



PERGAMON

Behaviour Research and Therapy 39 (2001) 1163–1181

**BEHAVIOUR
RESEARCH AND
THERAPY**

www.elsevier.com/locate/brat

Suppression of obsession-like thoughts in nonclinical individuals: impact on thought frequency, appraisal and mood state

Christine Purdon ^{a,*}, David A. Clark ^b

^a *University of Waterloo, Department of Psychology, Waterloo, Ontario, Canada N2L 3G1*

^b *University of New Brunswick, Department of Psychology, New Brunswick, Canada*

Accepted 20 September 2000

Abstract

Wegner's (1994, *Psychological Review*, 101, 34–52) research on the paradoxical effect of thought suppression has been incorporated into contemporary cognitive-behavioural models of obsessive-compulsive disorder. However, findings on the effects of thought suppression on thought frequency have been inconsistent and few studies have actually examined the suppression of thoughts that are obsessional in nature. In the present study 219 nonclinical participants were randomly assigned to suppress or not suppress a neutral, obsessional or positive thought during an initial monitoring interval. In a second thought monitoring interval, all participants received instructions not to suppress their target thought. No paradoxical effect of suppression on frequency was observed for any type of thought, although suppression of obsessional thoughts was associated with greater subsequent discomfort and a more negative mood state than suppression of positive or neutral target thoughts. © 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Thought suppression; Obsessional thoughts; Intrusive thoughts

1. Introduction

Wegner, Schneider, Carter and White's (1987) investigation of the ironic effects of deliberate thought suppression has had a significant impact on cognitive-behavioural models of disorders characterized by the persistent recurrence of unwanted thoughts. Wegner et al. (1987) found that participants instructed to suppress thoughts about "white bears" had more frequent thought occur-

* Corresponding author. Tel.: +1-519-888-4567, ext. 3912; fax: +1-519-746-8631.
E-mail address: clpurdon@watarts.uwaterloo.ca (C. Purdon).

rences in a later thought expression interval compared to participants who expressed white bear thoughts prior to suppressing them. Other studies have found a close link between suppression and mood, such that negative thoughts are more difficult to suppress when mood is negative (e.g., Wenzlaff, Wegner & Roper, 1988; Wenzlaff, Wegner & Klein, 1991). Wegner and his colleagues proposed that this “rebound” effect of suppression results from the association of the “to-be-suppressed” material with internal and external distracters used to facilitate suppression which become cues for the previously suppressed material during and after suppression efforts have ceased.

One obvious application of this research is to the understanding obsessive-compulsive disorder (OCD), which is characterized by the persistent recurrence of unwanted thoughts that are actively resisted. Leading cognitive-behavioural theories of OCD indeed implicate thought suppression as an important factor in thought persistence. Salkovskis (1985, 1989, 1996, 1998) argued that obsessional thoughts give rise to wilful suppression efforts because they activate a highly aversive sense that one has become, or may become, responsible for harm to oneself or others. However, such attempts are bound to fail, as per Wegner’s model. Furthermore the persistence of thoughts will have a negative impact on mood, which in turn will make the negative obsessional thoughts more accessible, and will prime negative appraisal of the thoughts. Rachman (1997, 1998) argued that obsessional thoughts escalate because they are interpreted as having catastrophic personal significance. Interpretations of significance lead to greater efforts to control the obsession but such efforts will backfire (again, as per Wegner), resulting in an increase in frequency and negative mood. Negative mood will in turn enhance the negative interpretation of the thought, thereby increasing control efforts. Clark and Purdon (Clark, 1989; Clark & Purdon, 1993; Purdon & Clark, 1999) have elaborated on these ideas, suggesting that individuals vulnerable to developing obsessional problems may believe that obsessional thoughts are evidence that undesirable personality characteristics exist and that their thoughts can and should be controlled. Failures in thought control are thus experienced as devastating and lead to a more negative mood state which in turn further reduces thought controllability.

Thought suppression, then, has been given a central place in cognitive-behavioural models of OCD. However, empirical support for the role of suppression in the persistence of thoughts has been mixed, with some studies replicating Wegner’s delayed “rebound” effect, other studies finding an immediate effect of suppression, and other studies finding no effect of suppression on thought frequency at all [see Purdon (1999) and Purdon & Clark (2000) for a comprehensive review]. Furthermore, although the thought suppression paradox has its most obvious application to OCD, very few studies have actually examined the suppression of thoughts that are obsessional in nature. The relationship between obsessionalism and suppression of nonobsessional thoughts has been studied (e.g., Smári, Sigurjónsdóttir & Sæmundsdóttir, 1994), but as Salkovskis (1996) has convincingly argued, obsessional problems are not associated with general deficits, but rather with difficulties associated with one or two thoughts in particular. Thus, our understanding of the role of suppression in OCD is likely best advanced by studies of the suppression of obsessional thoughts exclusively.

Several studies have examined the suppression of obsessional thoughts, but again, findings have been mixed. For example, Smári, Birgisdóttir and Brynjólfsdóttir (1995) observed no paradoxical effect of suppression on thought frequency, although there was some indication that participants higher in obsessional symptomatology had more target thoughts during suppression. Kelly and

Kahn (1994) used a crossover design to examine suppression vs expression (i.e., active generation) of neutral (“white bear”) thoughts as compared to suppression vs expression of “intrusive”, or normal obsessional thoughts. Suppression of neutral thoughts was associated with a later increase in thought frequency (i.e., a rebound effect), with heightened subjective distress, and a greater perceived loss of control over one’s thoughts. However, suppression of intrusive thoughts was not associated with paradoxical effects on frequency and subsequent distress. Rutledge (1998) asked participants to express a target thought during a baseline monitoring interval, suppress it during a second interval, and then express it again during a third interval. No effect of suppression on thought frequency was observed either during or after suppression, relative to the baseline first interval. Obsessionality was associated with greater thought frequency during suppression for women, but not for men. Finally, McNally and Ricciardi (1996) presented participants with a list of examples of thoughts reflecting the various themes of obsessions and asked them to identify one that they had previously experienced. Suppression of obsessional vs neutral thoughts was compared using a crossover design. No effect of suppression was observed although there was a marginally significant tendency for the obsessional thought to occur more often after suppression whereas neutral thoughts tended to occur less frequently after suppression.

Although the findings from these studies consistently revealed no suppression effect on frequency of obsessional thoughts, the implications of the findings for understanding OCD may be limited by methodological issues. In the first three studies, it is unclear whether the target thoughts examined actually represented obsessional thoughts because participants simply reported on thoughts that were distressing. One difficulty in assessing obsessional thoughts in nonclinical samples is ensuring that the participants are reporting on thoughts that have actual obsessional content, and are not representative of common worries. Like obsessional thoughts, worries are distressing, but they are far more common and more readily accessible to nonclinical individuals. Indeed, in the examples of target thoughts reported by Kelly and Kahn (1994) and by Rutledge (1998), the thought content appears to be more typical of worry (e.g., thoughts about finances, health). Clark and Purdon (1995) and Clark (1999) have argued that identification of obsessional thoughts requires that the distinguishing features of obsessions (e.g., discrete, spontaneous, intrusive, repugnant, ego-dystonic) be taken into account when eliciting thought content. Use of thought expression as a control condition is also problematic if findings are to be generalized to obsessional problems because obsessions are virtually never actively generated, but rather are actively avoided [see Lavy & van den Hout (1990); Merckelbach, Muris, van den Hout & de Jong, 1991 for a discussion]. The crossover design is also problematic because it confounds suppression instructions with rehearsal of the experimental task [see D.M. Clark, Ball & Pape (1991) and Keppel (1982)]. Purdon and Clark (2000) offer a thorough review and discussion of methodological issues in applying thought suppression research to OCD.

Salkovskis offers the most ecologically valid tests of the effects of suppressing obsessional thoughts in analogue samples to date. Salkovskis and Campbell (1994) selected nonclinical participants who reported frequent and distressing obsession-like intrusions and instructed them to either monitor or monitor and suppress their most frequent obsessional thought. During the initial monitoring interval, individuals were given further instructions to either suppress by using one replacement thought as a distracter (which, according to Wegner, should reduce thought rebound compared to other suppression strategies), suppress without using distraction or suppress by completing an attentionally engaging task (a relaxation task). In a second interval, all participants

received instructions to simply monitor their thought. All suppression groups except the “attentionally engaging task” group exhibited an immediate and sustained frequency of thoughts relative to “think anything” instructions such that thought frequency was higher in both intervals for those in the “initial suppress” condition. This suggested that the insidious effects of suppression on the frequency of obsessional thoughts may have different mechanisms than those proposed by Wegner. Ratings of discomfort and unacceptability did not vary by group, except that the “attentionally engaging” group reported lower ratings than the other groups.

Trinder and Salkovskis (1994) had participants record the occurrence of obsessional thoughts over a 4 day period. One group of participants were instructed to suppress the thought whenever it occurred, a second group were instructed to actively think about the thought (a control for the enhanced salience of the thought afforded by the “suppress” instructions), and a third group simply recorded the thought occurrences. Suppression resulted in greater frequency of thought occurrences and heightened discomfort relative to actively thinking about the thought or simply recording it, whereas discomfort declined for those in the latter group. Furthermore, suppression effort was associated with greater discomfort and thought frequency. Finally, for participants instructed to suppress, discomfort over thought occurrences showed a strong correlation with a symptom measure of anxiety. Taken together, the findings from these latter two studies suggest that, at least in analogue samples, obsessional thoughts may be more difficult to suppress. Furthermore, suppression appeared to be associated with greater thought frequency, discomfort and anxiety. The findings from these two studies support Salkovskis’ (1989, 1998) contention that thought occurrences, negative appraisal, negative mood, and suppression are components of an insidious feedback loop.

Janeck and Calamari (1999) conducted the only study to date that has examined the suppression of obsessional thoughts in a clinical sample of individuals with OCD. Patients and nonclinical controls were administered a validated measure of obsessional intrusions and then instructed to monitor a selected thought from that inventory over three intervals; baseline “think anything”, “suppress” vs “think anything”, and “think anything”. There was no evidence of either a rebound or immediate enhancement effect of suppression on thought frequency overall for either the OCDs or the nonclinical controls, although a greater proportion of the OCD sample experienced a rebound after suppression than did the controls. However, even at that, 75% of the OCD sample did not experience thought rebound.

The role of deliberate thought suppression in the development and persistence of obsessional ideation thus remains unclear. As observed earlier, there are methodological problems with some studies that limit their application to understanding obsessional problems and results from studies with strong ecological validity have been inconsistent. At the same time, other issues have remained unresolved in the literature. For example, although there is evidence of a strong link between negative mood and difficulties suppressing negative thoughts (e.g., Wenzlaff et al., 1988) the relationship between mood state and suppression of obsessional thoughts has not been well-examined. Furthermore, very few studies have examined the effects of suppression on variables other than frequency, such as discomfort, unacceptability and unpleasantness. Finally, it would be interesting to examine the effects of suppressing obsessional thoughts in relation to the effects of suppressing emotionally relevant positive vs emotionally neutral thoughts. This would allow for the role of personal relevance of the target thought to be disentangled from the role of emotional valence in the effects of thought suppression.

The purpose of the present study was threefold:

1. to contribute to the existing literature on the effects of suppressing exclusively obsessional thoughts on both thought frequency and emotional reaction to the thought whilst observing the methodological recommendations forwarded by Purdon and Clark (2000);
2. to further examine the relationship between suppression of obsessional thoughts and mood state; and
3. to compare the effects of suppressing obsessional thoughts to those of suppressing emotionally relevant positive thoughts and neutral thoughts with no emotional relevance.

In this study, 219 nonclinical individuals were randomly assigned to monitor and record either a neutral thought, an emotionally relevant positive thought, or an obsessional thought across two six minute intervals. In the first interval, half of the participants were instructed to suppress their target thought whereas the others were instructed not to suppress any thoughts. In the second interval, all participants received instructions not to suppress any thoughts.

The study was guided by three hypotheses based on cognitive models of OCD and the empirical literature. First, it was hypothesized that participants instructed to suppress obsession-like thoughts would report significantly more thought occurrences during the suppression period than participants instructed to suppress neutral or positive thoughts, or controls instructed not to suppress their target thought (i.e., an immediate enhancement effect, as observed by Salkovskis), whereas those instructed to suppress neutral thoughts will experience a resurgence of thoughts after suppression efforts have ceased (i.e., a rebound effect, as observed by Wegner). Second, it was hypothesized that individuals in the suppress/obsessional group would rate their target thought as significantly more emotionally upsetting than participants suppressing neutral or positive thoughts, or the controls instructed not to suppress their target thought. The final hypothesis was that suppression of intrusive thoughts would be associated with a more negative mood state than the suppression of neutral thoughts. No predictions were made about the effects of suppressing positive thoughts due to the exploratory nature of this condition.

2. Method

2.1. Participants

The sample consisted of 59 male and 160 female ($N=219$) Introductory Psychology students with a mean age of 19.59 ($SD=3.71$) who received course credit for their participation. Individuals were randomly assigned to one of the following groups: suppress/neutral ($n=37$), suppress/positive ($n=36$), suppress/obsessional ($n=38$), nonsuppress/neutral ($n=35$), nonsuppress/positive ($n=38$), and finally nonsuppress/obsessional ($n=35$). The groups did not differ significantly in age or gender distribution.

2.2. Measures

2.2.1. Revised Obsessive Intrusions Inventory (ROII)

The OII is a 52-item self-report questionnaire that assesses the frequency of obsessional intrusive thoughts, images and impulses (Purdon & Clark, 1993; Purdon & Clark, 1994a). The Revised version is identical to the OII, except that the frequency scale was extended from four to seven-points (Purdon & Clark, 1994b). In the ROII, each thought statement is rated on a seven-point scale ranging from 0 (“I have never had this thought”) to 6 (“I have this thought frequently throughout the day”). Sample items from this inventory include “While driving I have had unacceptable intrusive thoughts of swerving into oncoming traffic”; “even though I know it’s probably not true, I have had unacceptable intrusive thoughts that I left the heat, stove or lights on which may cause a fire”; “I have had unacceptable intrusive thoughts of engaging in a sexual act that I would find completely disgusting”. The measure has demonstrated good discriminant and concurrent validity, with factor scores of the OII emerging as a significant unique predictor of obsessional symptoms but not symptoms of depression or general anxiety (Purdon & Clark, 1993; 1994a). The ROII was included to obtain a personally relevant obsessive intrusive thought for use as a target thought during the experiment.

2.2.2. Positive Automatic Thoughts Questionnaire (ATQ-P)

This 30-item self-report inventory was developed by Ingram and Wisnicki (1988) to assess deficits in positive thinking in patients exhibiting psychopathology. The ATQ-P has good psychometric properties with a moderate negative correlation with depressed mood $r = -0.49$ and anxiety $r = -0.32$ (Ingram, Kendall, Siegle, Guarino & McLaughlin, 1995). Sample items include: “I have a good sense of humour”; “I am respected by my peers”; “There’s nothing to worry about”. In the present study participants indicated which of the positive thoughts endorsed on the ATQ-P was the most pleasant. This measure was included in order to elicit an emotionally relevant positive cognition for use as a target thought in the experiment proper.

2.2.3. Mood scale

This scale consisted of 19 adjectives used by Howell and Conway (1992) to assess positive and negative transient mood states following suppression of mood congruent and incongruent thoughts. Respondents rate each adjective according to how well it describes their mood at the moment, using 15-point scales ranging from 1 (“not at all like this”) to 15 (“very much like this”). The adjectives and rating scales were presented on a computer. Howell and Conway (1992) observed that participants who underwent a positive mood induction exhibited higher scores on all mood subscales whereas those who received a negative mood induction had lower scores on all subscales. In the current study a principle components analysis with varimax rotation was conducted on the 19 mood adjectives completed at Time 1 (T1). A one-factor solution emerged with three items failing to load on the factor. A total score was then calculated by summing across the remaining 16 items so that higher scores indicated a more positive mood state. The scale had high internal consistency [α s for T1 and Time 2 (T2) were 0.88 and 0.91, respectively]. This measure was administered before and after the experiment proper in order to examine the relationship between mood state, experimental group and thought frequency.

2.2.4. Appraisal questions

Four appraisal questions, written specifically for this study, were administered after each thought monitoring interval in order to assess participants' subjective experience of the target thought. The appraisal dimensions were discomfort, pleasantness, acceptability, and responsibility for having the thought. A fifth question asked participants how hard they tried to get rid of the thought during the interval. This was included as both a measure of suppression effort and as a manipulation check. Appraisals were assessed with 100 mm visual analogue scales ranging from "0" ("not at all") to "100" ("extremely").

2.3. Procedure

Participants began the experiment by first completing the ROII, the ATQ-P and the Mood Scale (the latter was administered by computer). They then took part in a 2 minute thought-monitoring practice task during which they monitored and recorded thoughts about a coat rack. Instructions for the practice task were identical to those for the nonsuppress groups (see below), substituting the word "coat rack" for the target thought. Thought occurrences were recorded by pressing the computer mouse.

Following the practice task, participants were presented with a cue card containing their assigned target thought, which was either:

1. a positive target thought (most pleasant positive thought as reported on the ATQ-P);
2. an obsessional target thought (most upsetting intrusive thought as reported on the ROII), or
3. a neutral target thought ("white bears"). Participants were instructed to imagine a scene involving their target thought for a 30 second interval.

Following this priming task, participants rated how vividly they had imagined the thought and how difficult it was to make themselves imagine the thought (validity check of the priming task). They were then administered the thought appraisal ratings for the first time.

Participants were then given the experimental instructions for the first thought monitoring interval. These instructions were based on Salkovskis and Campbell (1994). The suppression groups were instructed that they could think anything they liked, but that they were to try as hard as they could to suppress their target thought, recording thought occurrences should they happen anyway. In the nonsuppress groups participants were given instructions to think anything they liked, but to *not* suppress any thoughts, including their target thought, and to record all target thought occurrences. Explicit "do not suppress" instructions were given in order to discourage participants from engaging in spontaneous suppression attempts [see Purdon & Clark (2000), for a discussion]. As in the practice interval, individuals were seated at the computer facing a blank screen. In order to keep participants focused on the experimental task and prevent boredom or daydreaming they were given a simple vigilance task to perform simultaneously with thought monitoring. On an average of every 6 seconds, either a letter or a number (1:3 ratio of letters to numbers) appeared in the centre of the screen and participants were instructed to press the space bar whenever a letter appeared, but that reaction time was not important. This task was designed to be of minimal difficulty. Participants were introduced to the vigilance task during the practice interval.

After the 6 minute suppress or nonsuppress interval, participants were administered the thought appraisal ratings for a second time and were asked to rate their suppression effort on a 100 mm VAS. If participants did not have the target thought at least once during the interval, they only provided suppression effort ratings. Individuals then monitored and recorded their target thought during a second 6 minute interval. This time all participants were given the “think anything you like, but do not suppress any thought” instructions. After this second interval, the thought appraisal and suppression effort ratings were administered for a third time. The mood scales were re-administered. Participants in the Suppress groups were then interviewed about the suppression strategies they had used during the experiment. After this, individuals were debriefed and thanked for their participation in the study.

3. Results

3.1. Preliminary analyses

There were no significant group differences on the ROII, ATQ-P or T1 Mood Scale, indicating that random group assignment had been achieved. The overall means for the ROII and ATQ-P were within the expected range for a university sample. There was significant variability in the range of intrusions identified by participants as being their most upsetting, with the maximum endorsement for any one thought being ca. 10%. The four most frequently reported upsetting intrusive thoughts were:

1. unwanted, unacceptable thoughts of engaging in a sexual act that goes against one’s sexual preference;
2. unwanted, unacceptable thoughts of self-harm;
3. unwanted, unacceptable thoughts of having left the stove, heat or lights on and thereby caused an accident; and
4. unwanted, unacceptable thoughts of having sex with someone who is repugnant.

The top four most pleasant positive thoughts were:

1. There are many people who care about me;
2. I have friends who support me;
3. I will be successful; and
4. I’m fun to be with.

The rates of endorsement of these top four ranged from 27% to 5.5%.

Analyses of variance were conducted on each thought appraisal item administered after the visualization task, as well as the two items assessing the effectiveness of the prime (vividness and difficulty imagining the thought). Bonferroni adjustment for Type I error resulted in an alpha level of 0.01, and post hoc tests were conducted using Student Newman–Keuls tests. These analyses revealed that the obsessive intrusive group rated their thought as more discomforting [$F(2, 215)=153.16, p<0.001$], more unpleasant [$F(2, 215)=17.02, p<0.001$], more unacceptable [$F(2,$

215)=72.91, $p<0.001$] and more difficult to imagine [$F(2, 215)=15.91$, $p<0.001$] than did the neutral or positive groups. Those in the positive group rated their target thought as more pleasant than the neutral and obsessive intrusive groups [$F(2, 215)=17.02$, $p<0.001$]. These data indicated that, as intended, the assigned target thoughts represented positive, neutral and negative stimuli to participants. Participants in the obsessive intrusive group reported having less vivid images of their target thought during the priming task than the other two groups [$F(2, 216)=4.34$, $p<0.01$].

The next analysis was conducted to determine whether participants complied with the experimental instructions to suppress or not suppress. Means and standard deviations of the suppression effort scores across group and experimental interval are presented in Table 1. A 2 (Suppression Group)×3 (Target Thought Group)×2 (Interval, within subjects factor) repeated measures analysis of variance on suppression effort ratings was then conducted. There was a significant Target Thought Group×Suppression Group×Interval interaction [$F(2, 213)=4.63$, $p<0.011$]. Post hoc analyses following the principles of Fisher's protected tests were then conducted. In this procedure, tests of simple main effects are conducted using the same alpha level as used to determine the significance of the main effect or interaction (see Cohen & Cohen, 1983). Within interval 1, there was a significant interaction of target thought group×suppression group [$F(2, 213)=7.13$, $p<0.001$]. Post hoc analyses revealed that the suppress group had significantly higher suppression effort ratings than the nonsuppress group [$F(1, 217)=66.59$, $p<0.001$]. However, suppression effort scores within the nonsuppress groups varied according to target thought, which accounted for the two-way interaction within this interval. Analysis of simple main effects revealed that the nonsuppress/obsessional group had significantly higher suppression effort ratings than those in the nonsuppress groups assigned a neutral target thought [$F(1, 213)=14.08$, $p<0.001$] or a positive target thought [$F(1, 213)=33.06$, $p<0.001$]. Nonetheless, the suppression effort scores for the nonsuppress/obsessional group were significantly lower than those of their suppress/obsessional group counterparts [$F(1, 213)=3.93$, $p<0.05$]. In Interval 2 there was no target thought group×suppression group interaction and no significant main effect of suppression group. Thus,

Table 1
Means and standard deviations of suppression effort across experimental groups and intervals^a

Group	Interval 1		Interval 2	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Suppress</i> ^b				
Neutral	74.73	23.69	26.41	28.48
Positive	71.47	30.00	23.67	23.36
Intrusive	75.24	23.46	38.71	31.33
<i>Nonsuppress</i> ^b				
Neutral	38.63	30.70	39.77	32.89
Positive	26.53	28.62	25.00	28.10
Intrusive	62.74	24.38	46.49	30.10

^a Note: *n* per group ranges from 35 to 38.

^b "Suppress" and "Nonsuppress" refer to Interval 1 instructions; in Interval 2 all participants received the "Do not suppress" instructions.

suppression effort ratings in Interval 2 were equivalent across the suppress and nonsuppress groups. However, there was a main effect of target thought group [$F(2, 213)=7.19, p<0.001$] such that the obsessional thought group had higher scores than those in the neutral and the positive thought groups [$F(1, 213)=14.38, p<0.001$]. These findings indicated that, in general, participants complied with the experimental instructions to suppress or not to suppress their target thought.

3.2. Effects of suppression on thought frequency

The first hypothesis predicted that participants in the suppress/obsessional group would experience an immediate and sustained resurgence of target thoughts relative to all other groups (i.e., an immediate enhancement effect), whereas those in the suppress/neutral group were expected to have fewer thoughts during the first interval and more target thought occurrences than the nonsuppress groups in the second interval (i.e., a rebound effect).

Table 2 presents the means and standard deviations on the frequency of target thoughts during the first and second monitoring intervals for the six experimental groups. In order to understand the effect of the experimental manipulation on thought frequency across intervals a 2 (suppression group) \times 3 (target thought group) \times 2 (interval, within Ss factor) repeated measures analysis of variance was conducted on thought frequency. A significant target thought group \times suppression group \times interval interaction was observed [$F(2, 212)=5.69, p<0.004$]. This interaction is presented in Fig. 1.

Analysis of Interval 1 thought frequency revealed a significant target thought group \times suppression group interaction [$F(2, 212)=8.27, p<0.001$]. Analyses of simple main effects revealed that the nonsuppress/neutral group had significantly more thoughts than the suppress/neutral group [$F(1, 212)=29.84, p<0.001$]. Similarly, those in the nonsuppress/positive group reported significantly more thoughts than those in the suppress/positive group [$F(1, 212)=8.13, p<0.01$]. When intrusive thought frequency was compared across the suppress and nonsuppress obsessional groups, however, no significant difference was observed, thereby accounting for the interaction.

Table 2
Means and standard deviations of thought frequency by Interval and Experimental groups^a

Group	Interval 1		Interval 2	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Suppress</i> ^b				
Neutral	9.14	9.37	10.68	11.91
Positive	7.72	5.84	10.44	10.13
Intrusive	6.47	5.54	4.61	6.01
<i>Nonsuppress</i> ^b				
Neutral	20.46	15.33	12.91	10.00
Positive	13.55	8.23	8.97	7.08
Intrusive	5.88	3.46	2.71	2.36

^a Note: *n* per group ranges from 34 to 38.

^b “Suppress” and “Nonsuppress” refer to Interval 1 instructions; all participants received the “Do Not Suppress” instructions in Interval 2.

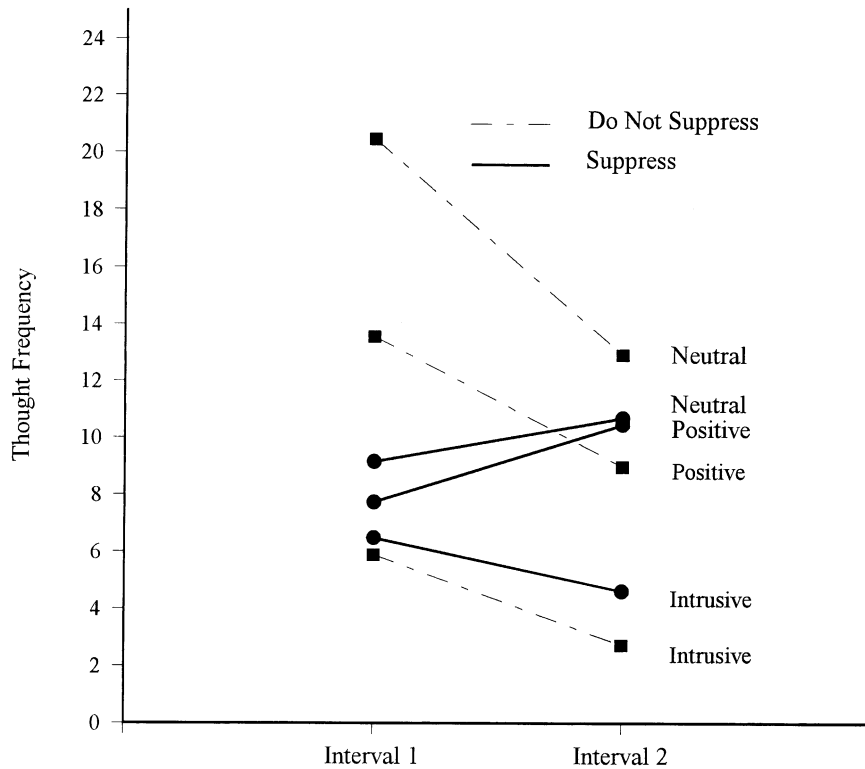


Fig. 1. Number of thought occurrences by experimental group and interval.

Examination of changes in reported thought frequency across interval revealed a significant decline for all nonsuppress groups from interval 1 to interval 2 [$F(1, 212)=39.77, p<0.001, F(1, 212)=15.91, p<0.001$ and $F(1, 212)=6.85, p<0.01$ for the neutral, positive and obsessional groups, respectively]. The suppress groups showed no significant change in thought frequency from interval 1 to interval 2. Examination of reported thought frequency within Interval 2 revealed a main effect of target thought group only [$F(2, 212)=18.98, p<0.001$]. Thus, thought frequency within target thought groups did not vary according to suppression group. Analyses of the main effect of target thought group revealed that the obsessional group had significantly fewer thoughts in interval 2 ($M=3.66, SD=4.18$) than either the positive group ($M=9.40, SD=7.50, F(1, 212)=18.14, p<0.001$) or the neutral group ($M=11.79, SD=10.96, F(1, 212)=35.892, p<0.001$)¹.

These analyses did not support the first hypothesis. There was no evidence of an immediate enhancement effect or rebound effect for any type of thought, although prior suppression of target thoughts did result in sustained levels of the target thought during the subsequent monitoring interval for all suppress groups (whereas frequency declined for all nonsuppress groups).

¹ In order to determine whether these results would differ if we controlled for compliance with the experimental instructions, the analysis was repeated, this time excluding participants from the nonsuppress groups who scored in the top 30th percentile on suppression effort. The results were identical to the previous analysis.

3.3. Suppression and thought appraisal

To determine whether suppression would interfere with emotional response to thoughts, a 2 (suppression group)×3 (target thought group)×2 (T1 vs T2) repeated measures analysis of variance was conducted on discomfort ratings. Participants who did not report at least one target thought occurrence during interval 1 or interval 2 did not make appraisal ratings after those intervals ($n=27$), and so were excluded from the analysis, as were others who had missing data ($n=2$). These participants were evenly distributed across groups. Two multivariate outliers were also excluded, leaving a final total $N=188$ ². Means and standard deviations of the discomfort ratings across experimental groups are presented in Table 3. Significant main effects of target thought group [$F(2, 182)=28.22, p<0.001$] and interval were observed [$F(1, 182)=21.54, p<0.001$], but there was also a significant interaction of interval with target thought group [$F(2, 182)=7.05, p<0.001$], and an interaction of suppression group with interval [$F(1, 182)=5.43, p<0.02$]³. These interactions were qualified by a three-way interaction of target thought group, suppression group and interval [$F(2, 182)=9.13, p<0.001$]. Post hoc analyses revealed that discomfort scores for the suppress/obsessional group were not significantly different from the nonsuppress/obsessional group after the first interval [$F(1, 182)=0.93, p<0.34$], but that there was a significant decline in discomfort scores for both the suppress/obsessional [$F(1, 182)=4.02, p<0.05$] and nonsuppress/obsessional groups [$F(1, 182)=25.95, p<0.001$] from interval 1 to interval 2. However, after the second interval, the suppress/obsessional group ratings of discomfort were significantly *higher* at interval 2 than those of their nonsuppress/obsessional counterparts [$F(1, 182)=9.87, p<0.002$].

Table 3
Means and standard deviations of “Discomfort” ratings across Experimental groups^a

Group	Interval 1 Discomfort		Interval 2 Discomfort	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Suppress</i>				
Neutral	19.66	23.48	9.97	16.42
Positive	25.70	28.09	10.23	14.54
Intrusive	52.54	29.97	43.89	31.09
<i>Nonsuppress</i>				
Neutral	11.17	17.19	21.14	25.94
Positive	18.05	22.67	18.05	23.35
Intrusive	46.04	27.35	24.86	19.42

^a Note: $N=188$, with exclusion of two outliers and participants who did not report a single thought occurrence during either interval 1 or interval 2 and subsequently not able to give “Discomfort” ratings. Higher ratings reflect higher discomfort. Cell ns range from 26 to 37.

² Examination of the outlying cases revealed that for both, Time 1 discomfort scores were extremely high (i.e., greater than three standard deviations above the mean and quite discontinuous), whereas Time 2 discomfort ratings were average. Because these cases were so clearly different from the rest of the sample and the distribution of scores in each cell containing these cases was otherwise normal, deletion rather than transformation was selected as a means of removing their undue influence.

³ When the multivariate outliers were included in the analysis, this two-way interaction was not significant [$F(1, 184)=2.11, p=0.24$].

The discomfort scores in the suppress/neutral group and the suppress/positive group were not different from their respective nonsuppress counterparts after interval 1, and declined significantly from interval 1 to interval 2 [$F(1, 182)=14.83, p<0.001$ and $F(1, 182)=6.21, p<0.01$, respectively], whereas discomfort scores for the nonsuppress/neutral scores increased [$F(1, 182)=7.19, p<0.01$]. After interval 2, discomfort scores for the suppress/neutral group were significantly lower than those for the nonsuppress/neutral group [$F(1, 182)=4.08, p<0.05$]. Discomfort scores for the nonsuppress/positive group were not significantly different from their suppress/positive counterparts after either interval.

A 2 (suppression group) \times 3 (target thought group) \times 2 (interval; within Ss factor) analysis was then conducted on participants' ratings of unpleasantness associated with the target thought at intervals 1 and 2. The total N for this analysis was 190. A significant main effect of target thought group emerged [$F(2, 184)=57.54, p<0.001$], but no other main effects were observed, nor were there any interactions. Post hoc analyses revealed that overall, the obsessional group rated their target thought as being more unpleasant ($M=66.82, SD=21.96$) than did the positive group [$M=29.13, SD=27.34; F(1, 184)=59.62, p<0.001$] and the neutral group [$M=40.04, SD=25.69; F(1, 184)=49.30, p<0.001$].

Unacceptability ratings were similarly examined ($N=190$). A main effect of target thought group was observed [$F(2, 184)=62.09, p<0.001$]. Post hoc analyses revealed that those in the obsessional thought group had significantly higher unacceptability ratings ($M=61.67, SD=28.09$) than the neutral [$M=22.00, SD=25.88; F(1, 184)=84.73, p<0.001$] or the positive group [$M=19.83, SD=27.83; F(1, 184)=100.76, p<0.001$]. A main effect of interval was also observed [$F(1, 184)=5.32, p<0.02$], but was qualified by the emergence of a two-way interaction of suppression group by interval [$F(1, 184)=7.81, p<0.01$]. Post hoc analyses revealed that unacceptability ratings for the suppress group were significantly higher at interval 1 [$M=40.63, SD=34.51; F(1, 188)=5.59, p<0.02$] than for the nonsuppress group ($M=29.56, SD=32.14$), and declined from interval 1 to interval 2 [M suppress T2=29.97, $SD=31.79; F(1, 188)=12.77, p<0.001$] whereas those of the nonsuppress group did not change across intervals (M nonsuppress T2=30.92, $SD=32.34$). Unacceptability ratings after interval 2 were the same across groups, thus accounting for the interaction. Finally, only a main effect of interval was observed on responsibility ratings [$F(1, 184)=6.97, p<0.01$], such that ratings after interval 2 were significantly lower ($M=49.114, SD=30.22$) than those completed after interval 1 ($M=54.24, SD=29.67$).

The results of these analyses offer partial support for the second hypothesis. Suppression of obsessional, but not positive or neutral thoughts resulted in higher levels of self-reported discomfort associated with target thought occurrences relative to the nonsuppress/obsessional thought group during the second monitoring interval. Furthermore, target thoughts that occurred during the first interval for the suppress group (i.e., thoughts occurring whilst participants were supposed to be suppressing) were rated as more unacceptable than thoughts occurring during the first interval for the nonsuppress group (i.e., when there were instructions not to suppress). Suppression did not have a significant effect on the pleasantness or responsibility appraisal ratings of intrusive, positive or negative thoughts.

3.4. Suppression and mood state

It was predicted that participants in the suppress/obsessional group would report a significantly more negative mood state after thought suppression than individuals who suppressed neutral or

positive thoughts, or participants in the no suppress conditions. Mood state was measured prior to the visualization task and then again after the second monitoring interval. A 2 (suppression group)×3 (target thought group) analysis of variance was performed on T2 mood scores, with T1 mood Scores entered as a continuous independent predictor⁴. Total number of thoughts across intervals 1 and 2 were entered as a second continuous predictor. The main effects were entered sequentially according to chronological order of events. This allowed for examination of the unique contribution of each predictor after the events preceding it had been removed.

Results indicated a significant main effect of T1 mood scores [$F(1, 200)=249.31, p<0.001$], such that higher scores at T1 predicted higher scores at T2. A main effect of target thought group was also observed [$F(2, 200)=6.76, p<0.001$]. This was qualified by a significant Target Thought Group×T1 mood interaction [$F(2, 200)=5.03, p<0.01$]. In order to interpret this interaction the zero-order correlations between T1 and T2 mood scores were examined within each level of target thought group. The correlations between T1 and T2 mood were quite high in the neutral and positive groups ($r=0.77, p<0.001$ and $r=0.86, p<0.001$, respectively). However, the correlation within the obsessive intrusive group was lower ($r=0.48, p<0.001$). Post hoc analyses revealed that T2 mood scores were significantly lower (i.e., more negative) for those in the obsessional thought group than for those in the neutral [$F(1, 200)=7.12, p<0.01$] or positive thoughts [$F(1, 200)=12.44, p<0.001$] groups.

A significant Target Thought Group×Thought Frequency interaction was also found [$F(2, 200)=3.99, p<0.02$]. It was qualified by a significant Target Thought Group×Suppression Group×Thought Frequency interaction [$F(2, 200)=3.18, p<0.04$]. The zero-order correlations between thought frequency and T2 mood within each of the six experimental groups were examined. Thought frequency had no relationship with T2 mood in any group (i.e., r s=approximately 0, all ns except for the suppress/obsessional group $r=-0.40, p<0.01$), such that higher thought frequency was associated with more negative T2 mood. This analysis supported the third hypothesis. More frequent thought occurrences were associated with more negative mood state for individuals instructed to suppress obsessional thoughts. Suppression of neutral or positive target thoughts did not have a significant impact on mood state.

4. Discussion

The purpose of this study was to examine the impact of thought valence, thought content and active suppression on mood state and on thought frequency and emotional intensity. It was hypothesized that suppression would result in an immediate escalation of obsessional thoughts and a rebound of neutral thoughts. Contrary to the hypotheses, there was no paradoxical effect of suppression on frequency for any type of target thought. This is contrary to findings by Wegner et al. (1987) as well as those of D. M. Clark (Clark et al., 1991; Clark, Winton & Thynn, 1993). On the other hand, these data contribute to a growing literature that has found no paradoxical effect of suppression on neutral thoughts (e.g., Merckelbach, Muris, van den Hout & de Jong,

⁴ We would have preferred entering T1 mood as a covariate but it interacted with the other independent variables, thereby violating the parallelism assumption of ANCOVA models. Thus T1 mood was included as a continuous independent predictor, but was ordered sequentially so that all effects of interest were analysed after partialling out T1 mood.

1991; Muris, Merckelbach & de Jong, 1993) or emotionally relevant thoughts such as worry, depressive rumination and thoughts relevant to phobic stimuli (Roemer & Borkovec, 1994; Mathews & Milroy, 1994; Muris, Merckelbach, Horselenberg, Sijsenaar & Leeuw, 1997; Wang, 1998), or obsessional thoughts (McNally & Ricciardi, 1996; Janeck & Calamari, 1999). However, thought frequency declined across intervals for the three nonsuppress groups, whereas it did not decline for the suppress groups. In this study, the intentional suppression of cognitions, regardless of their content or valence, appeared to interfere with the natural decline, or habituation of thoughts.

It is possible that the vigilance task may have facilitated suppression efforts by providing participants with a singular focus, much as using a single distracter (thoughts about a red Volkswagen) seems to prevent thought rebound (Wegner et al., 1987 Study 2). However, this explanation does not seem likely for two reasons. First, the computer presented 26 letters and 10 numbers at random. As such, rather than providing a single cue for distraction, multiple cues for distraction were made available by the computer. According to Wegner's model, this should result in an enhanced rebound effect, but this study found no rebound effect. Second, at the end of the study, participants in the suppress groups were asked about what strategies they used to suppress thoughts. Only nine participants out of the 111 participants in the suppress groups reported having used a strategy that involved the computer task. Typically, participants reported that they tried to think of a thought opposite in emotional valence to the target thought, that they tried to think of a different thought of the same valence as the target thought, or they tried to distract themselves in other ways, such as by sorting out their study schedule or singing a song in their head. Finally, it is important to note that the vigilance task was very easy. The letters and numbers were presented at a slow pace (average interval of five seconds) and stayed on the screen long enough to be easily and immediately discerned. Thus, this it is highly unlikely that this task represented a cognitive load that would thwart suppression efforts, and even if it was a cognitive load, we would expect a more pronounced rebound effect, which, again, was not the case in this study. Thus, the vigilance task does not appear to have played an important role in the study findings.

It is important to note that intentional suppression of neutral and positive thoughts was successful, as evidenced by significantly lower thought frequency relative to that reported by participants in the "think anything, but do not suppress" counterpart groups. On the other hand, suppression of negative thoughts with obsessional content resulted in the same number of thought occurrences as their control counterparts. It is possible that this finding simply reflects the fact that the nonsuppress/obsessional group exerted significantly stronger suppression effort relative to the other nonsuppress groups, or that the obsessional groups as a whole reported having less vivid images of their thought during the priming task. However, those in the suppress/obsessional group still reported significantly greater attempts at suppressing than those in the control group. If the latter explanation were the case, we would expect suppression to be more successful for those in the obsessional group, given that they had less vivid images. Thus suppression resulted in sustained thought frequency for all three suppress groups, and suppression was relatively less successful for those in the obsessional thought group. That suppression effort was still strong despite explicit instructions to not suppress underscores the extent to which these obsessional thoughts give rise to natural active resistance. Taken together, these data suggest that results from studies that have examined thoughts that are impersonal or personal but positive in nature may have limited relevance to understanding the effects of suppression on the frequency of emotionally significant thoughts that are negative and unwanted.

Despite the fact that individuals in the suppress and nonsuppress obsessional groups experienced about the same number of thought occurrences in both intervals, the suppress/obsessional group had significantly higher ratings of discomfort associated with the thought at interval 2 than did their nonsuppress/obsessional counterparts. This finding is consistent with Roemer and Borkovec (1994), who found that suppression of worry-related and depressive thoughts was associated with greater anxiety, but not greater frequency. In their study of obsessional thoughts, Trinder and Salkovskis (1994) observed a positive relationship between suppression effort and discomfort, although Salkovskis and Campbell (1994) found no relationship between self-reported ratings of discomfort and suppression of obsessional thoughts. In general, these results, along with the data from physiological studies showing that suppression is associated with physiological arousal (e.g., Wegner et al., 1993; Cioffi & Holloway, 1993), suggest that suppression of emotionally relevant, negative material may interfere with natural habituation to the thought.

There are two plausible explanations as to why suppression might interfere with habituation. First, suppression terminates exposure to the thought, much in the same manner as completion of a compulsive ritual. Rachman and Hodgson (1980) argued that brief exposure to an upsetting stimulus can actually result in fear incubation. Certainly in studies investigating suppression of trauma-relevant thoughts, suppression is associated with more frequent thought occurrences (e.g., Harvey & Bryant, 1998a,b) and specific types of thought control are associated with greater symptomatology (Reynolds & Wells, 1999). It is argued that suppression precludes emotional processing of the traumatic event (Wells, 2000). For OCD specifically, both Salkovskis (1985, 1989, 1996, 1998) and Rachman (1997, 1998) emphasize that neutralization and other thought control efforts like suppression prevent disconfirmation that no negative or catastrophic consequences of thinking the unwanted intrusive thought will occur.

A second reason that suppression may lead to heightened emotional response is that the instruction to suppress the negative target thought might prime expectations that negative intrusive thoughts can and should be controlled. Clark and Purdon (1993) and Purdon and Clark (1999) proposed that individuals who believe that failure to control obsessional thoughts represents mental weakness may be inclined to interpret occurrences of the “to-be-controlled” thought as highly significant. Appraisals of inflated significance will elevate the negativity of the target thought when under active suppression contingencies. Consistent with this argument, Kelly and Kahn (1994) found that participants who did experience a rebound of thoughts reported feeling more out with control of their thoughts. In the present study, individuals in all suppress groups rated thoughts that occurred during suppression as more unacceptable than thoughts that occurred in the interval after suppression, suggesting that suppression instructions may, indeed, result in a performance demand that participants expect themselves to meet. However, in this study, ratings of unpleasantness and responsibility for having the thought were not influenced by suppression. It may be that these are static qualities that simply reflect the thought valence.

Overall, mood state was significantly lower for individuals in the obsessional thought group, which supports the contention of various cognitive-behavioural models of OCD that obsessional thoughts may be primed by negative mood and vice versa. Furthermore, for those in the suppress/obsessional target thought group, higher frequency of target thought occurrences was significantly correlated with more negative mood state. This also suggests that the occurrence of negative, personally relevant, unwanted thoughts that one has tried to suppress are detrimental to mood state. Given that various studies have found a relationship between negative mood and

difficulty suppressing negative thoughts (Conway et al., 1991; Wenzlaff et al., 1988, 1991) and that thoughts are more difficult to dismiss during negative mood states (Edwards & Dickerson, 1987; Sutherland, Newman & Rachman, 1982), such a decline in mood state is likely to make later thought occurrences even more frequent, which would cyclically degrade mood state further. Again, these findings are consistent with the explanation that suppression of obsessive intrusive thoughts interferes with natural habituation processes. These data also lend support to cognitive models that posit a link between failures in thought control and enhanced negative appraisal and mood.

Taken together, these findings indicate that suppression of obsessional thoughts may have substantially more complex effects than suppression of neutral or positive thoughts. Moreover the most important effect of suppressing negative emotionally relevant thoughts may be on emotional response, appraisal and mood state, as opposed to the frequency of the “to-be-suppressed” thought. It is possible that beliefs that one can and should control emotionally relevant, unwanted thoughts enhance the individual’s stake in controlling thoughts, which in turn increases suppression efforts. Thought occurrences whilst suppression attempts are underway could result in increased negative appraisal, and yield further attempts at thought suppression. It is easy to understand how this cycle could result in a deterioration of mood. Thus, these data suggest that cognitive models of OCD should re-examine the role of suppression in the escalation and persistence of obsessional thoughts, focusing on concern over failures in thought control and how that influences emotional and cognitive response to the thought.

As is evident from this study, current research on the suppression of obsessional intrusive thoughts has raised more questions than it has answered. What does appear to be the case, however, is that the deliberate suppression of unwanted thoughts with obsessional content has untoward effects by prolonging the emotional intensity of the thought and its associated negative mood state.

Acknowledgements

This study was conducted for partial completion of the first author’s PhD at the University of New Brunswick, supervised by the second author, and was supported by a SSHRC Doctoral Fellowship.

References

- Cioffi, D., & Holloway, J. (1993). Delayed costs of suppressed pain. *Journal of Personality and Social Psychology*, 64, 274–282.
- Clark, D.A. (1989). A schema-control model of negative thoughts. Paper presented at the World Congress of Cognitive Therapy, Oxford, 30 June.
- Clark, D.A. (1999). Ego-dystonic vs. ego-syntonic intrusions. Paper presented at the 3rd Obsessive-compulsive Cognitions Workgroup meeting, Bracebridge, Canada.
- Clark, D. A., & Purdon, C. (1993). New perspectives for a cognitive theory of obsessions. *Australian Psychologist*, 28, 161–167.
- Clark, D. A., & Purdon, C. (1995). The assessment of unwanted intrusive thoughts: a review and critique of the literature. *Behaviour Research and Therapy*, 33, 967–976.

- Clark, D. M., Ball, S., & Pape, D. (1991). An experimental investigation of thought suppression. *Behaviour Research and Therapy*, 29, 253–257.
- Clark, D. M., Winton, E., & Thynn, L. (1993). A further experimental investigation of thought suppression. *Behaviour Research and Therapy*, 29, 253–257.
- Conway, M., Howell, A., & Giannopoulos, C. (1991). Dysphoria and thought suppression. *Cognitive Therapy and Research*, 15, 153–166.
- Edwards, S., & Dickerson, M. (1987). Intrusive unwanted thoughts: a two-stage model of control. *British Journal of Medical Psychology*, 60, 317–328.
- Harvey, A. G., & Bryant, R. A. (1998a). The role of valence in attempted thought suppression. *Behaviour Research and Therapy*, 36, 757–763.
- Harvey, A. G., & Bryant, R. A. (1998b). The effect of attempted thought suppression in acute stress disorder. *Behaviour Research and Therapy*, 36, 583–590.
- Howell, A., & Conway, M. (1992). Mood and the suppression of positive and negative self-referent thoughts. *Cognitive Therapy and Research*, 16, 535–555.
- Ingram, R. E., & Wisnicki, K. S. (1988). Assessment of positive automatic cognition. *Journal of Consulting and Clinical Psychology*, 56, 898–902.
- Ingram, R. E., Kendall, P. C., Siegle, G., Guarino, J., & McLaughlin, S. C. (1995). Psychometric properties of the Positive Automatic Thoughts Questionnaire. *Psychological Assessment*, 7, 495–507.
- Janeck, A. S., & Calamari, J. E. (1999). Thought suppression in obsessive-compulsive disorder. *Cognitive Therapy and Research*, 23, 497–509.
- Kelly, A. E., & Kahn, J. H. (1994). Effects of suppression of personal intrusive thoughts. *Journal of Personality and Social Psychology*, 66, 998–1006.
- Keppel, G. (1982). *Design and analysis: a researcher's handbook*. Englewood Cliffs: Prentice-Hall.
- Lavy, E. H., & van den Hout, M. A. (1990). Thought suppression induces intrusions. *Behavioural Psychotherapy*, 18, 251–258.
- Mathews, A., & Milroy, R. (1994). Effects of priming and suppression of worry. *Behaviour Research and Therapy*, 32, 843–850.
- McNally, R. J., & Ricciardi, J. N. (1996). Suppression of negative and neutral thoughts. *Behavioural and Cognitive Psychotherapy*, 24, 17–25.
- Merckelbach, H., Muris, P., van den Hout, M., & De Jong, P. (1991). Rebound effects of thought suppression: instruction dependent? *Behavioural Psychotherapy*, 19, 225–238.
- Muris, P., Merckelbach, H., & De Jong, P. (1993). Verbalization and environmental cuing in thought suppression. *Behaviour Research and Therapy*, 35, 769–774.
- Muris, P., Merckelbach, H., Horselenberg, R., Sijtsenaar, M., & Leeuw, I. (1997). Thought suppression in spider phobia. *Behaviour Research and Therapy*, 35, 769–774.
- Purdon, C. (1999). Thought suppression and psychopathology. *Behaviour Research and Therapy*, 37, 1029–1054.
- Purdon, C., & Clark, D. A. (1993). Obsessive intrusive thoughts in nonclinical subjects. Part I. Content and relation with depressive, anxious and obsessional symptoms. *Behaviour Research and Therapy*, 31, 713–720.
- Purdon, C., & Clark, D. A. (1994a). Obsessional intrusive thoughts in nonclinical subjects. Part II. Cognitive appraisal, emotional response and thought control strategies. *Behaviour Research and Therapy*, 32, 403–410.
- Purdon, C., & Clark, D. A. (1994b). Perceived control and appraisal of obsessional intrusive thoughts: A replication and extension. *Behavioural and Cognitive Psychotherapy*, 22, 269–285.
- Purdon, C., & Clark, D. A. (1999). Metacognition and obsessions. *Clinical Psychology and Psychotherapy*, 6, 96–101.
- Purdon, C., & Clark, D. A. (2000). White bears and other elusive intrusions: assessing the relevance of thought suppression for obsessional phenomena. *Behavior Modification*, 24, 425–453.
- Rachman, S. (1997). A cognitive theory of obsessions. *Behaviour Research and Therapy*, 35, 793–802.
- Rachman, S. (1998). A cognitive theory of obsessions: elaborations. *Behaviour Research and Therapy*, 36, 385–401.
- Rachman, S. J., & Hodgson, R. J. (1980). *Obsessions and compulsions*. Englewood Cliffs: Prentice Hall.
- Reynolds, M., & Wells, A. (1999). The Thought Control Questionnaire: replication with a clinical sample and experimental investigation. *Psychological Medicine*, 29, 1089–1099.
- Roemer, L., & Borkovec, T. D. (1994). Effects of suppression thoughts about emotional material. *Journal of Abnormal Psychology*, 103, 467–474.

- Rutledge, P. C. (1998). Obsessionality and the attempted suppression of unpleasant personal intrusive thoughts. *Behaviour Research and Therapy*, 36, 403–416.
- Salkovskis, P. M. (1985). Obsessional-compulsive problems: a cognitive-behavioural analysis. *Behaviour Research and Therapy*, 23, 571–584.
- Salkovskis, P. M. (1989). Cognitive-behavioural factors and the persistence of intrusive thoughts in obsessional problems. *Behaviour Research and Therapy*, 27, 677–682.
- Salkovskis, P. M. (1996). Cognitive-behavioural approaches to the understanding of obsessive-compulsive problems. In R. M. Rapee, *Current controversies in the anxiety disorders* (pp. 103–133). New York: Guilford.
- Salkovskis, P. M. (1998). Psychological approaches to the understanding of obsessional problems. In R. P. Swinson, M. M. Antony, S. Rachman, & M. A. Richter, *Obsessive compulsive disorder: theory, research and treatment* (pp. 33–50). New York: Guilford.
- Salkovskis, P. M., & Campbell, P. (1994). Thought suppression induces intrusions in naturally occurring negative intrusive thoughts. *Behaviour Research and Therapy*, 32, 1–8.
- Smári, J., Birgisdóttir, A. B., & Brynjólfssdóttir, B. (1995). Obsessive-compulsive symptoms and suppression of personally relevant unwanted thoughts. *Behaviour Research and Therapy*, 18, 621–625.
- Smári, J., Sigurjónsdóttir, H., & Sæmundsdóttir, I. (1994). Thought suppression and obsession-compulsion. *Psychological Reports*, 75, 227–235.
- Sutherland, G., Newman, B., & Rachman, S. (1982). Experimental investigations of the relations between mood and intrusive unwanted cognitions. *British Journal of Medical Psychology*, 55, 127–138.
- Trinder, H., & Salkovskis, P. M. (1994). Personally relevant intrusions outside the laboratory: long-term suppression increases intrusion. *Behaviour Research and Therapy*, 32, 833–842.
- Wang, A. (1998). Spider phobia: the effects of suppressing thoughts about looming vs nonlooming spiders. Poster presented at the Canadian Psychological Association annual convention, Ottawa, Ontario.
- Wegner, D. M. (1994). Ironic processes of mental control. *Psychological Review*, 101, 34–52.
- Wegner, D. M., Erber, R., & Zanakos, S. (1993). Ironic processes in the mental control of mood and mood-related thought. *Journal of Personality and Social Psychology*, 65, 1093–1104.
- Wegner, D. M., Schneider, D. J., Carter, S. R., & White, T. L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology*, 53, 5–13.
- Wells, A. (2000). *Emotional disorders and metacognition: innovative cognitive therapy*. Chichester: Wiley.
- Wenzlaff, R. M., Wegner, D. M., & Klein, S. B. (1991). The role of thought suppression in the bonding of thought and mood. *Journal of Personality and Social Psychology*, 60, 500–508.
- Wenzlaff, R. M., Wegner, D. M., & Roper, D. W. (1988). Depression and mental control: the resurgence of unwanted negative thoughts. *Journal of Personality and Social Psychology*, 55, 882–892.