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MOTIVATED MEMORY: MEMORY FOR ATTITUDE-RELEVANT INFORMATION AS A FUNCTION OF SELF-ESTEEM

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In this article we offer a new perspective on the contradictory findings in the literature on memory for attitude-relevant information. We propose that biases in memory are most likely to occur when the attitude involved is connected to personally important values and the self; i.e., if the attitude serves a value-expressive function. Moreover, we argue that the nature of these biases depends on participants' self-esteem because self-esteem is related to the perceived individual ability to effectively refute counter-attitudinal information. Three studies show that, for value-expressive attitudes, people with low self-esteem remember more pro-attitudinal information while their high self-esteem counterparts remember more counter-attitudinal information. We argue that this is the result of high self-esteem participants employing active-defensive and low self-esteem participants using passive-defensive strategies. Implications and suggestions for future research are discussed.

Traditionally, psychologists have assumed that people have better memory for information supporting their attitude as opposed to information contrary to their attitude. This so-called congeniality hypothesis can be related to people's motivation to defend their attitudes. For instance, people prefer information that supports their attitude over information that does not support it (Albarracin et al., 2009; Brannon, Tagler, & Eagly, 2007; Festinger, 1957; Frey, 1986; Smith, Fabrigar, Powell, & Estrada, 2007). However, people are not always in a position to choose which information they encounter. So what do people do when confronted with counter-attitudinal information? According to the congeniality hypothesis, people try to ignore it, pay little attention to it, or process it in a shallow manner. When both counter-attitudinal and pro-attitudinal information is present, as was the case in virtually all studies on the congeniality effect, the shallow processing of coun-

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ter-attitudinal information should render it less memorable and consequently pro-attitudinal information relatively more memorable, thus establishing a congeniality effect (Eagly, Chen, Chaiken, & Shaw-Barnes, 1999).

However, empirical evidence concerning the congeniality effect is mixed. Only a small majority of 70 studies included in an extensive meta-analysis displayed a congeniality effect, albeit weak, while the remaining studies showed no effect at all, or even an effect in the opposite direction (Eagly et al., 1999; see also Roberts, 1985). This led the authors to conclude that "the tendency for attitudes to bias memory in a congenial direction warrants description as extremely small or even as null" (Eagly et al., 1999, p. 84). The current research aims to provide a solution to the contradictory findings in tests of the congeniality effect and provides new insights into the onset, occurrence, and direction of biases in memory for attitude-relevant information. More specifically we will focus on the role of the self.

Attitudes that are said to have a strong link to the self are also known as serving a value-expressive function or having value-relevant involvement (Johnson & Eagly, 1989, 1990; Katz, 1960). Such attitudes are related to personally important values and moral judgments. Notwithstanding individual differences, typical examples of attitude-objects serving a value-expressive function are organ donation, animal rights, and the death penalty. Interestingly, Holland (2003) demonstrated that attitudes that participants idiosyncratically rated as high in value-relevance became more accessible when primed with the self, while those that were considered low in value-relevance did not. The reverse was also observed: priming with value-expressive attitudes made the self-concept more accessible while priming with attitudes that did not serve this function did not. These results suggest that there is indeed a link between the self and value-relevant attitudes.

The link with the self can help to explain why value-expressive attitudes are so difficult to change (Johnson & Eagly, 1989; Maio & Olson, 1995). If changing one's attitude implies changing a cherished aspect of the self, people should be reluctant to do so. As Levin, Nichols, and Johnson (2000, p. 164) state: "People who are involved with an attitude-issue in a manner similar to ... the value-expressive function are motivated to maintain their current attitude in defense of their values and self-concept." This involvement—also called ego-involvement (Sherif & Cantril, 1947) or value-relevant involvement (Johnson & Eagly, 1989)—can be equated with the involvement people have with attitudes serving an ego-defensive function (Johnson & Eagly, 1989; Katz, 1960; Levin, Nichols, & Johnson, 2000; also termed "externalization function": Smith, Bruner, & White, 1956). According to this function, people protect themselves from undesirable (i.e., negative) information about their personality, accomplishments, appearance, et cetera. Ego-defensive attitudes thus serve to defend one's self-image and self-esteem.

We argue that the self is contingent on value-expressive attitudes. By this we mean that information questioning these attitudes is a potential threat to the self that will instigate a need to protect the self. However, this does not necessarily imply that counter-attitudinal information is processed superficially as is assumed by the congeniality hypothesis. We believe that people can employ different methods to defend their attitude just as people can use different strategies to protect their self-esteem (see Tesser, 2000). Thus, instead of processing counter-attitudinal information passively, people can also employ more active strategies like counter-arguing.

This possibility was first introduced by Eagly and colleagues as an explanation for the limited empirical support for the congeniality hypothesis (Eagly, Kulesa, Brannon, Shaw, & Hutson-Cumeaux, 2000). They argued that an absence of the congeniality effect could be attributed to people using an active-defensive mode of processing. The active-defensive mode consists of the refutation of counter-attitudinal material and requires more elaboration than a more passive, avoidant strategy. This enhanced elaboration, in turn, is associated with a stronger memory trace (Craik & Lockhart, 1972). Better memory for counter-attitudinal information can thus be seen as the result of the more elaborate processing of counter-attitudinal content. Research by Eagly et al. (2000) supported this idea: participants that had engaged in counter-arguing (measured with a thought-listing task) had better memory for the statements that opposed their own attitude than participants who did not or to a lesser degree engage in counter-arguing. These findings thus suggest an active-defensive processing mode, but the question remains when either of the two processing modes is employed.

Because value-expressive attitudes are linked to the self-concept, we expect self-esteem—being one of the most important and central aspects of the self-concept (Greenwald, Bellezza, & Banaji, 1988)—to affect how people deal with counter-attitudinal information. Self-esteem is related to the confidence one has in one's ability to take on life's challenges (self-efficacy, e.g., Judge, Erez, Bono, & Thoresen, 2002). More importantly, self-esteem is associated with a host of other constructs that all suggest that people higher in self-esteem tend to approach and confront potentially threatening situations while those lower in self-esteem avoid them. This is, for example, reflected in the literature on coping (Carver, Scheier, & Weintraub, 1989; Holahan & Moos, 1987; Mullis & Chapman, 2000; Smith, Wethington, & Zhan, 1996) and promotion versus prevention focus (McGregor, Gailliot, Vasquez, & Nash, 2007).

With regard to attitudes, self-esteem is related to defensive confidence: the belief that one can successfully defend one's attitude. This conviction of high self-esteem participants led them to select more information incongruent with their attitude as compared to participants with low self-esteem (Albarracin & Mitchell, 2004). Similarly, our own recent results show that low but not high self-esteem individuals tended to postpone reading a counter-attitudinal essay. Moreover, when confronted with counter-attitudinal information, low self-esteem individuals attended more to distracting information that was presented simultaneously relative to high self-esteem individuals (Wiersema, 2009).

The different processing styles of high and low self-esteem attitude holders should result in qualitative differences in memory for information that challenges their attitude. More specifically, we expect participants with low self-esteem to have enhanced memory for pro-attitudinal information as a result of the passive-defensive processing of counter-attitudinal information. In contrast, their high self-esteem counterparts are expected to demonstrate enhanced memory for counter-attitudinal information as a result of their active-defensive processing style. We do not expect differences between low and high self-esteem participants in processing pro-attitudinal information since this information should not pose a threat.

OVERVIEW

This paper describes three studies that all investigate the hypothesis that biased memory is most likely to occur for attitudes in which people have high value-relevant involvement. Furthermore, we expect the direction of this bias to depend on participants' level of self-esteem. We expect participants with high self-esteem to have enhanced memory for counter-attitudinal information, reflecting an active-defensive processing mode while those with low self-esteem will show a more passive-defensive processing mode, leading to a congeniality effect. In Study 1 participants' attitude, their value-relevant involvement and their self-esteem were measured as well as their combined impact on memory. In Study 2 we manipulated value-relevance in order to rule out an alternative hypothesis. In Study 3 we manipulated participants' self-esteem at different stages of information processing in order to find out where the obtained biases in memory originate.

STUDY 1

METHOD

Participants. A total of 46 undergraduate psychology students (39 female, 7 male; mean age = 20.22, *SD* = 2.78) at the University of Amsterdam took part in this study in exchange for course credit or money (€ 4).

Materials and Procedure. Participants were seated in separate cubicles. Up to eight participants were tested in each session. Participants completed the tasks independently on a personal computer. The study was introduced as a study on public opinion. The attitude-issue was the United States' military presence in Iraq. Participants' attitude was assessed with two items using 7-point scales (1 = *disagree*, 7 = *agree*; 1 = *negative*, 7 = *positive*). The mean score on these two items represented the overall attitude (r = .94). Value-relevant involvement was measured with three items that were based on Pomerantz, Chaiken, and Tordessilas (1995); "How central is your attitude toward the U.S. military presence in Iraq to your self-concept?" (1 = *not at all*, 7 = *very much)*, "My attitude toward the U.S. military presence in Iraq reflects the kind of person I am" (1 = *disagree*, 7 = *agree*), and "My attitude toward the U.S. military presence in Iraq reflects values that are important to me" (1 = *disagree*, 7 = *agree*). These items tap on both the perceived link of an attitude with personally important values and the link with the self-concept. An index of value-relevance was created out of the mean score on these three items (α = .79).[1] We also assessed attitude importance (1 = *unimportant*, 7 = *important)* and attitude certainty (1 = *uncertain*, 7 = *certain).* Subjective ambivalence was assessed with three items that tap into the cognitive, affective, and behavioral bases of ambivalence (Priester & Petty, 1996). The mean score on these three items represented an index of ambivalence (α = .81). Participants' global self-esteem was measured with the Rosenberg Self-Esteem Scale (Rosenberg, 1965) that was administered as part of a

1. Although these three items are presented as two separate concepts in the research of Pomerantz, Chaiken, and Tordessilas (1995), we chose to combine them into one theoretical construct in order to be true to Katz's formulation of the value-expressive function of attitude.

mass-testing session participants attended to approximately one month earlier. All scales were 7-point scales ranging from 1 (*does not describe me*) to 7 (*describes me*).

After the attitude measurements, participants were asked to memorize twelve statements about the U.S. military presence in Iraq. Six of these statements were in favor of and 6 were against the U.S. military presence in Iraq. Examples are: "The U.S. military presence in Iraq is beneficial to democracy" and "The U.S. military presence in Iraq leads to a worldwide radicalization of Islamic people." Each statement was presented for eight seconds and was followed by a blank screen. The blank screen was replaced after one second by the next statement. The order of statements was randomized. Subsequently, participants engaged in an unrelated filler-task for approximately ten minutes after which they were asked to report on all the presented statements they could remember. They were allowed to spend up to five minutes on this free-recall task. Finally participants' attitude was assessed for the second time after which they were thanked and debriefed.

RESULTS AND DISCUSSION

Descriptives. Two independent raters judged participants' retrievals. The agreement between the two raters was $\kappa = .82$ for the statements favoring and $\kappa = .88$ for the statements opposing the U.S. military presence in Iraq. Retrieval scores were combined into a mean score for the pro-statements and a mean score for the anti-statements. Of the twelve statements presented to participants, the mean number of correct retrievals was 4.19 ($SD = 1.90$). The mean number of recalled pro-statements was 1.82 ($SD = 1.20$), this was slightly higher for anti-statements 2.37 ($SD = 1.32$). One participant did not remember any of the statements and was excluded from the analyses.

Overall, the attitude toward the U.S. military presence in Iraq was somewhat negative *(*$M = 3.40$, $SD = 1.52$). The perceived value-relevance of the attitude was on average 3.89 ($SD = 1.28$). The distribution of self-esteem scores in our sample was negatively skewed ($M = 4.98$, $SD = 1.07$).

Memory. In accordance with the recommendations of Aiken and West (1991) all predictors were centered to make their means equal to zero. Separate regressions were conducted for the memory for pro- and anti-statements.[2] All predictors (attitude, value-relevance, and self-esteem) and their interaction terms were regressed simultaneously onto the dependent variable. For the anti-statements this yielded no significant results, but for the pro-statements a significant two-way interaction for value-relevance and self-esteem was found, $t(44) = 2.32$, $p = .026$. This two-way interaction was further qualified by the expected three-way interaction of attitude, value-relevance, and self-esteem, $t(44) = -2.28$, $p = .029$.

To find out if biases in memory are indeed more pronounced for participants for whom their attitude is high in value-relevance, separate regression analyses were conducted for participants low (- 1 SD) and high in value-relevance (+ 1 SD). As expected, for those having attitudes low in value-relevance the two-way interac-

2. We also conducted a regression analysis on a difference score between amount of remembered pro- and anti-statements. This did not result in a significant outcome. The same is true for Study 2 and Study 3.

tion of attitude and self-esteem was not reliable ($t < 1$). In contrast, for those with highly value-relevant attitudes the two-way interaction was reliable, $t(44) = -3.26$, $p = .002$. Thus, participants with high, but not those with low value-relevant involvement show biases in memory.

Furthermore, we expected the direction of bias in memory to depend on participants' level of self-esteem. Therefore, we conducted simple slope analyses at one standard deviation above and below the mean of the predictor self-esteem to further probe the significant interaction of self-esteem and attitude. The simple slope of attitude was significant for participants with relatively low self-esteem (- 1 SD), $\beta = .621$, $t(44) = 2.60$, $p = .013$, $pr = .39$, as well as for those with relatively high self-esteem (+ 1 SD), $\beta = -.631$, $t(44) = -2.22$, $p = .032$, $pr = -.34$. This indicates that both high and low self-esteem participants have selective memory as a function of their attitude. Most relevant, the pattern of the interaction shows that the direction of this selective memory is different for those with high and low self-esteem. Participants with high self-esteem remembered more pro-statements when having a more negative attitude. Participants with low self-esteem showed the congeniality effect. For them, positive attitudes coincided with enhanced recall for the pro-statements (see Figure 1).[3] This pattern was only found for participants for whom value-relevant involvement was high, supporting the idea that biases in memory are especially likely to occur for value-relevant attitudes. Furthermore, attitude importance, certainty, and ambivalence did not affect memory for these statements and memory for pro- and anti-statements did not correlate significantly with amount of attitude change.

These results provide initial support for the hypothesis that biases in memory are more likely to occur for attitudes that are high in value-relevance and that the nature of these biases depends on self-esteem. In terms of processing modes, the results suggest that participants with high self-esteem use active-defensive processing strategies that render counter-attitudinal information more memorable, while participants with low self-esteem adopt a more passive-defensive processing mode resulting in enhanced memory for pro-attitudinal information. It should be noted that this effect was not symmetric (we found it for pro-statements, but not for anti-statements). It is not clear whether this asymmetry was obtained in earlier research, because all studies relied on difference scores.

Self-esteem did not correlate with any of the indices of attitude-strength (attitude importance, certainty, ambivalence, and value-relevance). This suggests that the differential effects on memory were not due to low and high self-esteem participants having differing levels of attitude strength. However, the correlational nature of Study 1 does not permit us to draw firm conclusions pertaining to the causal role of self-esteem. This issue is addressed in Study 3.

Value-relevant involvement is considered an aspect of attitude strength (Boninger, Krosnick, & Berent, 1995; Boninger, Krosnick, Berent, & Fabrigar, 1995). Not surprisingly, our involvement measure correlated with other indices of attitude strength such as ambivalence and certainty. Although these strength-indices were not related to memory for the statements, it is premature to conclude that it is the link with the self that is responsible for the effects due to the correlational

3. Scores for different levels on the continuous, independent variables in Figure 1 are obtained by estimates at one standard deviation below and above the mean. This applies to all figures in this article.

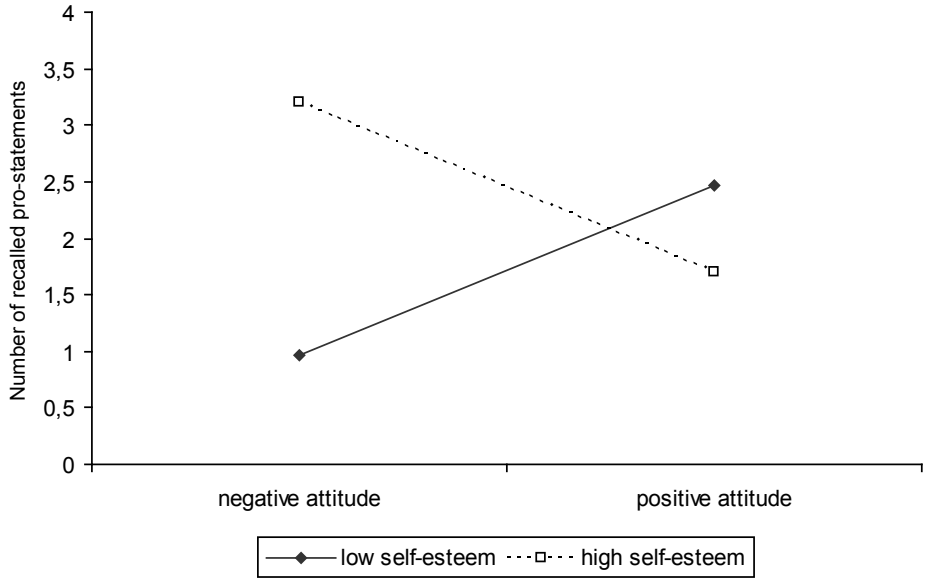

FIGURE 1. Memory for pro-statements for low and high self-esteem participants with attitudes high in value-relevant involvement.

design of Study 1. Hence, in our second study we seek to address this issue more directly by experimentally manipulating the perceived amount of value-relevant involvement. As in Study 1, we expect biases in memory to occur primarily at high involvement and that the direction of these biases is affected by participants' self-esteem. First, a pilot study was conducted in order to test our value-relevance manipulation.

STUDY 2

PILOT-STUDY

Participants, Design, Manipulation, and Measures. A total of 58 undergraduate students (49 female, 9 male; M_{age} = 20.16, *SD* = 2.12) at the University of Amsterdam participated for course credit or money (€ 3). Participants were randomly assigned to either the high or low value-relevance condition.

The study was introduced as a study on students' opinions on societal topics. The target issue was the potential entry of Turkey into the European Union. This issue received considerable attention in the media at that time. Before participants were given the opportunity to express their attitude, involvement was manipulated by means of a rank ordering task. A list of four issues was presented to participants, the second of which was always the target issue of Turkey and the European Union. They were asked to rank order the issues in terms of how closely they felt connected to it. Depending on condition, the three issues surrounding the target

issue were systematically varied. The rationale of this manipulation was that the value-relevance of the target issue could be influenced by that of the remaining three issues. In the high value-relevance condition the surrounding issues were assumed to be low in value-relevance compared to the target issue. An example of such an issue is the prohibition of sport fishing in a local river. The relative insignificance of the surrounding issues was hypothesized to raise the perceived value-relevance of the target issue. In the low value-relevance condition the surrounding issues were assumed to be high in value-relevance, such as the debts of Third World countries and legalization of gay marriage, and were hypothesized to lower the perceived value-relevance of our target issue.

After the rank ordering task, participants' attitude toward the entry of Turkey in the European Union was assessed with two items on 9-point semantic differential scales ("With respect to Turkey's entry in the European Union, I…" 1 = *totally disagree*, 9 = *totally agree*; "My attitude towards Turkey's entry in the European Union is …" 1 = *extremely negative*, 9 = *extremely positive*). The mean score of these two items constituted an index of overall attitude (r = .85). We also assessed attitude importance, attitude certainty, ambivalence, and the three items measuring value-relevance (see Study 1 for a description). The mean of these three items formed an index of value-relevance and also served as manipulation check (α = .79). All items were assessed on 9-point scales.

Results. To check whether the rank ordering task affected the perceived value-relevance of the target issue, we conducted an ANOVA on the relevance index with condition (low value-relevance vs. high value-relevance) as independent variable. Results yielded a significant effect of condition, F (1, 57) = 4.92, p = .031, η^2 = .08. Participants in the low value-relevance condition rated their attitudes as less value-relevant (M = 3.79, SD = 1.44, n = 32) than participants in the high value-relevance condition (M = 4.71, SD = 1.70, n = 26). This difference was also reflected by the rank number that was assigned to the issue of Turkey's entry in the European Union. For participants in the high relevance condition the target issue took a higher position (i.e., lower rank number) in their rank ordering (M = 1.92, SD = .83) than for participants in the low relevance condition (M = 3.17, SD = .87). Furthermore, the manipulation only affected participants' ratings of value-relevance without affecting the attitude itself or any of the attitude strength measures (Fs < 1). The only variable approaching significance was importance (F = 1.7, ns.) which is not surprising since value-relevant involvement is an antecedent of attitude importance (Visser, Bizer, & Krosnick, 2006). Since our manipulation worked and did not have any unwanted side-effects, we decided to use it in Study 2.

METHOD

Participants. Undergraduates of the University of Amsterdam (N = 57; 50 females, 7 males; M_{age} = 20.40, SD = 3.64) completed this study in exchange for course credit or money (€ 4).

Materials and Procedure. Upon entry, participants were welcomed by the experimenter and seated in separate cubicles. Up to eight participants were tested in each session. Participants completed the tasks independently on a personal computer. Assignment to either the high or low value-relevance condition was random.

As in the pilot study, the experiment was introduced as a study on students' opinions on societal topics and the target issue was the possible entry of Turkey into the European Union. Before participants expressed their attitude on this issue, the perceived value-relevance was manipulated by means of the rank ordering task described earlier.

After the manipulation, participants' attitude toward the entry of Turkey in the European Union was assessed with two items on 9-point scales (1 = *extremely negative*, 9 = *extremely positive*; 1 = *totally disagree*, 9 = *totally agree*). An index of participants' overall attitude was created on the basis of the mean score on these two items (r = .87). Self-esteem was assessed with the Rosenberg Self-Esteem Scale (1965) that was administered in a mass testing session participants attended to approximately two months earlier. Ratings were made on a scale ranging from 1 (*does not describe me*) to 7 (*describes me*). The scale had good reliability (α = .89).

Subsequently, participants read an article supposedly from a Dutch newspaper. The article contained two interviews, each with a supposed Dutch member of the European Parliament. One of them was against the entry of Turkey in the European Union and the other favored Turkey's entry. Each gave five statements in support of his opinion. The two interviews approximated each other in length (400 versus 376 words). Participants read the interviews at their own pace and—in contrast with Study 1—did not know their memory for the statements was to be assessed later on. The order in which the two interviews were presented was systematically varied. An example of a statement arguing against Turkey's entry in the EU is:

> When the geographical position of Turkey is taken into account, Turkey is situated more in Asia than in Europe. To put it more strongly, over 75% of Turkey is situated in Asia. Therefore, the fact that Europe even considers Turkey as a possible member of the E.U. is strange. Even more so, given the fact that Morocco was denied access to the E.U. on geographical grounds. Europe should respect its own borders.

An example of an argument in favoring Turkey's entry is:

> The appeal of Turkey and Europe is not something new. Historically Turkey always has had close ties to Europe. For instance, as early as 1100 B.C. the Greeks set foot on present Turkey's soil. The combination of the Greek culture and the influences of the original inhabitants led to a new, highly developed culture. In the fourth century B.C. Alexander the Great conquered the area and in the second century B.C. came Caesar Constantine. He even declared present Istanbul the main capital of the Roman Empire. Turkey's entry in the E.U. thus would blend in perfectly in this historical tradition.

After a filler-task that took participants approximately ten minutes to complete, participants spent up to five minutes writing down the statements they could remember from the two interviews. Finally, their attitude was assessed once again after which they were thanked and debriefed.

RESULTS AND DISCUSSION

Descriptives. Retrievals were coded by two independent raters who were blind for condition. The agreement between the two raters was $\kappa = .76$ for the anti-statements and $\kappa = .70$ for the pro-statements. The ratings for pro- and anti-statements were combined into one mean score for the number of recalled pro-statements and a mean score for the number of recalled anti-statements. First, we checked for order effects of the two interviews. ANOVAs revealed that order did not affect the amount of retrieved pro- and anti-statements (Fs < 1) hence order was dropped from the analyses. Furthermore, none of the independent variables affected reading times. The mean attitude score was slightly positive ($M = 5.39$, $SD = 1.64$). The distribution of self-esteem was negatively skewed ($M = 5.16$, $SD = 1.00$). There were no outliers.

Memory. Predictors were centered on their means and used as continuous variables (Aiken & West, 1991). Condition, attitude, self-esteem, and their interaction terms were entered into the regression simultaneously. Results yielded a three-way interaction of condition, attitude, and self-esteem on the anti-statements, $t(56) = -2.83$, $p = .007$. To test the hypothesis that biased memory is strongest in the high value-relevance condition two separate regressions were conducted, one for participants in the low relevance condition and one for participants in the high relevance condition, using dummy coded variables for condition. In the high relevance condition the two-way interaction approached significance, $t(56) = 1.97$, $p = .055$. The simple slope of attitude was marginally significant for participants low in self-esteem, $\beta = -.523$, $t(56) = -1.69$, $p = .098$, $pr = -.23$. For those high in self-esteem the simple slope was not significant ($t > 1$, $pr = .16$). Although marginally significant, the pattern of the interaction fully supports our hypothesis and replicates the pattern we found in Study 1 for participants with attitudes high in value-relevance (see Figure 2). Low self-esteem participants show the congeniality effect; they remember more anti-statements when their attitude is against Turkey's entry into the European Union. High self-esteem participants on the other hand, demonstrate enhanced recall for anti-statements when having a positive attitude.

In the low value-relevance condition we found an unexpected interaction of attitude and self-esteem, $t(56) = -2.05$, $p = .046$. Although the simple slopes of attitude were not reliable for either low (- 1 SD) or high self-esteem participants (+ 1 SD), the pattern is opposite of that found in the high value-relevance condition. Low self-esteem participants remembered more anti-statements when being in favor of Turkey's entry in the EU and high self-esteem participants remembered more anti-statements when being negative about Turkey's entry in the EU.

At this point, it remains unclear what caused the effects in the low relevance condition. A possible explanation is that, due to the manipulation of involvement, differences between low and high levels of involvement were more pronounced in the present study as opposed to the perhaps intermediate levels in the previous study. This could have triggered the differential information processing by low and high self-esteem participants in the low relevance condition. For instance, low involvement could have caused low self-esteem participants to have more confidence in dealing with counter-attitudinal information in an active instead of a passive manner, since the stakes were low. Prior research has indeed shown that when the link to the self is weak, low self-esteem individuals' behavior sometimes mirrors that of their high self-esteem counterparts (Brown, Collins, & Schmidt,

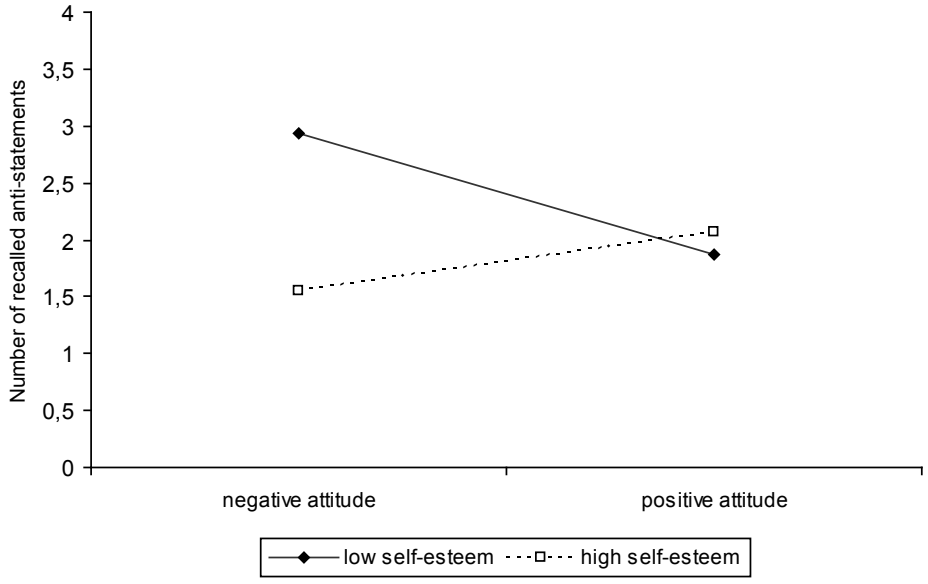

FIGURE 2. Memory for anti-statements for low and high self-esteem participants in the high value-relevance condition.

1988). On the other end of the self-esteem continuum, the results for high self-esteem participants suggest passive processing of uncongenial content. Perhaps they did not want to take the trouble of engaging in active processing for an attitude that they did not care about. Hence, there is reason to believe that the processing of information related to attitudes low in value-relevance is determined by a variety of motives. This seems less so when we are dealing with attitudes related to important values. In the present studies we focus on the way people deal with information about important, value-based attitudes.

As was the case in Study 1, memory for pro- and anti-statements did not correlate with attitude change, although these correlations were marginally significant in the low value-relevance condition (ps $\leq .10$). This seems to suggest that the processing strategies participants employ for a highly value-relevant attitude serve the function to prevent their attitude from changing while at low relevance memory is less a reflection of defensive processing.

STUDY 3

The results of the previous two studies showed that participants low and high in self-esteem differ in their memory for attitude-relevant information. In the introduction, we related these differences to low self-esteem participants employing a passive-defensive and high self-esteem participants an active-defensive processing style. This idea places the origin of biases in memory at the encoding stage. That is, biases in memory are the result of the differential allocation of attention

and resources to pro- and counter-attitudinal information at the first encounter. Of course one could also argue that these selective effects in memory are due to processes at the retrieval stage. Thus, although pro- and counter-attitudinal information received equal amounts of attention at the encoding stage and thus should be similarly accessible at retrieval, one can be recalled better than the other. This is the case for instance when the attitude itself serves as retrieval scheme (Bartlett, 1932), causing people to remember predominantly information that fits the scheme (i.e., pro-attitudinal information). Evidence for these reconstructive processes comes from the finding that sometimes biases in memory are somewhat stronger when the memory measurement is delayed rather than immediate (Eagly et al., 1999; Roberts, 1985).

Study 3 addresses whether the selective effects on memory are due to processes at the encoding stage or at the retrieval stage. We do this by investigating the role of self-esteem at these two separate stages in information processing. In this study participants are given the opportunity to enhance their self-esteem either just before encoding the persuasive content (boost-before-encoding condition) or just before retrieving it (boost-after-encoding condition). If biases in memory originate primarily from processes during encoding, the self-esteem manipulation will affect the nature of biases in memory *only* when it precedes the encoding stage. When participants enhance their self-esteem after the encoding stage, this will not affect their memory since the biases originated earlier. Therefore, we do not expect the pattern of biased memory to be affected if the self-esteem manipulation follows upon the encoding stage. However, when the manipulation precedes encoding, low self-esteem participants are expected to show the pattern of biased memory that is associated with high self-esteem participants due to the boost in their self-esteem. For an attitude object high in value-relevance, this would imply relatively better memory for incongruent information. We do not expect high self-esteem participants to be affected by the self-esteem manipulation because their self-esteem is high to begin with. This implies that they will demonstrate relatively better memory for incongruent information than for congruent information, irrespective of the manipulation. An additional benefit of this method is that it enables us to establish the role of self-esteem more firmly.

METHOD

Participants. A total of 82 undergraduate psychology students (63 female and 19 male, M_{age} = 20.49 years, SD = 2.59) took part in this study in exchange for course credit or money (€ 4). Participants were randomly assigned to either the boost-before-encoding or boost-after-encoding condition.

Materials and Procedure. Upon entry participants were seated in separate cubicles. Up to eight participants were tested simultaneously. They were told that they were to take part in a series of unrelated experiments. Ostensibly, the goal of the first study was to compare several measurements of personality with each other. In between several filler items, participants' self-esteem was assessed with the Rosenberg Self-Esteem Scale (1965, α = .88) on a 7-point scale ranging from 1 (*does not describe me at all*) to 7 (*totally describes me*).

The next study was presented as a study on students' opinions. The attitude-issue was related to the issue of organ donation. More specifically, it was about

the role of relatives of the deceased in giving permission to the donation of his or her organs. In the Netherlands, even if a person has indicated to be willing to donate organs, close relatives can veto this decision if they do not feel comfortable with it. The issues of organ donation and the lack of donor organs were frequently covered in the media at the time of the study and a pilot study established that this attitude-issue was highly value-relevant to our participants.[4] Participants' attitude on the right of veto of close relatives in case of organ donation was assessed with two items using 9-point scales (1 = *extremely negative*, 9 = *extremely positive*; 1 = *totally disagree*, 9 = *totally agree*). The mean score on these two items constituted an index of participants' overall attitude (r = .90).

After expressing their attitudes, half of the participants were given the opportunity to enhance their self-esteem, while the remaining participants engaged in a neutral filler-task. Participants in the boost-before-encoding condition were given the opportunity to raise their self-esteem in a study that was supposedly about personality, values, and personal experiences. For the manipulation of self-esteem we adopted a task developed by Cohen, Aronson, and Steele (2000).[5] First, participants selected from a list of eleven values the one value that was most important to them. Examples of values are music, sports, aesthetics, and romance. Subsequently, they were asked to write down two personal experiences where this value played an important role. They were asked to make clear in their writings how this value relates to their experience and why this value is so important to them. Furthermore, the experiences they wrote down had to give them a positive feeling about themselves. We reasoned that writing about experiences that made participants feel good about themselves would temporarily boost their self-esteem.

While participants in the boost-before-encoding condition were working on the personality and values task, participants in the boost-after-encoding condition were asked to copy a neutral text on the production and usage of asphalt. Subsequently, all participants were welcomed back to the study on opinions. They were asked to memorize ten statements concerning close relatives' right of veto with regard to organ donation. Five of the ten statements were in favor and five were opposing the right of veto. Each statement was presented on the screen for ten seconds after which a blank screen followed. After one second the blank screen was replaced by a new statement. Each statement was presented once and statements appeared in random order.

Following the encoding stage, all participants engaged in an unrelated filler-task that took approximately eight minutes. After this, participants in the boost-before-encoding condition, who already received the self-esteem manipulation, copied

4. Issues included in the pilot study were, amongst others: terrorism, a database of genetic profiles, and chemical castration of pedophiles. Participants expressed the amount of value-relevant involvement with their attitude on 9-point semantic differential scales for each issue separately. Participants were most involved with the issue of organ donation (M = 5.26, SD = 1.96). Furthermore, when asked to indicate with which issue they felt least involved, only 3 out of 99 participants selected the topic of organ donation.

5. Although Schmeichel and Martens (2005) did not find effects of this task on state self-esteem, we think that this may be caused by differences between the instruction Schmeichel and Martens gave participants and the instruction used by Cohen, Aronson, and Steele (2000). More specifically, participants in the research by Cohen et al. were instructed to write about experiences that "made you feel good about yourself" while this sentence is absent in the Schmeichel and Martens instruction. Thus, in the current study we adopted the approach by Cohen et al. (2000).

the text on asphalt while participants in the boost-after-encoding condition engaged in the task designed to heighten their self-esteem. In the end all participants had performed the same tasks, but the order in which the tasks were presented was systematically varied. The final phase of this experiment consisted of the free recall task for which participants were given up to five minutes followed by a repeated measure of attitude.

RESULTS AND DISCUSSION

Descriptives. Two independent raters judged participants' retrievals. The agreement was $\kappa = .80$ for anti-statements and $\kappa = .92$ for pro-statements. Two indices of participants' memory were created from the mean of the two coding schemes for pro-statements and the mean of the coding schemes for anti-statements. Memory for the anti-statements ($M = 1.99$, $SD = 1.16$) was somewhat better than that for pro-statements ($M = 1.56$, $SD = 1.03$), $t(81) = 3.13$, $p < .05$. On average, participants remembered a total of 3.55 statements ($SD = 1.82$).

Participants were moderately negative about relatives having the right to veto someone's decision to donate organs ($M = 4.09$, $SD = 2.16$). The distribution of the self-esteem score was negatively skewed ($M = 5.08$, $SD = .47$). Participants with outlying self-esteem scores (z value more than 3 or less than minus 3, n = 2; Stevens, 1996) were excluded from the analyses as were participants who did not remember any of the presented statements (n = 6). The final sample thus consisted of 74 participants.

Memory. All independent variables were centered before entering them in the regression (Aiken & West, 1991). Condition, attitude, and self-esteem as well as their interaction terms were entered simultaneously. No effects were found on the pro-statements. For the anti-statements results yielded a marginally significant main effect of self-esteem, $\beta = -.228$, $t(73) = -1.85$, $p = .055$. More importantly, the hypothesized three-way interaction of condition, self-esteem, and attitude was found, $t(73) = 2.56$, $p = .013$.

To test the hypothesis that low but not high self-esteem participants are affected by the timing of the self-esteem manipulation, separate regression analyses were conducted for low (- 1 SD) and high self-esteem (+ 1 SD). For participants with low self-esteem, we found the expected two-way interaction of condition and attitude, $t(73) = -2.02$, $p = .048$. We tested the simple slopes of attitude for each condition separately using dummy coded variables for condition. In the boost-before-encoding condition, the simple slope of attitude was significant, $\beta = .482$, $t(73) = 2.15$, $p = .035$, $pr = .26$. In the boost-after-encoding condition the slope was not significant ($t < 1$, $pr = -.11$). The overall pattern of the interaction supports our predictions. When the self-esteem manipulation followed encoding, participants with low self-esteem and a negative attitude remembered more anti-statements (i.e., congeniality effect). Thus, when self-esteem is heightened after encoding it does not affect the nature of bias in memory. However, when the self-esteem boost preceded encoding, the nature of biased memory reverses. Now, participants with dispositional low self-esteem remember more anti-statements when their attitude is more positive (see Figure 3). This pattern reflects the pattern normally found for participants with dispositional high self-esteem.

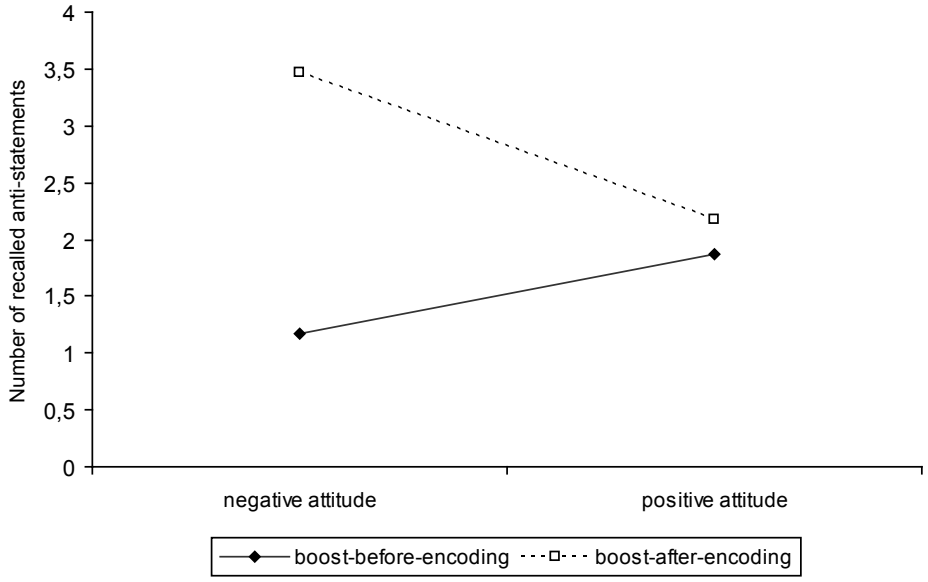

FIGURE 3. Memory for anti-statements for low self-esteem participants as a function of condition (boost-before-encoding vs. boost-after-encoding).

A somewhat surprising finding was that, for high self-esteem participants the two-way interaction of condition and attitude was marginally significant, $\beta = .46$, $t(73) = 1.80$, $p = .08$. Although the simple slopes of attitude do not reach significance in either of the two conditions, the pattern of results reveals that, although the "usual" high self-esteem effect (i.e., better memory for incongruent information) is found in the boost-after-encoding condition, a reverse pattern is obtained in the boost-before-encoding condition. In this condition, they tended to remember more anti-statements when their attitude is also more negative. This pattern resembles that normally found for participants with dispositional low self-esteem.

We also tested if our independent variables affected participants' Time 2 attitude. This was not the case. Memory for pro- and anti-statements also did not correlate with the attitude change score, implying that participants' processing was targeted at maintaining the attitude.

One explanation for the unexpected finding for high self-esteem participants in the boost-before-encoding condition could be that the manipulation somehow lowered their self-esteem. Possibly, high self-esteem participants had difficulty substantiating their positive self-claims. This may well have been the case since prior research has shown that high self-esteem is often illusory in the sense that it is not based on factual information supportive of high levels of self-esteem (for a review, see Taylor & Brown, 1988). Furthermore, research by Schwartz and colleagues has shown that when people experience difficulty in generating exemplars corresponding to a particular personal characteristic (e.g., assertiveness) this translates into lower self-reported levels of the characteristic on a subsequent measure (Schwartz et al., 1991). Thus, the difficulty in substantiating their positive self-claims could have lowered the self-esteem of high self-esteem individuals. More-

over, the task we used to increase self-esteem can also be related to other research on self-perception. Research by Sedikides, Horton, and Gregg (2007) suggests that introspecting about why one possesses certain characteristics can raise uncertainty about the self. Importantly, these drops are more pronounced for individuals that initially score high on the characteristic (Csank & Conway, 2004). We think a similar process took place for our high self-esteem participants that introspected about why the selected value was important to them.

Although at this point we can only speculate about the reason for the slight reversal of the nature of memory bias for high self-esteem in the boost-before-encoding condition, we would like to stress that the results of Study 3 clearly suggest that biases in memory originate at the encoding and not the retrieval stage. Furthermore, the results confirm the role of self-esteem on memory for information related to an attitude that is connected to the self-concept. Low self-esteem participants who raised their self-esteem right before encoding the information, showed the pattern of biased memory associated with high self-esteem participants.

GENERAL DISCUSSION

The present studies together help to explain contradictory findings in the literature regarding memory for attitude-relevant information and suggest an important role for the self. The findings reveal biases in memory for attitude-relevant information that occur primarily for attitudes that are connected to personally important values and, thus, the self. Moreover, the direction of these biases depends on level of self-esteem. We believe that these findings carry important clues and insights for future research on the relationship between attitudes and processes of attitude-protection. Our findings stress the importance of the interplay between the link of an attitude to the self and self-esteem as key determinants of how people process counter-attitudinal information. For attitudes with strong links to the self, an individuals' self-esteem affects how counter-attitudinal information is dealt with and this, in turn, affects memory for this information. Below, we will discuss the main findings, some limitations and prospects for future research.

Results of Study 1 show that participants high in self-esteem tend to have better memory for information contrary to their attitude while participants low in self-esteem tend to selectively retain congruent information. In accordance with expectations, this pattern was found in case of high value-relevance, albeit only for the anti-statements. In Study 2, the perceived value-relevance was experimentally manipulated. As expected, only in the high value-relevance condition the pattern of biased memory of Study 1 was replicated. Again, participants high in self-esteem demonstrated relatively better recall for counter-attitudinal information as opposed to when this information was pro-attitudinal. Low self-esteem attitude holders showed the opposite pattern. In the low value-relevance condition an unexpected interaction of self-esteem and attitude was found. The pattern of this interaction was opposite from that found in the high relevance condition. We noted earlier that this finding suggests that different motivational processes take place at lower as opposed to higher levels of relevance. For instance, low self-esteem individuals could exploit a situation of low relevance to enhance their self-esteem and experiment with more active forms of processing.

The goal of Study 3 was twofold. One aim was to investigate the causal role of self-esteem by employing an experimental design in which self-esteem was manipulated. The self-esteem manipulation, which provided participants the opportunity to enhance their self-esteem, was administered either before encoding the attitude-relevant information or after encoding, but before retrieval. This pertains to the second goal of Study 3; i.e., to shed more light on when biases in memory originate.

Low self-esteem participants who boosted their self-esteem remembered more anti-statements when having a positive attitude. This pattern of biased memory of low self-esteem individuals resembled that of individuals with dispositional high self-esteem, which indicates that the manipulation was successful. When the manipulation of self-esteem followed upon the encoding stage, but preceded retrieval, the pattern of memory of low self-esteem participants did not shift. As was the case in Study 1 and in Study 2, under conditions of high value-relevance, low self-esteem participants demonstrated enhanced recall for statements in support of their attitude. Contrary to expectations, the self-esteem manipulation also affected the memory of high self-esteem participants when presented before encoding. Based on the direction of the memory bias, it appears that the manipulation designed to enhance their self-esteem, in effect lowered the self-esteem of participants whose trait self-esteem was high. Since previous research that employed this manipulation did not investigate differential effects of dispositional levels of self-esteem, we did not anticipate these effects. We have introduced a possible explanation for these effects that needs further exploration. Nonetheless, since the self-esteem manipulation only affected the nature of biased memory when it preceded encoding, this strongly supports the claim that biases in memory are the result from processes taking place at the encoding stage.

The notion that the psychological function of an attitude affects memory for attitude-relevant information is not new. In their meta-analyses, Eagly and colleagues (1999) also investigated the role of attitude functions. They showed that biases in memory are more pronounced for attitudes high in value-relevance. Our data corroborate the findings of Eagly et al. that value-relevant involvement exerts an effect on information processing and memory. The added value of the present approach is that our manipulation of value-relevant involvement provides more insight into the processes through which people protect their attitudes. Our findings show that people are headstrong when it comes to their self-concept and values. Changing a value-expressive attitude is undesirable since it implies a denial of our core values, i.e., the prime determinants of our self-concept. Although people low and high in self-esteem use different strategies to protect their attitudes, leading to differences in memory and possibly different long-term effects on their attitudes, they share the same goal: to protect valued attitudes.

We therefore assume that both low and high self-esteem participants aim to protect their value-relevant attitudes. Thus, we agree with Eagly and colleagues (Eagly, Kulesa, Brannon, Shaw, & Hutson-Cumeaux, 2000; Eagly, Chen, Chaiken, & Shaw-Barnes, 1999) that the active and passive processing modes are defensive in nature. However, it needs to be added that the present research is not conclusive in this respect. For instance, high self-esteem participants may have better memory for counter-attitudinal information not because they counter-argue, but because they have a stronger accuracy motivation, are more tolerant of disagreement or because they are just better information processors. The present research cannot

completely rule out these alternative explanations, but we think they do not satisfactorily explain our findings and are also not corroborated by other research findings. First, if high self-esteem individuals are not defensive but have a motive to be accurate it is hard to explain the differences found under conditions of low and high value-relevance since then they should have behaved similarly irrespective of the amount of value-relevance they attach to their attitude. Clearly, this was not the case. Second, oftentimes people are not driven by an accuracy motivation, but by a motive to derive at specific, desired conclusions (for a discussion, see Kunda, 1990). This idea is also reflected in the literature on the processing of self-relevant information which unambiguously shows that people are defensive when the self is involved (e.g., Sedikides & Green, 2004; Förster, Higgins, & Werth, 2004). Furthermore, both low and high self-esteem individuals were found to be motivated to enhance their self-esteem after reading a counter-attitudinal essay which suggests the presence of a defense motive aimed at protecting the self (Wiersema, 2008). Third, if high self-esteem individuals are not defensive this would have been reflected in a correlation between amount of attitude change and their memory for the statements. Finally, prior research has demonstrated that high self-esteem individuals are generally more difficult to persuade than low self-esteem individuals (for a meta-analysis, see Rhodes & Wood, 1992). This finding corresponds with the idea that high self-esteem individuals are defensive.

With respect to the idea that high self-esteem individuals are just better information processors, we would like to point out that on the whole low and high self-esteem participants did not differ in the *amount* of statements they retrieved, but only in the *valence* of the statements they retrieved. High self-esteem individuals however do have more faith in their own capacity relative to low self-esteem individuals (e.g., defensive confidence; Albarracin & Mitschell, 2004). The difference between low and high self-esteem is thus mainly a matter of belief, since there is generally no relation between self esteem and cognitive abilities. It is this higher confidence of high self-esteem individuals that causes them to approach information that is incongruent with their attitude resulting in better memory performances for incongruent information. Ergo, we think that an active-defensive account of high self-esteem provides the best explanation for our findings as well as those obtained in earlier research.

Generally the congeniality effect is tested by computing a difference score (the number of remembered pro- versus anti-statements) and no separate analyses are reported for pro- and anti-statements. Our research shows considerable variation when we look at pro- and anti-statements separately. This approach of separately analyzing the two sets of statements differs from previous research, and shows differential effects for different types of statements. Similar findings were obtained in earlier studies that reported statistical data on both argument-sets. For instance, participants in a study by Furnham and Singh (1986) demonstrated biased memory only for pro-statements. Likewise, Jamieson (1970) finds an effect only for participants who were identified as pro. Differences between sets of statements could be due to a number of factors such as the relative novelty of pro- versus anti-statements. For instance, due to the predominantly negative attention given to the American military presence in Iraq in the Dutch media, the positive side of the story most likely was less familiar to participants and therefore more threatening.

People can more or less simultaneously use multiple methods for dealing with uncongenial information and some of these methods need not necessarily concern

the uncongenial information itself. A possibility that—by our knowledge—has not been covered in the literature on the congeniality effect is that of low self-esteem people shifting attention to congenial information. The congeniality hypothesis and the active- and passive-defensive processing modes all focus on processing *uncongenial* information. For example, the idea that the shallow processing of uncongenial information in the passive-defensive processing mode renders congenial information relatively more memorable, says nothing about how people process the latter. Memory for congenial information is thus primarily seen as a result of the way uncongenial information is processed. However, it could be that in addition to or instead of the shallow processing of uncongenial material, low self-esteem people focus more on congenial material as a means of coping with uncongenial information. This could have been the case in Study 2 and Study 3 where the differences between low and high self-esteem people are most pronounced when information matched their attitude. Thus, future research should also address what people do with information that is in accordance with their attitude.

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