

WALDUM, EMILY ROSE., M.A. Can you Forget what you Believe? Directed Forgetting of Attitude Information. (2007)  
Directed by Dr. Lili Sahakyan. 52 pp.

Research shows that people can intentionally forget previously learned information when instructed to do so – known as the directed forgetting effect (for a review, see MacLeod 1998). The current experiments investigated intentional forgetting of self-relevant information presented in the form of political attitude statements. Groups of Republicans and Democrats participated in two list-method directed forgetting studies, during which they studied a mixture of statements that expressed representative views of these parties. Experiment 1 results revealed that both Republicans and Democrats showed directed forgetting of statements expressing the views of the opposing political party, but showed no directed forgetting of statements expressing the views of their own party. In Experiment 2, participants studied the same statements and also rated them for agreement level. The results confirmed that regardless of the party affiliation, there was no directed forgetting of statements that participants agreed with; however there was directed forgetting of statements with which they disagreed or felt neutral about. Attitudes that people agree with are integrated in memory as an intrinsic part of the self concept, this integration, in turn, acts to prevent directed forgetting of this type of information.

CAN YOU FORGET WHAT YOU BELIEVE? DIRECTED FORGETTING OF  
ATTITUDE INFORMATION

by

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A Thesis Submitted to  
The Faculty of the Graduate School at  
The University of North Carolina at Greensboro  
in Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

Greensboro  
2007

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## CHAPTER I

### INTRODUCTION

Situations often arise in everyday life where for various reasons we want to willingly forget certain information. This paper is about deliberate forgetting of politically relevant attitude statements. While at first it may not be immediately obvious why anyone would want to forget political attitude information, consider the following scenario:

Imagine that you are following a candidate who you think has been impressive in a current campaign. You have listened to this person speak, and are well-informed about this individual's views on important political issues. Unfortunately, later you learn of a scandal that this person was involved in, and you decide that you no longer want to vote for this candidate. Furthermore, you feel that you should forget all the information you have learned about this candidate not only because it is no longer relevant, but also because it could help you better learn about the views of the other candidates. In situations like this, forgetting or inhibiting unwanted information could serve an adaptive role because it could allow for the formation of more accurate impressions about other candidates. In the lab, a technique that is often used to capture the mechanisms of intentional forgetting is known as the directed forgetting procedure, invented by Bjork, LaBerge, and LeGrand (1968)

During directed forgetting studies, people are presented information to learn for a later memory test. Participants are instructed to forget certain items following study and are asked to remember other items. Instructions to forget or remember can be delivered either on an item-by-item basis or after an entire block of items has been presented (known as the *item-method* and the *list-method* of directed forgetting, respectively). The current research utilizes the list-method, and therefore, it is discussed in greater detail.

In the list method, two lists of items are presented to participants to study for a later memory test. Following presentation of the first list, participants are given a cue to either forget or to remember all List 1 items. Participants receiving the forget instruction are informed that the first list was presented simply “as practice,” and that there is no need to remember them. Participants receiving the remember instruction are informed that the items presented on List 1 were only the first half of the items and that they should remember for a later test. Then all participants study the second list of items, after which they are asked to recall items from both lists. The typical *directed forgetting effect* consists of two components, known as the *costs* and *benefits*. The costs of directed forgetting refer to the impaired recall of List 1 items by the forget group compared to the remember group; the benefits of directed forgetting refer to the increased recall of List 2 items by the forget group compared to the remember group.

### **Theoretical Mechanisms of Directed Forgetting**

There are currently several accounts of the directed forgetting effect which can be grouped as single-process theories versus dual-process theories. The former explain both



the costs and benefits of directed forgetting using a single mechanism, whereas the latter uses different processes to account for the costs and the benefits of directed forgetting.

The first single-process account, known as the *selective rehearsal hypothesis*, was proposed by Bjork (1970, 1972). He argued that in response to a forget instruction participants cease all rehearsal and mnemonic strategies that they used to remember List 1 items and instead devote these strategies entirely to List 2 items. According to this theory, the costs of directed forgetting arise as a result of terminating List 1 rehearsal following the forget cue. List 1 rehearsal termination in the forget group can also explain the benefits of directed forgetting. Because participants in the forget group no longer need to rehearse List 1 items, all rehearsal can be directed toward List 2 items. Remember group participants, on the other hand, must rehearse both List 1 and List 2 items. The inefficient List 2 rehearsal by the remember group participants can lead to poorer List 2 recall in this group compared to the forget group, giving rise to the benefits of directed forgetting.

Several findings have posed a challenge for the selective rehearsal theory. For example, Geiselman, Bjork, and Fishman (1983) as well as Sahakyan and Delaney (2005) have demonstrated that both intentionally and incidentally learned list items produced directed forgetting effects. According to the selective rehearsal account, incidental items should not have produced directed forgetting effects, because they were not to be remembered, and therefore, were less likely to be rehearsed by the participants. The intentional items, on the other hand, were probably rehearsed and therefore should have been the only items to suffer from the termination of rehearsal following the forget cue

Another reliable finding that is problematic for the selective rehearsal account is the absence of directed forgetting costs on recognition tests (e.g., Basden, Basden, & Gargano, 1993; Benjamin, 2006; Bjork & Bjork, 1996; Block, 1971; Elmes, Adams & Roediger, 1970; Geiselman et al., 1983; Sahakyan & Delaney, 2005). If selective rehearsal led to an encoding disadvantage of forget items compared to the remember items, such deficits in encoding should have been evident on recognition tests as well as recall tests; however, researchers have not observed such an effect.

These inconsistencies led R.A. Bjork (1989) to propose a new mechanism of directed forgetting, which emphasizes retrieval processes over encoding differences – called, a *retrieval inhibition hypothesis*. The retrieval inhibition account suggests that the forget instruction initiates a process that at the time of retrieval inhibits or blocks access to List 1 items, producing the costs. The benefits are explained by differences in the amount of proactive interference that accrues on List 2 items in the forget and remember groups. Because List 1 items are inhibited in the forget group, they produce less proactive interference on List 2. Consequently, the forget group is able to recall more List 2 items than can the remember group, leading to the benefits of directed forgetting

Recently, a dual-process account has been proposed that attributes the costs and the benefits to the operation of two different mechanisms (Sahakyan & Delaney, 2005). The first component of the dual-process account relies on Sahakyan and Kelley's (2002) mental context change mechanism to explain the costs of directed forgetting. The second component utilizes the strategy-change mechanism of Sahakyan and Delaney (2003) to account for the benefits of directed forgetting. According to the context hypothesis, the

costs of directed forgetting arise because participants attempt to actively change mental context when given a forget cue (Sahakyan & Kelley, 2002). As a result, the context present at the time of the final test better matches the learning context that was present during List 2 encoding than List 1 encoding, leading to forgetting of List 1 items. Empirical evidence for this theory was shown by demonstrating that in the absence of a forget cue, a deliberate context change between the lists induced by engaging people in a diversionary thought, produces the same effects as those normally demonstrated in the forget group. Additionally, reinstating the original List 1 context at retrieval reduced the costs and the benefits of directed forgetting (Sahakyan & Kelley, 2002).

According to the strategy change mechanism of Sahakyan and Delaney (2003), the benefits of directed forgetting arise because participants in the forget condition are more likely to switch to a more efficient encoding strategy between Lists 1 and List 2 than are participants in a remember condition. The initial evidence for this idea came from verbal reports which revealed that although many participants switched from a shallow encoding strategy on List 1 to a deeper encoding strategy on List 2, participants in the forget group switched to a deeper encoding more frequently than did remember group participants. Furthermore, when participants were not allowed to switch strategy between List 1 and List 2 and instead were required to use the same encoding strategy on both lists, no benefits emerged (Sahakyan & Delaney, 2003). Likewise, when all participants were required to switch from a shallow to a deeper encoding strategy between the two lists, there were no relative benefits for the forget group, because the remember group also benefited from strategy change. Taken together, these findings

support the idea that directed forgetting benefits arise from encoding differences between the forget and remember groups.

### **Rationale for Current Studies**

The directed forgetting effect has been investigated with unrelated words (for reviews see Bjork, Bjork, & Anderson, 1998; MacLeod, 1998), emotional words (e.g., Power, Dalgleish, Claudio, Tata & Kentish, 2000; Wessel & Merckelbach, 2006), pictures (e.g., Basden & Basden, 1996; Lehman, McKinley-Pace, Leonard, Thompson & Johns, 2001), and prose sentences (e.g., Geiselman, 1977a, 1977b). However, there has been limited research exploring the ability to intentionally forget complex attitude information. To date, two studies have investigated directed forgetting using lists of stereotypic trait words (Araya, Akrami, & Ekehammar, 2003; Macrae, Bodenhausen, Milne, & Ford, 1997). However, the manipulation of attitude information in these studies was rather weak, as it involved the use of trait words that were supposed to reflect a specific social category (e.g. Swedish people, immigrants, child abusers). In both studies, the relevant social category was primed prior to list learning. Macrae et al. (1997) primed the social category “child abuser” by having participants read a newspaper article concerning an incident of child abuse prior to list learning; this task was framed as unrelated to the list learning task that followed. Araya et al. (2003) used subliminal facial priming by showing masked presentations of stereotypical Swedish and immigrant faces prior to list learning. In both experiments, following the priming task, lists of trait words were presented as the study stimuli, and both studies reported significant directed forgetting costs. However, it remains unclear whether participants associated the studied

trait words with the primed social category or were aware of the relationship between them. Furthermore, no manipulation checks were used to determine if the participants actually held the relevant stereotypic beliefs. While these studies found significant costs of directed forgetting for stereotypic trait words, there are reasons to suspect that more complex attitudinal information, presented in the form of statements, may reduce or prevent directed forgetting.

Because attitudinal information is a well-integrated part of the self-concept, its presentation is likely to elicit self-referential encoding. Self-referential encoding produces strong memory representations and enhances memory partly because it promotes elaborative and organizational processing (e.g., Klein & Loftus, 1988). For example, participants might elaborate on the presented attitude information by actively linking it with other extra-list counter-arguments and personal experiences already present in memory (Eagly, Kulsea, & Brannon, 2000). They might also organize the presented material by grouping it into categories, such as “things that describe me” versus “things that do not describe me” (Klein & Kihlstrom, 1986). Elaborative and organizational processing are both said to improve memory because they create multiple routes for retrieval (e.g., Hunt & Einstein, 1981; Hunt & McDaniel, 1993).

The strong retrieval cues established in response to encoding attitude information may be resilient to directed forgetting, because they might be used at retrieval to reduce or eliminate the costs of directed forgetting. For example, it is known that participants tend to spontaneously reinstate self-reference conditions at retrieval (Wells, Hoffman, & Enzle, 1984). If directed forgetting arises from changes in mental context between the

study episodes, then attitude information may be resistant to contextual change because at the time of test, self-related cues can be reinstated and overcome the effects of contextual disruption. It is known that reinstating the initial study context at the time of final test reduces the directed forgetting costs (Sahakyan & Kelley, 2002). Therefore, if participants spontaneously reinstate self-reference conditions at the time of test, we might observe a reduced or null directed forgetting effect with attitudinal statements.

The current studies utilized the list-method directed forgetting design using political attitude statements as the study materials. The choice of stimuli was partly motivated by the prominence of the selected issues in everyday life, and because people typically hold pre-existing beliefs and attitudes regarding them. The use of political stimuli enabled us to identify and recruit two distinct groups with divergent viewpoints on the selected issues (Republicans vs. Democrats), and to manipulate the study material to be either congruent or incongruent with their existing beliefs. In Experiment 1, liberally and conservatively phrased political attitude statements concerning a variety of issues were presented to Democrat and Republican participants in a list-method directed forgetting paradigm. Experiment 1 was conducted primarily as an exploratory study, as the main purpose was to observe whether or not typical directed forgetting effects would emerge with complex, self-relevant attitude information. We thought it possible that congruent attitude information may be more resilient to directed forgetting than incongruent attitude information, because congruent attitude information may be more likely to elicit strong self-referential processing than incongruent attitude information. Information with which one agrees may be a more integrated part of the self-concept than

information with which one disagrees. Therefore, the presentation of congruent attitude information may lead to the establishment of many strong, self-relevant retrieval cues that could lead to the elimination or attenuation of the costs of directed forgetting. Incongruent attitude information, on the other hand, may be more susceptible to a directed forgetting cue if this type of information elicits less self-referential processing.

## CHAPTER II

### EXPERIMENT 1 METHODS

#### *Participants*

The participants were 64 University of North Carolina at Greensboro undergraduate students who participated for course credit. Prior to testing, half of the participants identified themselves as Republicans, and half identified themselves as Democrats. They were tested in small groups of no more than 5 participants at a time.

#### *Materials*

A pool of statements reflecting political attitudes was developed according to the following procedure. A group of 44 undergraduate psychology students was assigned 4 of 16 pre-selected political issues (e.g., abortion, global warming) and asked to write two statements regarding each of the 4 issues. They were instructed to write one statement that they thought was representative of a typical Republican viewpoint regarding each issue and one statement that they believed was reflective of a typical Democratic viewpoint regarding the same issue. Responses regarding all 16 issues were collected, and the experimenters selected one representative Republican statement and one representative Democratic statement for each of the 16 issues. Thus, there were 16 liberally phrased statements, and 16 conservatively phrased statements that comprised the pool of stimuli.



To further ensure that the statements would be perceived as representative of the two political ideologies, pre-testing was conducted. Seventy-eight undergraduate psychology students who had no prior familiarity with the items were asked to rate one version of each statement. Therefore, 16 statements (8 Republican and 8 Democratic) were rated by half of the participants, whereas the opposing versions of those statements were rated by the remaining participants. Each participant rated the 16 statements based on how representative they felt each was of a Republican or a Democratic viewpoint. They were asked to use a scale from 1 to 7, where 1 reflected the most characteristic Democratic viewpoint, and 7 reflected the most characteristic Republican viewpoint. Pre-testing results confirmed that students perceived the Republican and Democratically phrased statements as representative of typical party ideologies; they rated Republican statements significantly higher (5.4) than they rated Democratic statements (3.0),  $t(78)=15.18$ ,  $p<.001$ . Therefore, the final pool of items consisted of the same 32 statement used in pre-testing.

From the final pool of 16 topics, experimenters created two lists (A and B), each containing four liberal and four conservative statements. Two additional lists (C and D) were created that contained the same 16 topics as Lists A and B, but the statements were phrased in the opposite way. For example, a liberally-phrased statement on List A was phrased in a conservative way on List C (and vice versa). Each participant studied two lists (either A and B, or C and D). The order of the lists was counterbalanced. Thus, each person studied 4 conservative and 4 liberal statements in each study list.

### *Design*

This study employed a mixed factorial design, with Cue (forget vs. remember) and Party Affiliation (Republican vs. Democrat) as the between subjects factors, and Attitude Statements (congruent vs. incongruent) as the within subjects factor. When the party affiliation of the participants coincided with the phrasing of the statements that they studied, we termed this condition *congruent* (i.e., conservative statements studied by Republicans and liberal statements studied by Democrats); whenever they were opposite, we termed this condition *incongruent* (i.e., liberal statements studied by Republicans, and conservative statements studied by Democrats).

### *Procedure*

The procedure followed the list method of directed forgetting. Prior to list presentation, participants were informed that they should read and memorize the presented statements. During encoding, participants were instructed to rate each statement, on a scale of 1 to 7, according to how conservatively or liberally they thought each statement was phrased. Participants were informed that a rating of 1 should be given to those statements that they thought represented the most liberal attitudes, and a rating of 7 was to be given to those statements that they considered most representative of conservative attitudes.

All statements were presented on a computer screen at a rate of 10 s per statement. List 1 presentation was followed by either a forget or a remember cue, which was verbally presented by the experimenter. Participants receiving the *forget* cue were informed that List 1 presentation was “just for practice,” and was presented in order to

familiarize them with the task. They were told to try and forget those statements because they would not be tested. The *remember* cue specified that the statements presented on List 1 were just the first half of items that were to be remembered for a later memory test.

Following the mid-list cue, all participants were presented with a second list of statements. After studying List 2, participants were first given 3 minutes to recall List 1 statements, and an additional 3 minutes to recall List 2 statements. Recall was carried out on separate sheets of paper, and participants were informed that they could paraphrase the statements.

### CHAPTER III

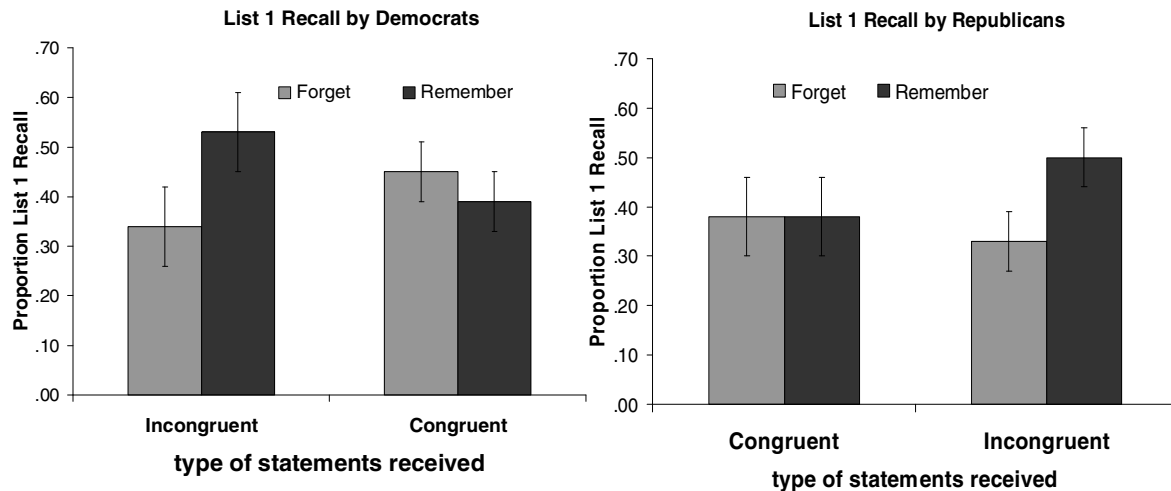
#### EXPERIMENT 1 RESULTS

A statement was scored as correct only if the participant both successfully recalled the main topic of the statement (e.g. abortion) and made some indication of whether the statement had been presented as liberally or conservatively phrased. For example, for the presented statement “Abortion of an unborn child is murder,” the recalled phrase “abortion is wrong” would have been an acceptable response, whereas “abortion” would not count toward correct recall.

The number of statements that were switched during recall (e.g., liberally presented statements recalled with conservative phrasing, or conservatively presented statements recalled with liberal phrasing) was also recorded. Overall, the mean proportion of confusions during recall was very low (.02 on List 1 and .01 on List 2).

*Directed Forgetting Costs.* To examine the effect of attitude congruency on directed forgetting, a mixed-factorial ANOVA was conducted on proportion of correct List 1 recall using *cue* (forget vs. remember), *party* (Democrat vs. Republican), and *attitude statements* (congruent vs. incongruent). The results are displayed in Figure 1.

**Figure 1.** Proportion of List 1 Recall by Attitude Statements, Cue, and Party in Experiment 1. Error bars represent SE.

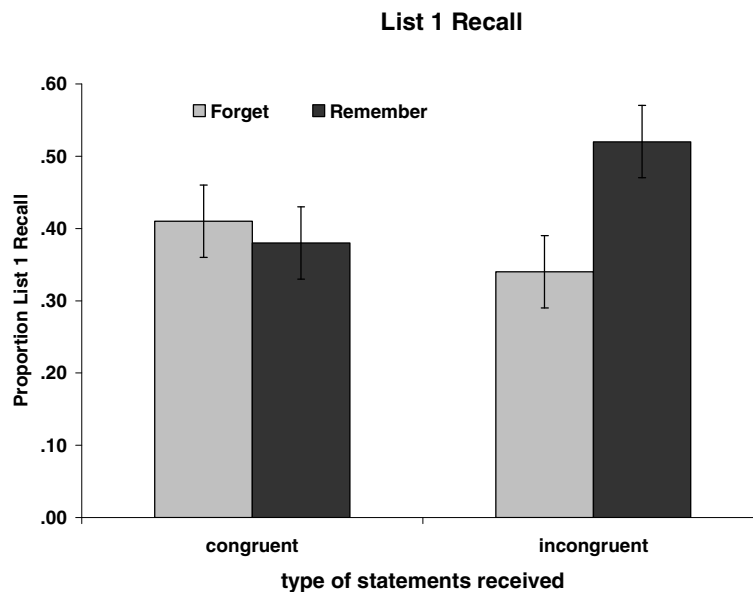


No significant main effects were found (Cue,  $F(1,60)=1.29$ ,  $p=.26$ ; Party,  $F<1$ ; Attitude Statements,  $F<1$ ). However, a significant attitude statements by cue interaction was identified,  $F(1,60)=7.78$ ,  $MSE=.049$ ,  $p<.01$ ,  $\eta^2=.12$ . Follow-up tests indicated that participants in the forget condition recalled significantly fewer incongruent statements (.34) than participants in the remember group (.53),  $t(32)=2.76$   $p<.01$ . However, there was no significant difference in recall of congruent statements between the remember group (.38) and the forget group (.43),  $t<1$ . In other words, incongruent statements showed the costs of directed forgetting, whereas the congruent statements did not (See Figure 2). Furthermore, this pattern of forgetting emerged for both Republicans and Democrats, as there was no significant 3-way interaction ( $F < 1$ ). None of the remaining two-way interactions were significant (all  $F$ 's  $<1$ ). To summarize, Democrats forgot

conservatively phrased statements, and Republicans forgot liberally phrased statements, but they did not forget the statements that expressed the views of their own party.

**Figure 2.** Proportion of List 1 Recall by Cue and Attitude Statements in Experiment 1.

Error bars represent SE

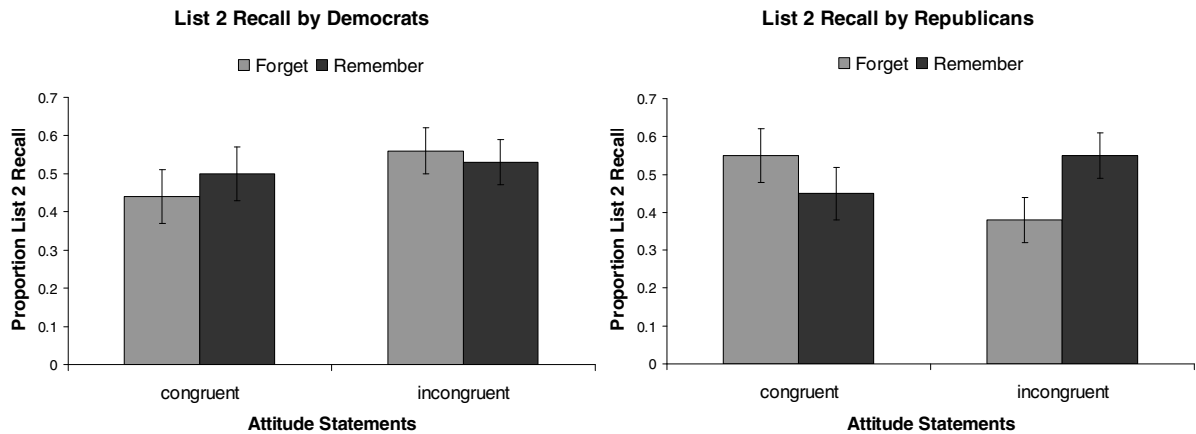


*Directed Forgetting Benefits.* While the costs of directed forgetting were of principal interest in this study, we also examined the directed forgetting benefits using similar analyses. The results are summarized in Figure 3. A mixed-factorial ANOVA on proportion of List 2 recall by *cue* (forget vs. remember), *attitude statements* (congruent vs. incongruent) and *party* (Republican vs. Democrat) revealed no significant main effects (all  $F$ 's < 1). Furthermore, no 2-way interactions were significant (Party x Cue:

$F < 1$ ; Attitude Statements x Cue:  $F(1,60)=1.04, p=.31$ ; Attitude Statements x Party:  $F(1,60)=1.94, p=.17$ . However, a significant 3-way interaction was observed,  $F(1,60)=4.55, MSE=.057, p<.05, \eta^2 =.07$ .

To follow-up this interaction, separate analyses were conducted on congruent and incongruent attitude statements using *cue* (forget vs. remember) and *party* (Democrat vs. Republican). For congruent statements, there were neither significant main effects ( $F$ 's < 1), nor an interaction,  $F(1,63)=1.42, p=.24$ . In other words, there were no directed forgetting benefits for congruent attitude statements. For incongruent statements, there were also no significant main effects (Cue:  $F(1, 63)=1.28, p=.26$ ; Party:  $F(1,63)=1.92, p=.17$ ). The cue by party interaction approached but did not reach significance,  $F(1,63)=2.68, p=.11$ . Although the interaction was not significant, we nonetheless conducted follow-up tests to better explore the results. Additional analyses revealed that on incongruent statements, Democrats showed no directed forgetting benefits,  $t < 1$  (.53 in Remember and .56 in Forget), but the Republicans actually showed significant anti-benefits,  $t(16)=2.07, p<.05$ , with better List 2 recall in the remember condition than in the forget condition. Overall, the analyses revealed no significant directed forgetting benefits either on congruent or incongruent statements; surprisingly, Republicans showed significant anti-benefits on List 2 incongruent statements.

**Figure 3.** Proportion of List 2 Recall by Attitude Statements, Cue, and Party in Experiment 1. Error bars represent SE



*Summary.* The directed forgetting costs were observed only on incongruent attitude statements, but not on congruent attitude statements, and this was true both in the Republican and the Democrat participants' recall. In other words, participants were unable to intentionally forget statements that expressed the views of their own party, but were able to forget statements that expressed the views of the opposing party. Additionally, no significant directed forgetting benefits were found on either type of statement; quite unexpectedly, the Republican participants displayed significant anti-benefits of List 2 incongruent statements.

If we assume that in general participants agreed with congruent statements and disagreed with incongruent statements, then the directed forgetting costs results imply that agreement might moderate one's ability to intentionally forget information. In the



current study, participants were unable to intentionally forget congruent statements that expressed the views of their own party, presumably because they were more likely to endorse those views compared to views expressed in incongruent statements. However, because no agreement ratings were collected in Experiment 1, it remains to be seen how the congruent/incongruent categorization of attitude statements reflects the degree to which participants actually endorse those views, and how the level of endorsement affects directed forgetting. This was addressed in Experiment 2.

## CHAPTER IV

### EXPERIMENT 2 METHODS

In Experiment 2 we required participants to rate each statement in terms of how much they endorsed the views expressed in it. This change was made to allow for a more detailed exploration of a possible mediating effect of attitude endorsement on directed forgetting, and to take into account any variability in the degree of agreement within the congruent and incongruent statements. In all other respects, the study was identical to Experiment 1.

#### *Participants*

The participants were 85 University of North Carolina at Greensboro undergraduate students who participated for course credit. Prior to testing, 41 of the participants identified themselves as Republicans, and 44 identified themselves as Democrats. They were tested in small groups of no more than 5 participants at a time.

#### *Materials*

The materials used in the current study were the same as those used in Experiment 1. The Mehrabian(1996) Liberalism-Conservatism scale was also used in this experiment as an independent measure of political party affiliation. This is a seven item scale that is comprised of items such as, “I am politically more liberal than conservative”. Participants are required to provide a rating of +4 (very strong agreement) to -4 (very strong

disagreement) for each item. Highly positive scores on this scale represent strong conservatism, and large negative scores reflect liberalism. Scores on this scale can range from -28 to +28.

### *Procedure*

The procedure for Experiment 2 was identical to that of Experiment 1, except for two small changes. Participants were asked to rate each statement for agreement/disagreement rather than for liberalism/conservatism, using a scale from 1 to 7, where 1 represents strong agreement, and 7 represents strong disagreement. Also, participants completed the Mehrabian (1996) Liberalism-Conservatism following List 2 recall.

## CHAPTER V

### EXPERIMENT 2 RESULTS

On average, the scores on the Mehrabian (1996) Liberalism-Conservatism scale validated participants' self reports of political party affiliation. The scores obtained from self-reported Democrats ( $M = -6.24$ ,  $SD = 7.12$ ) were significantly lower than the scores obtained from self-reported Republicans ( $M = 9.71$ ,  $SD = 7.71$ ),  $t(81) = 9.79$ ,  $p < .001$ . Two scale scores were missing from this analysis, as two participants did not complete the scale due to experimenter error. Although for most participants the scale scores validated their self-reports, ten participants received scores on the scale that did not correspond with their self-reported political party (i.e., some self-reported Democrats scored in the Republican range of the scale and vice versa.). Because of these contradictory scores, political party in all reported analyses was defined by the Liberalism-Conservatism scale scores rather than self-reports. The former is likely to be a more sensitive measure as it consists of several questions that inquire about party affiliation as opposed to self-reports, which could be influenced by demand characteristics of the experiment. The two participants who did not complete the scale due to experimenter error were excluded from the analyses.

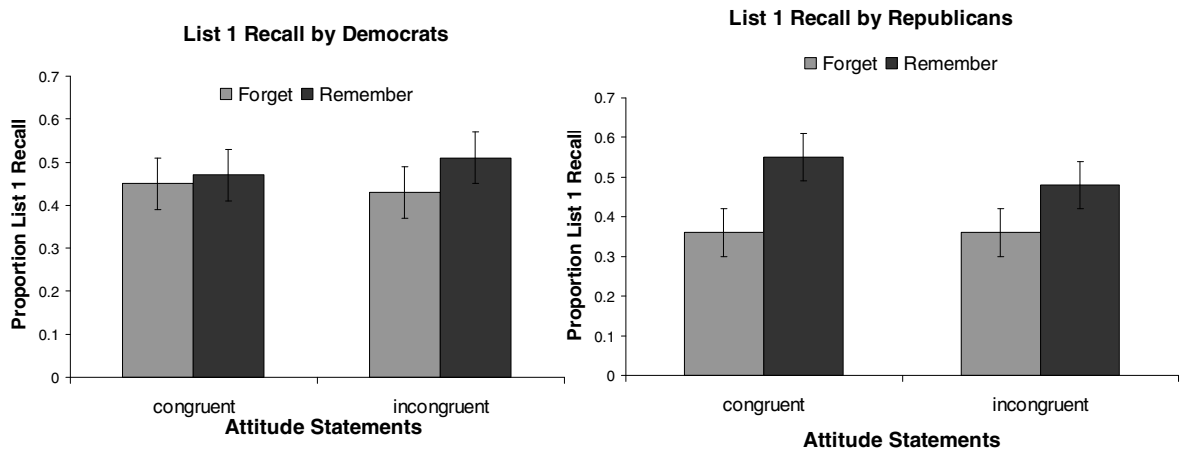
The number of statements that were switched during recall (i.e., liberally presented statements recalled with conservative phrasing, or conservatively presented statements recalled with liberal phrasing) was again recorded in Experiment 2. As in

Experiment 1, the mean proportion of switches was very low both on List 1 (.04) and on List 2 (.03).

Participants' average agreement ratings were also analyzed to determine how well they mapped onto the incongruent/congruent distinction of statements. On the scale from 1 to 7, ratings higher than 4 indicated disagreement, whereas ratings lower than 4 indicated agreement. Overall, participants rated congruent statements significantly lower (3.33) than incongruent statements (4.13),  $t(83)=4.15$ ,  $p<.001$ , confirming that they tended to agree more with congruent statements, and disagree more often with incongruent statements.

*Directed Forgetting Costs.* To analyze the directed forgetting costs, a mixed factorial ANOVA was conducted on proportion of correct List 1 recall using *cue* (forget vs. remember), *party affiliation* (Republican vs. Democrat), and *attitude statements* (congruent vs. incongruent). The results are summarized in Figure 4.

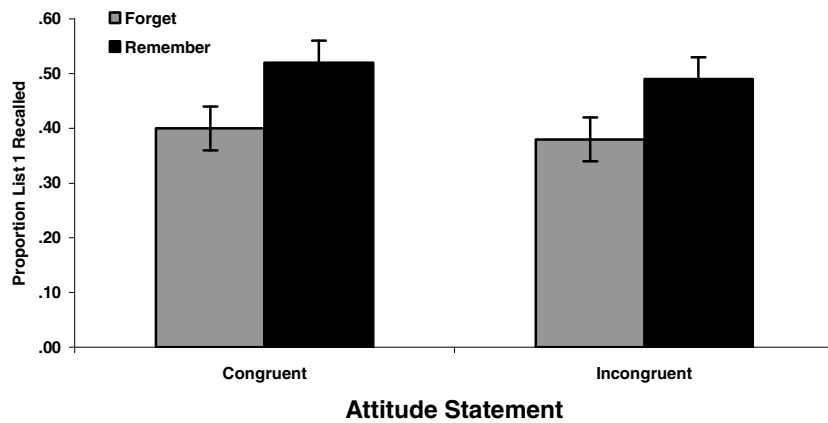
**Figure 4.** Proportion of List 1 Recall by Attitude Statements, Cue, and Party in Experiment 2. Error bars represent SE



Only a significant main effect of cue emerged,  $F(1,79)=5.32$ ,  $MSE=.090$ ,  $p<.05$ ,  $\eta^2=.06$  (.50 in Remember and .40 in Forget). None of the remaining main effects or interactions was significant (Party Affiliation x Cue,  $F(1,79)=1.23$ ,  $p=.27$ ; all other  $F$ 's < 1). Most surprisingly, counter to what was observed in Experiment 1, the cue by attitude statements interaction was not significant,  $F < 1$ , which indicates that participants showed equivalent forgetting of both congruent and incongruent statements (see Figure 5).

**Figure 5.** Proportion of List 1 Recall by Cue and Attitude Statements in Experiment 2.

Error bars represent SE.



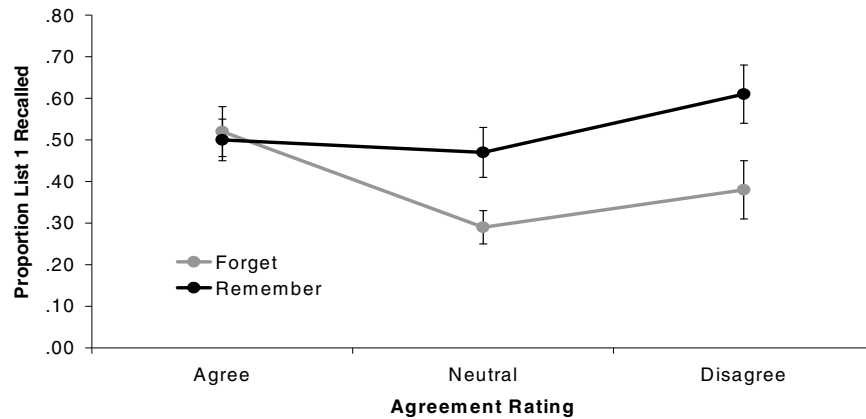
*Directed Forgetting Costs by Agreement Ratings.* List 1 recall was also analyzed as a function of participants' degree of agreement with the attitude statements. The statements were grouped into three broad categories – agree, neutral, and disagree. Any statement receiving a rating of 1 or 2 was classified as an *agree* statement, statements rated as 3, 4, or 5 were classified as *neutral*, and statements rated as 6 or 7 were labeled as *disagree*. Separate agree, neutral, and disagree statement recall proportions were calculated by dividing the number of each type of statement recalled at test by the total number of the corresponding statement type rated during study. For example, if a participant rated two of the eight List 1 statements as disagree statements, and recalled only one of the disagree statements at recall, the proportion of disagree statement recall

would be ½ or .50. Separate analyses were conducted using these agree, disagree, and neutral recall proportions to determine the magnitude of directed forgetting costs for each type of statement.

The results showed that there were significant directed forgetting costs on *disagree* statements, with the forget group recalling significantly fewer disagree statements from List 1 (.39) than the remember group (.61),  $t(67)=2.24, p<.05$ . Similarly, analyses on *neutral* statements also revealed significant directed forgetting costs, with the forget group recalling fewer neutral statements (.31) than the remember group (.47),  $t(80)=2.36, p<.05$ . In contrast, recall of *agree* statements in the remember condition (.50) did not differ significantly from the forget condition (.51),  $t<1$ , revealing no directed forgetting costs for the agree statements. To summarize, when participants agreed with the views reflected in the statements they studied, they were unable to intentionally forget them; however, if they disagreed or felt neutral about them, they were able to deliberately forget them (see Figure 6). Therefore, the degree of attitude endorsement moderated the ability to intentionally forget information. Although we only report results from the analyses where statements were grouped as *agree* (1-2), *neutral* (3—5), and *disagree* (6-7), we also examined results through alternative ways of grouping the statements into the three categories, including examining only extreme ratings (i.e., *agree* (1), *neutral* (4), and *disagree* (7)). Regardless of the grouping method, the basic pattern of findings was obtained in all analyses – there was no forgetting of statements that participants agreed with, but there was directed forgetting of disagree and neutral statements.



**Figure 6.** Proportion of List 1 Recall by Cue and Agreement in Experiment 2. Error bars represent SE.

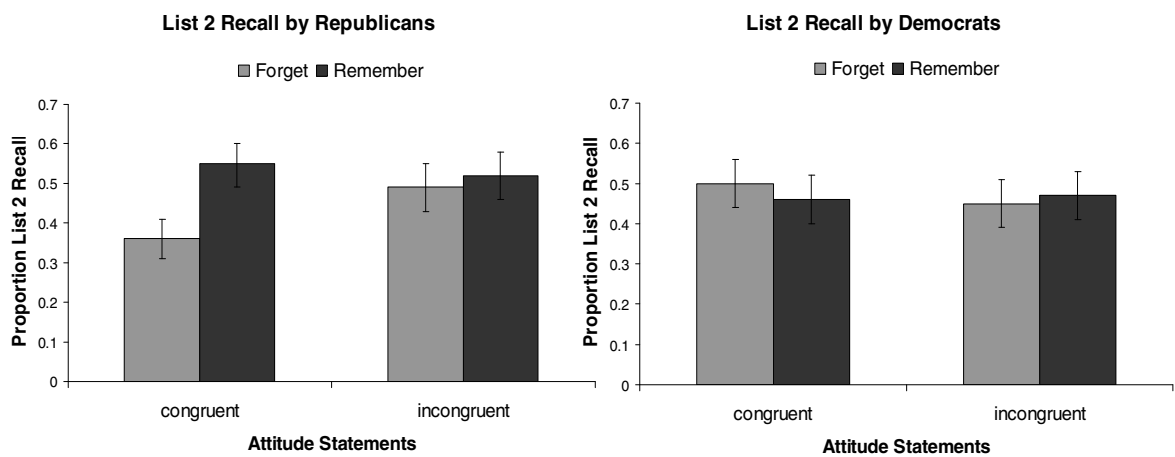


*Directed Forgetting Benefits.* To evaluate the benefits of directed forgetting, a mixed-factorial ANOVA was conducted on proportion of correct List 2 recall using *cue* (forget vs. remember), *party* (Republican vs. Democrat), and *attitude statements* (congruent vs. incongruent). The results are summarized in Figure 7. No main effects were identified (Cue,  $F(1,79)=1.45$ ,  $p=.23$ ; Party:  $F<1$ ; Attitude Statements,  $F<1$ ). There were also no significant 2-way interactions (Cue x Party Affiliation,  $F(1,79)=1.90$ ,  $p=.17$ , all other  $F$ 's $<1$ ). Likewise, there was no significant 3-way interaction,  $F(1,79)=2.36$ ,  $p=.13$ .

Given that the 3-way interaction was approaching significance, we further explored the results. Overall, the follow-ups revealed that there were significant directed forgetting anti-benefits in the Republican group on the congruent statements,  $t(42)=2.71$ ,

$p < .05$ , but not on incongruent statements,  $t < 1$ . On the other hand, in the Democrat group, the directed forgetting benefits were absent both on congruent statements and on incongruent statements, both  $t$ 's  $< 1$ .

**Figure 7.** Proportion of List 2 Recall by Attitude Statements, Cue, and Party in Experiment 2. Error bars represent SE



*Directed Forgetting Benefits by Agreement Ratings.* List 2 recall was also analyzed as a function of participants' degree of agreement with the attitude statements. There were no significant List 2 recall differences for the *agree* statements  $t < 1$  (.49 in Forget and .57 in Remember). There were also no significant differences in List 2 disagree statement recall,  $t < 1$  (.37 in Forget and .46 in Remember). Finally, there were no significant differences in List 2 recall of neutral statements  $t(80) = 1.57$ ,  $p = .12$  (.40 in Forget and .50 in Remember).

*Summary.* Significant costs of directed forgetting were observed for both incongruent as well as congruent statements. This means that participants were able to intentionally forget statements that expressed the views of their own party as well as statements that expressed the views of the opposing party. When statements were further broken down into those participants agreed, disagreed, or felt neutral about, only the disagree and neutral statements produced significant directed forgetting costs; statements with which participants agreed were not successfully forgotten.

The results of the benefits analyses revealed no typical directed forgetting benefits either on congruent or incongruent statements. The benefits were also absent when recall was analyzed by degree of agreement. However, Republicans showed significant anti-benefits for congruent statements

## CHAPTER VI

### GENERAL DISCUSSION

Two list-method directed forgetting studies were conducted using political attitude statements to determine whether attitude congruency and level of agreement affect one's ability to intentionally forget information. In Experiment 1, participants were able to successfully forget information that expressed views which were incongruent with their own political party (i.e., Democrats were able to forget conservatively phrased statements, and Republicans were able to forget liberally phrased statements). However, they were unable to forget statements that were congruent with the views associated with their own political party. Experiment 2 was identical to Experiment 1, except that participants were asked to indicate their level of agreement or disagreement with each statement. Contrary to what was observed in Experiment 1, participants showed significant forgetting of congruent as well as incongruent statements in Experiment 2. However, when recall was further analyzed by the degree of agreement, some interesting findings emerged. Specifically, participants were unable to forget statements with which they agreed, but were able to forget statements they felt neutral about as well as statements they disagreed with.

There was an interesting discrepancy in findings between the two experiments – specifically, congruent statements were not forgotten in Experiment 1, but the same congruent statements showed significant directed forgetting in Experiment 2. The only

difference between these two experiments was the orienting task that was used during presentation of statements. In Experiment 1, participants were asked to rate each statement for how liberally or conservatively they thought each statement was phrased. However, in Experiment 2, they rated each statement for the level of agreement or disagreement.

It is possible that the conservative/liberal judgments used in Experiment 1 led to strong priming of party affiliation, which in turn led to more extreme feelings of agreement or disagreement in that experiment. For example, participants may have felt more obligated to agree or disagree along party lines when political party affiliation was made salient in Experiment 1. In other words, the orienting task could have biased participants' true feelings of agreement or disagreement in Experiment 1. In contrast, in Experiment 2, the orienting task did not emphasize political party, and participants' ratings of agreement or disagreement may have more accurately reflected their own endorsement of those views. Note that in Experiment 2, nearly one half of the congruent and incongruent statements were rated neutrally (See Table 1).

**Table 1.** Proportion of List 1 Recall by Agreement Ratings in Experiment 2

<b>List 1 Statements</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>
<b>Congruent</b>	37.0%	49.8%	13.2%
<b>Incongruent</b>	21.1%	46.7%	32.2%

Therefore, it is possible that in Experiment 1, the party priming from the orienting task may have led to a larger proportion of congruent statements being perceived as “agree” statements than what was observed in Experiment 2. If more of the congruent statements were perceived as “agree” statements in Experiment 1, this could explain why they were unforgettable in that experiment; specifically because “agree” statements were shown to be immune to directed forgetting in Experiment 2.

### **Mechanisms by which Agreement Moderates Directed Forgetting Costs**

Previous research shows that the degree of attitude endorsement also moderates other forgetting phenomena such as retrieval-induced forgetting (Dunn & Spellman, 2003). They found that the more participants endorsed certain stereotypes, the less retrieval-induced forgetting of stereotypic information they displayed. Dunn and Spellman argue that participants’ high level of endorsement of relevant stereotypes serves to integrate stereotypic information, thereby preventing forgetting. The findings of the current studies suggest that agreement is also an important variable that moderates the ability to deliberately forget certain information. Specifically, information with which participants agree becomes immune to directed forgetting, and an important question is why this happens.

Attitude information with which one agrees may be more integrated in memory as part of the self-concept than more neutral information, or information with which one disagrees (Dunn & Spellman, 2003). It is reasonable to assume that attitude information contained in the self-concept may most often take the form of information a person agrees with, because people tend to review or summarize their own beliefs in terms of

agreement. For instance, it is more likely that a person might say “I am against the Iraq War,” and “I am pro-choice,” than “I disagree that the Iraq war is justified,” or “I disagree with people who are pro-life.” While these statements do reflect the same views, the statements that are phrased in terms of the person’s agreement may be more integrated with each other as part of the self-concept because people practice retrieving them together more often than statements phrased in terms of disagreement.

Because attitudes with which one agrees are likely a relatively stable, integrated part of the self-concept, they may be harder to intentionally forget for several reasons. First, people most likely have access to many self-relevant retrieval cues for information that they agree with, and can access and reinstate these strong cues during retrieval despite being given an instruction to forget. Second, if agree statements become easier to integrate, then the presentation of one agree statement could remind people of other agree statements. For example, when participants encounter a statement on List 2 with which they agree, it could remind them of other agree statements from List 1 and eliminate the directed forgetting costs. Research shows that when items across the two lists are related to each other, they tend to remind participants of List 1 items they are trying to forget, and this recursive reminding prevents directed forgetting (e.g., Conway et al., 2000; Sahakyan & Goodmon, in press). In fact, it could be argued that presentation of disagree information may also lead to reminding of already studied agree information as part of a defensive, counter-argumentation process. Eagly et al. (2000) has described a process by which participants react to counter attitudinal information by producing counter-arguments in response to the information they disagree with. Therefore, a counter-

argument, which is essentially an agree statement produced in reaction to a disagree statement, may also serve to remind participants of other agree statements already studied and reduce directed forgetting.

No significant benefits of directed forgetting were observed in either experiment. According to the strategy change theory of directed forgetting benefits (Sahakyan & Delaney, 2003), benefits may have failed to emerge because participants in the forget condition were not more motivated to switch to a better encoding strategy on List 2 compared to participants in the remember condition. Sahakyan and Delaney (2003) noted that participants who switched encoding strategies from List 1 to List 2 most often switched from a shallow encoding strategy on List 1 to a deep encoding strategy on List 2. They proposed that this strategy change takes place more often in the forget group than in the remember group because a forget cue serves to break up the study episode and allows participants in the forget group to assess and realize the ineffectiveness of their shallow List 1 strategy. This mid-list assessment makes participants in the forget group more likely to switch strategies in attempts to improve List 2 encoding than participants in the remember group, who are never presented with a clear opportunity to assess List 1 learning. However, in the current study, encoding was controlled because participants were required to perform the same orienting task on both lists. Sahakyan and Delaney (2003) demonstrated that requiring use of the same encoding strategy on both lists eliminates benefits, because the opportunity to switch to a more efficient strategy on List 2 is prevented. Therefore, because encoding strategy was controlled in the current studies, participants may not have recognized any opportunity to switch strategies



between Lists 1 and 2. Additionally, even if participants did evaluate their encoding strategy following List 1, because the orienting tasks engaged deep processing on List 1, participants in both the remember and forget conditions likely did not perceive a strategy shift between Lists 1 and 2 necessary to improve List 2 recall. Finally, while many participants may be aware of different mnemonics that they can use to improve the encoding of lists of words, such as making up a story, they may simply not know of any strategies that they can use to improve the encoding of sentences. If this is the case, a strategy change between lists would not be expected.

While there were no directed forgetting benefits observed in either experiment, in both experiments Republicans showed anti-benefits on List 2 recall. However, unlike in Experiment 1, where Republicans showed anti-benefits for incongruent statements, in Experiment 2 they showed significant anti-benefits for congruent statement recall. We had no a priori reason to expect anti-benefits, or that Republican and Democrats would show different patterns of List 2 recall. While it is interesting that only Republicans showed anti-benefits, because these anti-benefits were obtained for incongruent statements in Experiment 1 and congruent statements in Experiment 2, there seems to be no clear explanation for the effect that we can give at this time.

### **Implications for Theoretical Mechanisms of Directed Forgetting**

As described in the introduction section, there are currently two classes of theories of directed forgetting – single-process account, which explain the costs and the benefits via a single mechanism, and dual-process theories, which explain the costs and benefits with two separate mechanisms. In the current studies, costs of directed

forgetting were observed in both experiments, however, no significant benefits were observed in either experiment. The dissociation between the costs and the benefits is problematic for single-process theories because they assume that these effects are interdependent and that one cannot observe one effect of directed forgetting without the other. Sahakyan and Delaney's (2003, 2005) dual process account of directed forgetting allows one to explain the emergence of costs but not benefits, without having to make additional assumptions, because the costs and the benefits are attributed to two separate mechanisms that do not always operate simultaneously.

While the dual-process account provides a better explanation for the absence of benefits despite significant costs, the presence of costs could be explained using any one of three popular directed forgetting mechanisms: selective rehearsal, retrieval inhibition, or context change.

First, Bjork's (1970, 1972) selective rehearsal theory posits that the costs of directed forgetting arise because participants in the forget group terminate rehearsal of List 1 items following a forget cue, and are consequently less able to recall those items than participants in the remember group. The finding that both disagree and neutral statements were forgotten is consistent with this theory; however, how this theory might explain the lack of forgetting of agree statements is less clear. One could assume that the deep encoding or strong retrieval cues associated with agree statements could compensate for the lack of rehearsal of these items. However, if this were the case, one might also have expected a lack of forgetting of disagree statements, as these statements were actually recalled better in the remember condition in Experiment 2 than were agree

statements. This finding implies that strong encoding and good retrieval cues were also likely present for the disagree statements, and yet did not prohibit successful forgetting. To account for the lack of forgetting of agree statements we would need to assume that this type of information is insensitive to encoding factors. Future research is needed to determine whether or not this is the case.

Bjork's (1989) retrieval inhibition hypothesis attributes the costs of directed forgetting to the inhibition or blocked access to List 1 items during retrieval in the forget group. Once again, this account can easily explain the costs that were observed for disagree and neutral statements. However, to explain the lack of costs for agree statements, one must assume that participants were less able to inhibit agree statements than disagree or neutral statements. It is possible that integration of agree statements may have led to an inability to inhibit these items. Researchers in both the areas of directed forgetting (Conway et al., 2000) and retrieval-induced forgetting (Anderson & McCulloch, 1999) have argued that item integration can reduce or eliminate inhibitory effects.

Finally, Sahakyan and Kelley's (2002) context change account states that the costs of directed forgetting arise because the presentation of a forget cue leads to a switch in mental context between Lists 1 and 2; in following, List 1 forget group recall suffers because the context present at the time of retrieval does not match that of List 1 encoding. A context switch may have led to forgetting of neutral and disagree statements, as access to the cues associated with these statements may have been lost following this context change. It is also possible that because attitude information with which one agrees is

likely a well-integrated part of the self-concept that the self-relevant cues associated with agree information were easily reinstated following the context change, leading to a lack of forgetting of these statements.

While the current results do not clearly distinguish what theory or combination of theories best explains directed forgetting, the emergence of boundary conditions found in the current study (such as agreement), are important because they continue to shape and develop the theoretical understanding of this phenomenon. The current study revealed an important role of agreement in directed forgetting of self-relevant attitude information. However, further research needs to address the role of other factors such as personal importance, knowledge level, and/or emotional reaction. These variables play an important role in memory for attitudes ( e.g., Zajonc, 1980; Holbrook, Berent, Krosnik, Visser, & Boninger, 2005; Wiley, 2005) and might also mediate the directed forgetting effect.

An important implication of the current study is that the presentation context in which attitude information is framed can affect how forgettable that information becomes. In the current study, simply changing the orienting task that participants were required to perform during encoding affected the forgetting of congruent statements, which were unforgettable when participants were required to rate statements for their liberal/conservative phrasing, but were forgettable when participants were asked rate them according to agreement/disagreement. The same kind of effect may take place in more real-world situations. For example, it is possible that people may be less likely to forget information they learned during a political debate if their own political party was

made very salient during presentation of the information they agreed with. However, people may be more able to forget unwanted information when it is presented in a context that is framed strictly in terms of agreement/disagreement rather than political party affiliation, such as in the case of an Independent candidate running for office for example.

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