = 13), and an expression-neutral group (n = 13). As each S began with either a suppression or an expression phase which was then for all Ss followed by two expression phases, a three level time factor was included in the analysis.

**Procedure**

Each S was run through the procedure individually. Ss were seated in a chair that was placed in a quiet laboratory room. After the electrodes and respiration belt had been attached, the Ss were left alone for about 3 min. During this period the experimenter calibrated the recording apparatus and took a baseline measurement of spontaneous fluctuations. Then the experimenter re-entered the room and the experiment proper started. The experiment consisted of three phases. In the first phase, each S was confronted with either an emotional or a neutral story which he/she had to read twice. Ss were explicitly asked to identify themselves with the main character of the story. The emotional story was taken from Wenzlaff, Wegner and Roper (1988, p. 884). The main character in this story is responsible for an accident in which a baby dies. The non-emotional version of this story* had the same length and grammatical structure, but emotional words and phrases were replaced by neutral elements. Having read the story, Ss were asked to rate the emotionality of the story on a 8 cm visual analogue scale (VAS) (0 = ‘not at all emotional’; 8 = ‘very emotional’). Next, the Ss received instructions. One group was told to suppress all thoughts about the story for a 5 min period: “In the next 5 min think about something you like. There is one exception: please, try not to think about the story that you just read. Every time a thought about the story nevertheless occurs to you, press the button of the event marker” (see Wenzlaff et al., 1988). The other group received (?liberal’) expression instructions: “In the next 5 min think about anything you like. You might think about the story that you just read, but you don’t have to. Every time you happen to think about the story, press the button of the event marker” (see Merckelbach et al., 1991). After 5 min, all Ss were asked to indicate on a VAS to what extent they had tried to suppress thoughts about the story (0 = ‘not at all; 8 = ‘very much’). These VAS scores provided a manipulation check on the instructions given to the Ss. A 5 min expression phase (phase 2) followed during which Ss were free to think or not to think about the story they had previously been reading. Ss were told that if they had thoughts about the story, they should use the marker. The next stage consisted of a distraction task (i.e. looking at neutral slides) which lasted for approx. 20 min. Ss were informed that this task had nothing to do with the story they had been reading. The final phase (phase 3) consisted of a 5 min expression period during which Ss were, again, told that they were free to think or not to think about the story and that they should use the marker if they happened to think about the story. Finally, Ss were debriefed and paid.

**Response definition and analyses**

The number of target thoughts (i.e. thoughts about the story) was measured by counting event marks on the polygraph chart. For each phase, target thoughts were summed. To normalize the data distribution, the summed scores were square-root transformed (Wegner et al., 1987). Differences between the groups were evaluated by 2 (instruction) × 2 (emotionality) × 3 (phase) analyses of variance (ANOVAs).

Electrodermal data were measured in microhmo and scored by hand. The number of nonspecific skin conductance responses (NSCRs) were counted. NSCRs refer to electrodermal deflections that are elicited by covert processes rather than external stimuli. Recent research shows that there is a close connection between the saliency of cognitions and concerns on the one hand and the occurrence of NSCRs on the other hand (Nikula, 1991). An electrodermal fluctuation was regarded as a NSCR when it exceeded the value of 0.05 μV within 2 sec and when it was not caused by respiratory irregularities. A NSCR was regarded as related to a target thought when it occurred within 5 sec prior to the event marker. NSCRs which began 1–5 sec after a target thought were disregarded because they probably reflect motor activity. In all other instances, NSCRs were considered as ‘unrelated’ NSCRs. Percentage of target thoughts preceded by a NSCR were computed and evaluated by 2 (emotionality) × 2 (instruction) × 3 (phase) ANOVA. Furthermore, the number of NSCRs during baseline was evaluated to examine whether there were pre-experimental differences between the groups.

*Available from the first author.
Fig. 1. Mean number of target thoughts per phase for the four groups.

Table 1. Percentages of target thoughts preceded by a nonspecific skin conductance response (NSCR) (standard deviations are given in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppression—emotional (n = 7)</td>
<td>32.6 (30.1)</td>
<td>33.5 (45.9)</td>
<td>36.3 (42.7)</td>
</tr>
<tr>
<td>Suppression—neutral (n = 12)</td>
<td>43.3 (38.4)</td>
<td>32.3 (38.8)</td>
<td>24.4 (35.3)</td>
</tr>
<tr>
<td>Expression—emotional (n = 9)</td>
<td>54.3 (27.3)</td>
<td>39.8 (28.5)</td>
<td>12.1 (22.5)</td>
</tr>
<tr>
<td>Expression—neutral (n = 7)</td>
<td>27.1 (30.3)</td>
<td>41.6 (36.2)</td>
<td>16.4 (21.7)</td>
</tr>
</tbody>
</table>

RESULTS

Manipulation checks
A t-test performed on the VAS scores showed that Ss, indeed, rated the emotional story as more emotional than the neutral version,* the means being 5.6 (SD = 2.0) and 3.3 (SD = 1.7), respectively [t (47) = 4.3, P < 0.01]. Furthermore, initial suppression Ss indicated that they had tried harder to suppress target thoughts than initial expression Ss, the means being 5.9 (SD = 3.6) and 3.6 (SD = 2.6), respectively [t (51) = 3.3, P < 0.01]. Consequently, it can be concluded that both manipulations (i.e. emotional impact of the story, and suppression vs expression instructions) were successful.

Target thoughts
Figure 1 shows the mean number of target thoughts of the four groups during the three phases of the experiment. To examine whether there was an initial enhancement effect (i.e. more target thoughts in the suppression condition than in the expression condition), a 2 (initial instruction) × 2 (emotionality) ANOVA was carried out on the frequency of target thoughts during the first phase. This ANOVA yielded no significant main effects of instruction or emotionality (both Fs < 1). There was a marginally significant interaction of instruction with emotionality [F(1,49) = 2.7, P = 0.10] caused by the lower frequency of target thoughts in the expression-neutral group. The suppression-neutral group had significantly more target thoughts than the expression-neutral group [t (25) = 2.5, P < 0.02, one-tailed]. As can be seen in Fig. 1, such an initial enhancement effect was absent in the emotional groups.

In order to explore whether there were rebound effects of suppression (i.e. increased frequency of target thoughts in the suppression groups during the second and third phase, a 2 (initial instruction) × 2 (emotionality) × 3 (phases) ANOVA was carried out, with the last factor being a repeated measure. This ANOVA revealed no main effects of emotionality or initial instruction (both Fs < 1). However, there was again a marginally significant interaction between emotionality and initial instruction [F(1,49) = 4.0, P < 0.06], due to the fact that the expression-neutral group reported less target thoughts during the first two phases of the experiment than the other three groups (which displayed highly comparable curves). The only other effect reaching significance was a main effect of trials [F(2,98) = 14.3, P < 0.001], which was caused by an overall decline of target thoughts over time. Thus, the interaction effect of instruction with trials was not significant, which means that there were no convincing rebound effects.

Electrodermal data
Due to apparatus failure, the records of 6 Ss had to be excluded from the data analysis. Furthermore, 12 Ss were excluded because they reported no target thoughts during one of the three phases and, consequently, no percentage of related NSCRs could be calculated. The remaining sample contained 35 Ss. There were no group differences in baseline fluctuations.

Table 1 shows the percentage of target thoughts that were preceded by a NSCR for the four groups. A 2 (instruction) × 2 (emotionality) ANOVA performed on the related NSCRs during phase 1 showed that there was no initial enhancement effects (all Fs < 1). A 2 × 2 × 3 ANOVA revealed that there were no main effects of emotionality and initial instruction (both Fs < 1). Although during the last (expression) phase, the initial expression groups had a smaller percentage of thoughts preceded by a NSCR (‘related NSCRs’) than the initial suppression groups, this (‘rebound’) interaction did not reach significance [F(2,64) = 2.0, P = 0.15].

DISCUSSION

The VAS data presented above showed that the emotional story was evaluated as more emotional than the neutral story. Moreover, Ss in the suppression condition, indeed, reported more often that they had avoided the target thought than

*Due to procedural errors, the VAS scores of four Ss had to be excluded.
expression Ss. There was also a ‘rebound effect’ in the sense of Wegner et al. (1987; experiment 1) in that suppression-neutral Ss reported more target thoughts during phase 2 than expression-neutral Ss during phase 1. Still, the present study found no evidence to suggest that suppression of emotional material produces stronger rebound effects of target items than the suppression of neutral material. In fact, there was no rebound effect in the strict sense of the word (i.e. increased thought frequency subsequent to suppression) and suppression of emotional material, suppression of neutral material, and expression of emotional material resulted in highly comparable short-term (phase 2) and long-term (phase 3) effects. It was the frequency of target items in the expression-neutral group that deviated from the frequencies in all other groups.

As to the immediate effects, we found clear evidence that, with neutral material, efforts to suppress have the paradoxical effect of increasing the incidence of the target thoughts. However, no such effect occurred in the group suppressing emotional material. Thus, the data suggest that the immediate enhancement effect is limited to situations in which suppression is directed at neutral material. Note that this suggestion is in accordance with the findings of Lavy and van den Hout (1990) who reported immediate enhancement when Ss were instructed to suppress thoughts about a neutral category, namely ‘vehicles’. Why would thought suppression produce immediate enhancement in some studies but not in others? In the absence of controlled data we can only speculate. Assume that the likelihood of consciously thinking about a cue is mainly determined by the saliency of that cue and that saliency of the cue, in its turn, is determined by a range of factors like its emotionality, liveliness, colourfulness, novelty, its isolation (i.e. not being embedded in a series of comparable cues) etc. Let us finally assume that efforts to suppress a thought also acts to increase the saliency of the cue. In cases of highly salient cues, Ss would think pretty much about the cue, even in the absence of thought suppression instructions. Thought suppression instructions may not produce extra intrusions because of ceiling effects: saliency was already high because of other factors. Ss who are presented with salient cues did not tend to dwell about them. But if a thought suppression instruction is given, saliency increases and more intrusions will be present than in a group not suppressing thoughts about the insalient cue. Note that the Ss from the Clark et al. (1991) study and from the present ‘emotional’ condition were suppressing salient cues and did not show initial enhancement. However, Ss from the Lavy and van den Hout (1990) study and from the present ‘neutral’ condition suppressed a non-salient cue and did experience initial enhancement. Thus, while the account in terms of saliency is post hoc, it covers the existing findings.

In a previous study (Merckelbach et al., 1991), it was reported that suppression results in higher intrusion-linked electrodermal activity (NSCRs) than expression. The data presented provide only weak support for this phenomenon. It is tempting to speculate how the data relate to real life obsessions or intrusive images experienced by PTSD-patients. However, before extrapolation from the lab to the clinic can be expected to be fruitful we should have a good grasp of the laboratory phenomena. At present we have not. Thought suppression has paradoxical effects; it backfires on the suppressing S. We do not know under what conditions backfiring takes the form of initial enhancement or rebound. We do not know how thought suppression affects idiosyncratic themes. The issues are empirical and can be properly resolved. Whether the enterprise proves clinically worthwhile can only be established after it has been undertaken.

REFERENCES


