

The predictors of thought suppression in young and old adults: Effects of rumination,  
anxiety and other variables

James A.K. Erskine, Lia Kvavilashvili and Diana E. Kornbrot

*University of Hertfordshire.*

Address for correspondence

James Erskine

University of Hertfordshire

School of Psychology

College Lane

Hatfield

Herts, AL10 9AB

United Kingdom

Telephone number: 01707 284641

Fax number: 01707 285073

E-mail: [J.A.K.Erskine@herts.ac.uk](mailto:J.A.K.Erskine@herts.ac.uk)

## **Abstract**

The tendency to use thought suppression in everyday life as assessed by the White Bear Suppression Inventory (WBSI) has been related to several psychopathological and personality factors. However, previous research has primarily investigated a limited set of psychopathological factors and their relation to the use of thought suppression in younger adults only. Virtually nothing is known about the relation between thought suppression and psychopathology in older adults. The present study examined a wide variety of variables that have been theoretically and empirically linked to thought suppression and used regression models to predict the tendency to suppress thoughts in everyday life, in both younger (mean age 20) and older (mean age 73) adult samples. Results demonstrated that in both samples, the use of thought suppression was best predicted by rumination and trait anxiety. In addition, young participants had significantly higher WBSI scores than older adults but this age difference disappeared when controlling for low levels of anxiety and rumination in older adults.

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Most people have at times experienced disturbing or potentially distressing thoughts. One popular method by which people often attempt to control these (and other) thoughts is by trying to suppress them (Wegner, 1994). However, there is ample evidence showing that thought suppression can be counter productive and produce paradoxical effects. Wegner, Schneider, Carter, and White (1987) were the first to demonstrate experimentally that prior thought suppression can lead to later preoccupation with the very same thought - a phenomenon they called the “rebound effect”. Despite numerous demonstrations of the rebound effect in the laboratory (Wenzlaff, & Wegner, 2000), thought suppression continues to be used in everyday life by many people. For example, in an informal survey conducted by Erdelyi and Goldberg (1978), 99% of college students reported having tried to exclude disturbing thoughts from consciousness in an effort to avoid the associated discomfort.

One widely used index of the tendency to use thought suppression in everyday life is the White Bear Suppression Inventory (WBSI) developed by Wegner and Zanakos (1994). This 15-item questionnaire had a test-retest reliability of .69 over a 3-month period leading Wegner and Zanakos (1994) to suggest that the scale measures a stable, trait like individual difference in one’s propensity to use thought suppression. Muris, Merckelbach and Horselenberg (1996) also examined the test-retest reliability of the WBSI and found it to be .80 over a 12-week period. Furthermore, both of these studies reported a one-factor solution when the WBSI was factor analysed (but see Blumberg, 2000, and Rassin, 2003, who report three- and two-factor solutions, respectively).

An important theoretical question concerns the consequences of one’s tendency to use thought suppression. The results of several correlational studies suggest that a disposition to suppress thoughts in everyday life is linked to various

forms of psychopathology. For example, several studies have shown that the WBSI correlates positively and significantly with depression and trait anxiety in both undergraduate and clinical samples (Muris et al., 1996; Spinhoven & Van der Does, 1999; Wegner & Zanakos, 1994).

Wegner and his colleagues (Erber & Wegner, 1996; Wegner, 1994; Wegner and Zanakos, 1994) have repeatedly suggested that thought suppression itself leads to greater levels of psychopathology (see also Purdon, 1999). In contrast, other researchers have argued that pre-existing psychopathological tendencies cause one to begin to use thought suppression to avoid discomfort. For example, according to Martin and Tesser (1996) it is rumination and other linked psychopathologies that “cause” one to use thought suppression. Rumination has been defined as a type of conscious thought which revolves around one theme and is recurrent, often for extended periods of time (Martin & Tesser, 1996). Martin and Tesser suggest that rumination occurs due to a person not being able to approach or achieve goals that they have set for themselves. Under this formulation thought suppression is viewed as a consequence of rumination due to the fact that rumination can often be aversive and interfere with other tasks. As a result, thought suppression is instigated in an effort to prevent further ruminations. However, Erber and Wegner (1996) argue that rumination is a result of prior thought suppression and that the rebound effect itself may be viewed as a form of rumination. Therefore, to date, rumination has been theoretically linked with thought suppression but, to our knowledge, this link has not been tested empirically (Erber & Wegner, 1996; Martin & Tesser, 1996).

On the other hand, Rassin and colleagues (Rassin, Merckelbach, Muris & Schmidt, 2001; Rassin, Muris, Schmidt, & Merckelbach, 2000) have suggested that Thought Action Fusion may be an antecedent of thought suppression. Thought Action

Fusion (TAF) refers to a cognitive bias whereby a person has an inflated sense of responsibility for their thoughts believing that thinking of certain acts (e.g. killing an obnoxious neighbour) is as bad as actually engaging in that act. It is therefore likely that high scorers on TAF would be inclined to avoid these disturbing cognitions by trying to suppress them. TAF is included here as one of the possible correlates of the use of thought suppression. Of particular relevance to the current study is the TAF-moral subscale that assesses how much a person views thinking of bad thoughts as being as bad as actually engaging in those behaviours (Berle & Starcevic, 2005).

One further variable that we wanted to investigate is participants' age. All previous studies have relied on young undergraduate or clinical samples. As a result, virtually nothing is known about the use of thought suppression in older adults. With respect to age, older adults may be more likely to use thought suppression as a result of health worries, the actual loss of friends and family members, and/or worries about declining cognitive functioning (*cf.* Teachman, 2006). However, thought suppression has been demonstrated to have negative effects on health and immune system in young adults. For example, Petrie, Booth and Pennebaker (1998) found that thought suppression, using both emotional and neutral thoughts, produced reductions in circulating T lymphocytes and T suppressor cells. In light of these findings, older adults may be particularly vulnerable to adverse effects of thought suppression due to their poor general health and weaker immune system. Evidence also exists to suggest that older adults may be less able at cognitive tasks involving inhibition (Hasher & Zacks, 1988). If this is the case, it may be that older adults need to try harder to suppress their thoughts or to suppress repeatedly due to the failure of earlier suppression attempts.

In summary, the current study was designed to examine the tendency to suppress thoughts in everyday life, as assessed by the White Bear Suppression Inventory, and its correlates in a sample of 84 young adults and 65 older healthy community dwelling adults. It was expected that the tendency to use thought suppression would correlate with a wide range of psychopathological variables such as trait anxiety, depression, neuroticism, rumination and TAF in both younger and older adults. However, the present study wanted to refine the analysis of the associations between thought suppression and psychopathology by predicting the use of thought suppression from its significant correlates. Therefore, the tendency to use thought suppression as assessed by the WBSI was the main outcome variable of interest. It was hypothesised that when entered into regression models rumination, in view of its strong theoretical links with thought suppression, would be the main significant predictor of the use of thought suppression in both young and older adults, and that rumination would remain a significant predictor when controlled for other measures of psychopathology.

## **Method**

### *Participants*

Participants were 84 university undergraduates (69 females and 15 males) and 65 older adults (33 males, 32 females), with mean ages of 20.40 years ( $SD=2.99$ ; range 18–30 years) and 73.61 years ( $SD=5.55$ ; Range 64–84 years) respectively. All participants reported English as their first language.

The older participants were retired, healthy and community dwelling adults who did not report any vision, hearing or physical mobility problems nor any of the following: serious head injury, stroke, mental health and/or memory problems that had been diagnosed by their physician. They were recruited from a subject pool of

122 older adults who had previously taken part in a study by Kvavilashvili, Kornbrot, Mash, Cockburn and Milne (in preparation). All older participants in the study of Kvavilashvili et al. (in preparation) scored above the cut-off point of 24 on the Mini Mental State Examination (MMSE;  $M = 27.80$ ). Importantly, those 65 older adults who took part in the present study did not reliably differ from the remaining pool of older adults ( $N=57$ ), who decided not to volunteer, in terms of their mean age ( $M_1=73.12$ ,  $M_2=73.62$ ), years of education ( $M_1=12.00$ ,  $M_2=11.96$ ), cognitive status as measured by MMSE ( $M_1=27.82$ ,  $M_2=27.99$ ) and the occupation prior to retirement. Out of our 65 older participants, the majority had previously been skilled workers (55%) and professionals (28%) with the remaining participants being unskilled workers (13%) and housewives (3%).

### *Materials*

All participants completed the following self-report questionnaires in the order in which they appear.

The Spielberger Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1983) measures trait anxiety with 20 items. Trait anxiety is conceptualised as a stable individual difference in anxiety proneness. Items include “I feel pleasant” and “I feel anxious”. Ratings are made on a 4-point scale from “not at all” to “very much so”. Scores can range from 20 to 80.

The White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994) is a 15- item questionnaire that measures the propensity to use thought suppression in everyday life, and contains statements like “I always try to put problems out of mind” or “I have thoughts I cannot stop”. Ratings are made on a five-point scale ranging from “strongly disagree” to “strongly agree”. Scores can range from 15 to 75 with

higher scores indicating a greater tendency to suppress one's thoughts in everyday life.

The Eysenck Personality Questionnaire (EPQ-R; Eysenck, Eysenck, & Barrett, 1985) has sub scales each containing 12 items, measuring the personality dimensions of introversion/extraversion, neuroticism and psychoticism. Responses are made by circling "Yes" or "No" to each item.

The Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979, 13-item short form) measures participants' level of depression. The participant reads a series of statements and is asked to circle any they feel apply to them (e.g., "I feel discouraged about the future" or, "I don't feel disappointed in myself"). High scores indicate a greater level of depression. Scores can range from 0 to 39.

The Thought Action Fusion Questionnaire (TAF; Shafran, Thordarson, and Rachman, 1996) consists of 19 items scored on a 5-point scale (0=disagree strongly; 4= agree strongly). Twelve items assess a morality subscale (e.g. "If I wish harm on someone, it is almost as bad as doing harm") and 7 assess the likelihood/probability of various occurrences being dependent on one's thoughts (e.g. "If I think of a relative/friend being in a car accident, this increases the risk that he/she will have a car accident"). For the purposes of this study only the morality sub-scale scores were analysed.

Rumination Inventory - (McIntosh & Martin, 1992). This ten-item scale assesses participants' tendency to ruminate or experience repetitive uncontrollable thoughts. Items include "When I have a problem, I tend to think about it a lot of the time", "Sometimes I feel like I have no control over my thoughts" or "I rarely become lost in thought". Ratings are made on a 7-point scale with 1= "does not describe me



well” to 7=“describes me well”. Scores range from 10 to 70 with higher scores indicating a greater tendency to ruminate.

### *Procedure*

The study was introduced to participants as an investigation of people’s ability to control their thoughts and its relation to various personality variables. For young participants, the study consisted of two 1-hour long sessions in which they first completed the standard laboratory thought suppression task developed by Wegner et al (1987).<sup>1</sup> At the end of each session they were provided a questionnaire packet with the instruction to complete questionnaires in the order provided. Each questionnaire started with written instructions about how to fill them in so that no further explanation was needed from the experimenter. At the end of Session 1 young participants completed the Trait Anxiety Inventory, White Bear Suppression Inventory, Eysenck Personality Inventory, and Beck Depression Inventory. At the end of Session 2 they completed the Thought Action Fusion Questionnaire and the Rumination Inventory.

For the older adults, questionnaire packets containing the same inventories used with the younger sample were sent to 122 members of an existing subject pool of older adults. All older adults were asked to fill in the inventories in the same order as the younger participants, and mail the completed questionnaires back to the experimenter at their convenience. Out of 122 older adults, 65 (54%) completed the questionnaires and 57 returned the questionnaires uncompleted.

### **Results**

Initially, all of the variables were screened for outliers. Outliers were defined as scores which fell two standard deviations above or below the mean of a respective age group. In the young sample, two participants were found to be outliers on the

WBSI and several other inventories. The data analysis was run with and without these outliers and no significant differences emerged. Therefore, the data of these two participants were not excluded and the final sample comprised 84 young participants. In the old sample, three participants were excluded as their scores were too extreme on the rumination inventory, and these three outliers changed the overall correlation matrix significantly when included. One older participant was an outlier on psychoticism but did not change the overall correlation matrix and was retained. The final sample, therefore, comprised 62 older adults.

Results will be presented in two sections for young and old participants, respectively.

#### *Young sample*

The Pearson product-moment correlations are presented in Table 1. The tendency to use thought suppression (as assessed by the WBSI) was positively and significantly correlated with trait anxiety, depression, neuroticism, and rumination. To explore these relations further several regression models were computed.

The first regression model entered all of the significant correlates of the WBSI scores as predictors: trait anxiety, depression, neuroticism, and rumination. The regression model was significant,  $F(4,73)=7.48$ ,  $p<.001$ , with the  $R^2$  of .30. With all of these predictors in the model, only rumination had a significant t-value, and trait anxiety although insignificant was deemed close enough to warrant further investigation (see Table 2 for beta values). The model was therefore re-computed with only rumination and trait anxiety as predictors. This resulted in a significant model  $F(2,73)=15.30$ ;  $p < .0001$ , and an  $R^2$  of .30. Furthermore, both predictors were significant as evidenced by significant t-values (see Table 2).

In order to assess whether the effects of anxiety and rumination are additive or multiplicative an additional regression model was computed with anxiety, rumination and their interaction as predictors. To avoid problems with multicollinearity the variables were centred prior to computation of the interaction term. The interaction term was not significant suggesting that there is no multiplicative effect of being both a ruminator and an anxious person on thought suppression. The effects of both variables are additive and it would seem independent.

#### *Old sample*

The Pearson product-moment correlations are presented in Table 1. As in the young sample, the tendency to use thought suppression (WBSI) correlated positively and significantly with trait anxiety, neuroticism, and rumination, but not with depression.

To explore these relations further a regression model was computed attempting to predict participants' WBSI scores from their significant correlates. The first regression model entered all of the significant correlates of the WBSI scores as predictors: trait anxiety, neuroticism, and rumination. In line with the results of the young sample, only trait anxiety and rumination had significant t-values (see Table 3 for beta values from the multiple regression). The model was therefore re-computed with only trait anxiety and rumination as predictors. This resulted in a significant model  $F(3,53)=11.77, p< .0001$ , and an  $R^2$  of .31, with both anxiety and rumination remaining significant (see Table 3). Therefore, the final accepted model had both rumination and trait anxiety as predictors and explained 31% of the variance in WBSI scores. As with the young sample, the interaction term comprising both rumination and anxiety was computed and entered into the regression model as a predictor. The interaction term was not significant.

### *WBSI scores as a function of age*

One additional aim of the study was to compare the use of thought suppression in young and older adults. The means presented in Table 1 show that younger participants had higher WBSI scores ( $M=51.62$ ) than older participants ( $M=44.81$ ). The difference between these means was significant,  $F(1,144) = 17.17, p < .0001$  (effect size -partial  $\eta^2 = .11$ ). Interestingly, young participants also had significantly higher scores on trait anxiety ( $F(1,143) = 38.68, p < .0001, \eta^2 = .21$ ) and rumination ( $F(1,131) = 28.10, p < .0001, \eta^2 = .18$ ) than old participants. Given that in both age groups rumination and anxiety scores were significant predictors of WBSI scores, it was necessary to see if the obtained age effect in thought suppression remained significant when controlling for low levels of anxiety and rumination in older adults. When trait anxiety and rumination were added as covariates to a one-way between subject analysis of variance the significant age difference in WBSI scores disappeared  $F(1,126) = 1.30, p = .25$ .

### **Discussion**

The results suggest that in both young and older adults the use of thought suppression most closely relates to the variables of rumination and anxiety. It is interesting that some of the variables theoretically linked to thought suppression did not demonstrate clear associations. For example, Thought Action Fusion did not correlate with the use of thought suppression in either young or older adults. This is unexpected because Rachman (1997) has suggested that increased TAF scores should “cause” or be related to increased thought intrusions, and especially unwanted intrusions. In addition, Rassin and colleagues (Rassin et al., 2000; Rassin et al., 2001) have sought to demonstrate possible links between thought suppression and TAF with some success. Thus, Rassin et al. (2000) administered the WBSI, TAF and Maudsley

Obsessive-Compulsive Inventory questionnaires to 173 undergraduates and used structural equation modelling to examine which of their hypothesised models best fitted their data. The final model accepted was a mediational model whereby TAF leads to suppression attempts that in turn lead to greater obsessionality. In their sample the correlation between the WBSI and TAF moral was .21 which was significant at the .01 level.

However, the usefulness of TAF as a concept has recently been called into question by Rassin et al. (2001) who demonstrated that while internal consistency factors proved to be satisfactory the temporal stability of TAF was disappointing. Thus, over a 3-month test interval mean TAF scores dropped significantly leading Rassin et al. (2001) to suggest that TAF scores are “unstable and susceptible to change” (p. 542). The unstable temporal profile of TAF scores and the current lack of association between TAF and WBSI scores in both younger and older participants call into question the view that Thought Action Fusion is a key factor in the development of intrusions and thought suppression.

Another interesting finding in relation to the psychopathological measures obtained in the present study was that in young participants the use of thought suppression was correlated with depression scores while this was not the case in older adults. Furthermore, even in younger participants, once entered in a regression model as a predictor of the use of thought suppression, depression proved insignificant. Neuroticism also showed the same pattern as depression. Overall, it seems that when trait anxiety and rumination are included as predictors of thought suppression there is no significant further proportion of the variance in WBSI scores explained by adding depression or neuroticism into the model. That the same final model was accepted in both younger and older participants (with similar  $R^2$  values of .30 and .31,

respectively) supports the notion that the use of thought suppression may be motivated by similar mechanisms in both age groups.

In line with the theories of Erber and Wegner (1996) and Martin and Tesser (1996) it would appear that the use of thought suppression and rumination are closely linked. This is important as both groups of researchers conceive of models whereby thought suppression either causes rumination (Erber & Wegner, 1996), or is itself caused by rumination (Martin & Tesser, 1996). In all probability the relationships between thought suppression, rumination and anxiety are bidirectional and self-reinforcing. Whilst not being able to disentangle this causal question the current study has provided the vital step of verifying these theoretical relations with empirical data.

The final question of interest concerned the prevalence of using thought suppression in younger and older participants. Contrary to our predictions, old participants reported using thought suppression less frequently than young participants. In addition, they also reported reliably lower scores on trait anxiety and rumination. Therefore, when levels of anxiety and rumination were controlled for in the analysis of co-variance, the age effect in thought suppression disappeared. This may suggest that older adults use thought suppression less because they have lower levels of rumination and anxiety. There is now growing evidence showing that older adults are generally less likely to experience task unrelated thoughts (Giambra, 1989) and involuntary autobiographical memories (Schlagman, Kvavilashvili & Schulz, in press) than younger adults. This reduced ability to experience ruminative thoughts (some of which may be negative and unwanted) means that there is less need for thought suppression in old age. Indeed several old participants, who did not volunteer, sent the questionnaires back saying that they were unable to take part in the study because they rarely experienced negative thoughts. Overall, findings concerning

rumination and thought suppression seem to provide support to Carstensen's Socioemotional Theory of ageing (Carstensen, Isaacowitz, & Charles, 1999) that predicts increased positivity and psychological well-being in old age rather than negative affect and psychopathology (see also Erskine, Kvavilashvili, Myers & Conway, submitted).

One potential criticism of the current study concerns the validity of the WBSI. Recent papers have called into question the notion that the WBSI measures one distinct entity that can be labelled thought suppression (Blumberg, 2000; Rassin, 2003). Rassin (2003) found two factors underlying the WBSI in a sample of 674 undergraduates and labelled them thought suppression and intrusions. Items loading on the intrusion factor would include "I have thoughts I cannot stop". Items loading on the suppression factor include "I have thoughts I try to avoid". However, in Rassin's (2003) study, the two factors were correlated at .70 ( $p < .01$ ). In order to answer criticisms based on the validity of the WBSI, all analyses presented in the results section, were re-run on two subscales (intrusion and suppression) of the WBSI as suggested by Rassin (2003). However, the correlations of both sub-scales with other psychopathological measures collected in the present study were virtually identical to the correlations of overall WBSI scores presented in Tables 1 and 3 for young and old adults, respectively. Furthermore, when predicting both sub-scales from their significant correlates, identical models to the overall model reported in the result section were found. Thus, the intrusion subscale was best predicted by trait anxiety and rumination as was the suppression subscale, and this was the case both in young and older adults.

In summary, the current study demonstrates that the key variables involved in the use of thought suppression in everyday life in both younger and older adults are

rumination and trait anxiety. Furthermore, it would appear that older adults may use thought suppression less than younger adults due to their reduced self-reported anxiety and rumination. The current study opens the door to future research investigating more closely the possible causal structure of the relations between trait anxiety, rumination and thought suppression. In addition, future research is necessary to examine the question of ability to employ thought suppression as a cognitive strategy and how this may change across the life span.

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## Footnotes

<sup>1</sup> The results from this study are reported elsewhere (Erskine, 2004).