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Affective valence and the self-reference effect: influence of retrieval conditions

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Abstract

Positive trait information is typically better recalled than negative trait information when encoded in reference to the self, but not when encoded in reference to someone else or when processed for general meaning. This study examined whether this influence of affective meaning is modulated by retrieval conditions. Participants encoded positive and negative trait adjectives in reference to themselves or to a celebrity. They were then presented with either a free recall task (Experiment 1) or a recognition memory task (Experiment 2). Positive adjectives were better recalled than negative adjectives, but only when they were encoded in reference to the self. In contrast, encoding condition and valence did not interact in the recognition memory task. Taken together, these findings suggest that the difference in memory between positive and negative self-referent information is due, at least in part, to a control exerted on memory retrieval.

Substantial evidence indicates that information is better remembered when it is processed in relation to the self than when it is related to someone else or when it is processed for general meaning (the so-called self-reference effect, SRE; e.g., Rogers, Kuiper, & Kirker, 1977). In their meta-analysis, Symons and Johnson (1997) found that the SRE occurs with highly significant regularity, although it is modulated by several factors, including the nature of the comparison task (other-reference versus semantic processing) and the degree of intimacy of the person used in the other-reference task. Specifically, a higher SRE was found in studies that compared self-reference (e.g., "does this word describe you?") with a semantic task (e.g., "does this word mean the same as XXX?") than in studies that compared self-reference with other-reference (e.g., "does this word describe your mother?"). In addition, in the latter studies, the SRE was stronger when the person involved in the other-reference task was not someone with whom the subject was intimate (e.g., the subject's mother versus a celebrity; see Symons & Johnson, 1997).

Other studies suggest that the SRE also varies according to the affective valence of the stimuli. Indeed, it has been found that positive information (e.g., trait adjectives such as "kind" or descriptions of behaviours such as "I would take care of a sick friend for several days") is better recalled than negative information (e.g., trait adjectives such as "dishonest" or descriptions of behaviours such as "I would not pay back money that I owed to a friend") when it is processed in reference to the self, but not when it is processed in reference to another person or when it is processed for general meaning (Denny & Hunt, 1992; Kuiper & Derry, 1982; Sanz, 1996; Sedikides & Green, 2000, 2004). This influence of valence on memory for self-referent information is probably due to self-enhancement goals, i.e. the motivation for most people to process positive rather than negative information about themselves (e.g., information indicating that they are competent, likable, attractive and so forth; Baumeister, 1998; Taylor & Brown, 1988). Specifically, when encountering new self-referent information, people may emphasise positive information and/or neglect negative information, thus enhancing the retention of positive as compared to negative information. In other words, the difference in memory for positive and negative self-referent information may result from differences in depth or elaboration of memory encoding. In agreement with this proposition, Sedikides and Green (2000, Experiment 3) found that increasing stimuli presentation time (from 2 to 8 seconds) enhanced recall of positive information, but not recall of negative information when this information was processed in reference to the self. The authors concluded that the memory effect is due, at least in part, to participants expending minimal processing resources while encoding negative information.

However, the memory difference between positive and negative self-referent information may also depend on processes occurring at retrieval. It has been proposed that, when retrieving information from memory, the self shapes retrieval cues in order to construct memories that are relevant to current goals of the individual (e.g., Conway & Pleydell-Pearce, 2000). By this means, access to negative self-referential information could be reduced, as this information may threaten the positive conception most people have of themselves (Baumeister, 1998; Taylor & Brown, 1988). If the difference in memory for positive and negative self-referent information is in part due to such a control on memory retrieval, then this difference should vary with retrieval conditions, including the amount and specificity of retrieval cues. Specifically, the difference should be more pronounced when there are few retrieval cues, as is the case in a free recall task, than when retrieval cues are provided, as in a recognition task. Indeed, in a recall task, individuals must rely on strategic search processes (i.e., they have to elaborate their own retrieval cues) in order to access stored information (Koutstaal & Schacter, 1997; Norman & Schacter, 1996), thereby allowing the self to facilitate or, conversely, to reduce the access to information (by shaping retrieval cues). In these conditions, positive self-referent information should be better remembered than negative self-referent information, which is precisely what has been found in studies that used a recall task to examine memory for positive and negative self-referent information (Denny & Hunt, 1992; Kuiper & Derry, 1982; Sanz, 1996; Sedikides & Green, 2000, 2004). In contrast, people have less need to elaborate their own retrieval cues in order to search for information stored in memory when they are confronted with a recognition task (Koutstaal & Schacter, 1997; Norman & Schacter, 1996). In this case, the self probably has less opportunity to exert control on the access to stored information because retrieval cues provided by the task directly match information that is stored in memory. Therefore, if the difference in memory for positive and negative self-referent information is in part due to a control exerted on memory retrieval, this difference should be reduced or even eliminated when memory is assessed by means of a recognition task.

To the best of our knowledge, this hypothesis has not been tested directly by comparing the SRE for positive and negative stimuli in a recall and a recognition task. The purpose of this study was precisely to make such a comparison. Participants were asked to process positive and negative trait adjectives either in reference to themselves or in reference to a celebrity. Then, memory was assessed either with a free recall task (Experiment 1) or with a recognition task (Experiment 2) in order to examine whether the SRE for positive and negative adjectives is modulated by retrieval conditions.

Experiment 1

The purpose of this first experiment was to examine the SRE for positive and negative information when there are few retrieval cues, i.e. in a free recall task. In line with earlier studies (Denny & Hunt, 1992; Kuiper & Derry, 1982; Sanz, 1996; Sedikides & Green, 2000, 2004), we predicted that positive information would be better recalled than negative information when encoded in reference to self, but not when encoded in reference to someone else.

Method

Participants

Thirty-six undergraduates from the University of Liège participated in the study (19 women and 17 men). Their average age was 22 years (*SD* = 2.39 years). Participants were randomly assigned to one of two encoding conditions (self-reference versus other-reference), with equal numbers of participants in each condition.

Materials

We used two lists (list A and list B) of 48 trait adjectives (24 positive, e.g. *sincere*, *kind*, and 24 negative, e.g. *coward*, *dishonest*). Two lists were needed for the recognition task in Experiment 2 and we wanted to use exactly the same materials in both experiments. The adjectives were selected from a set of 244 trait adjectives that had been rated for valence by 20 other participants. The ratings were made on an 11-point scale, with –5 anchored at very negative, 0 at neutral and +5 at very positive. The positive adjectives that were used in the present study had a mean rating superior to +2; the negative adjectives had a mean rating inferior to -2. Adjectives in list A and list B were matched for frequency (Content, Mousty, & Radeau, 1990), length (number of letters) and valence. T-tests showed that the two lists did not differ for valence, frequency, or word length (all *t*s < 1). Also, positive and negative adjectives within each list did not differ in terms of frequency, $t < 1$, and length, $t(94) = 1.18$, $p = .24$. Within each encoding condition (self-reference, other-reference), half of the participants received adjectives from list A, while the other half received adjectives from list B.

Procedure

Participants were tested individually. They were told that their task was to rate a set of trait adjectives; they were not aware that their memory would be assessed subsequently (i.e., encoding was incidental). Half of the participants had to assess the self-descriptiveness of the adjectives by answering the question “To what extent does this adjective describe you?” (self-referent condition) on a rating scale ranging from 1 (not at all) to 4 (completely). The remaining participants had to assess the extent to which the adjectives describe the famous French singer Johnny Hallyday by answering the following question: “To what extent does this adjective describe Johnny Hallyday?” We chose a celebrity rather than an intimate person because we wanted to produce a sufficiently strong SRE, as it has been shown that SRE is weaker when the person referred to is known personally (Symons & Johnson, 1997).

The adjectives were presented randomly, one at a time, on a computer screen. Each adjective was presented for 10 seconds, during which participants made their rating. The task began with 4 filler trials, followed by the presentation of the 48 critical trials and of 4 final filler trials. The filler adjectives were used to minimize the recency and primacy effects in the free recall task. Participants then completed a mathematical filler task for 5 minutes before they were given the free recall task. They were asked to write down as many adjectives as they could remember, in any order. There were no time constraints and the task ended when participants said they could not recall any more adjectives. Participants were thanked and debriefed at the end of the experiment.

Results

Proportions of correctly recalled adjectives were computed as a function of encoding task (self-reference vs. other-reference) and valence (positive vs. negative; see Table 1). These proportions were analyzed with a 2 (encoding task) X 2 (valence) analysis of variance (ANOVA). An alpha level of .05 was used. For the main outcomes, Pearson’s point-biserial correlations (*r*s) are also reported as indicators of effect size (Rosnow & Rosenthal, 2003). The other-referent group was set to 0 and the self-referent group to 1, so a positive correlation indicated a higher recall performance for the self-referent group. For the within-group comparisons, *r*s were obtained with an equation provided by Rosnow and Rosenthal (2003). Estimated correlation coefficients are reported with their 95% confidence interval (CI).

The ANOVA showed that the main effect of valence was not significant, $F < 1$, and that the main effect of encoding condition was marginally significant, $F(1, 34) = 2.88$, $p = .10$, with recall performances tending to be better in the self-referent group than in the other-referent group, $r = .29$ (95% CI: -.04 to .56). However, there was a significant interaction between encoding condition and valence, $F(1, 34) = 6.84$, $p = .01$. Planned comparisons indicated that participants in the self-referent condition recalled more positive adjectives than participants in the other-referent condition, $F(1, 34) = 5.77$, $p = .02$, $r = .38$ (95% CI: .06 to .63), whereas the two groups did not differ concerning negative adjectives, $F < 1$, $r = .08$ (95% CI: -.26 to .40). In addition, participants in the self-referent condition recalled more positive adjectives than negative adjectives, $F(1, 34) = 6.08$, $p = .01$, $r = .47$ (95% CI: .00 to .77). In contrast, proportion of correctly recalled adjectives was slightly higher for negative than for positive adjectives for participants in the other-referent condition, but this difference was not significant, $F(1, 34) = 1.52$, $p = .22$, $r = .33$ (95% CI: -.16 to .69).

Most participants (76%) made at least one intrusion during the recall task and 27% of the participants made more than three intrusions (mean frequency of intrusions was 2.33 words, $SD = 1.72$; see Table 1 for mean number of intrusions as a function of valence and encoding condition). Most of these intrusions consisted of synonyms of presented adjectives (e.g., *thoughtful* for *considerate*). A 2 (encoding task) X 2 (valence) ANOVA showed that intrusions consisted of positive adjectives more often than negative adjectives, $F(1, 34) = 15.52$, $p < .001$, $r = .55$ (95% CI: .27 to .74). However, this main effect of valence did not interact with encoding task, $F(1, 34) = 1.54$, $p = .22$. The main effect of encoding task was not significant, $F < 1$.

Experiment 2

In agreement with previous studies (Denny & Hunt, 1992; Kuiper & Derry, 1982; Sanz, 1996; Sedikides & Green, 2000, 2004), we found in Experiment 1 that positive adjectives were better recalled than negative adjectives, but only when they were processed in reference to the self. In Experiment 2, we investigated whether the memory difference between positive and negative self-referent information is similar when retrieval cues are provided, i.e. in a recognition task. If, as we have suggested, the difference in memory for positive and negative self-referent information is in part due to control processes exerted during retrieval, then this difference should be reduced or even eliminated in the recognition task.

Method

Participants

Thirty-six undergraduates from the University of Liège participated in the study (18 women and 18 men). Their average age was 21.5 years (*SD* = 2.39 years); they were randomly assigned to one of the two encoding conditions (self-reference versus other-reference), with equal numbers of participants in each condition.

Materials and Procedure

The stimuli and procedure were the same as in the first experiment, with one exception: the free recall task was replaced by a recognition task. The 48 adjectives that had been presented during the study phase were listed randomly on a sheet of paper along with 48 distractors (for half of the participants, adjectives from list A were used as studied items while adjectives from list B served as distractors, and this was reversed for the other half of the participants). Participants had to put a cross next to words they had seen during the study phase. In addition, as it has been found that the influence of emotional valence on memory is not always reflected in overall recognition scores, but may nevertheless be located in qualitative aspects of recognition memory (Dewhurst & Parry, 2000; Ochsner, 2000), we used the remember (R) / know (K) / guess (G) procedure (Gardiner & Richardson-Klavehn, 2000) in order to assess the states of awareness that were associated with stimuli recognition. The instructions we used to explain the R, K and G responses were inspired by those used by Gardiner and colleagues (see Gardiner & Richardson-Klavehn, 2000). Briefly, participants were told that an R response should be given to any adjective which, at the time it was recognised, brought back to mind something they had consciously experienced (e.g., an association, a thought, a feeling) at the time it was presented. In contrast, they were asked to make a K response if the adjective felt familiar, but they were unable to recollect details of its prior exposure. Finally, they were asked to make a G response if they were unsure whether or not the adjective had been presented in the study phase.

Results

Proportions of hits and false alarms are presented in Table 1 as a function of encoding condition and valence. We first conducted a 2 (encoding condition) X 2 (valence) ANOVA on proportions of hits. The main effects of encoding condition and valence were not significant, $F(1, 34) = 2.23$, $p = .15$, and $F < 1$, respectively, nor was the interaction between the two, $F < 1$. An ANOVA on proportions of false alarms revealed a main effect of valence, $F(1, 34) = 33.38$, $p < .001$, $r = .70$ (95% CI: .48 to .84), with false alarms being higher for positive than for negative adjectives. The main effect of encoding condition was marginally significant, $F(1, 34) = 3.42$, $p = .07$, $r = -.30$ (95% CI: -.57 to .03), with false alarms tending to be higher in the other-referent condition than in the self-referent condition, but the interaction between valence and encoding condition was not significant, $F < 1$. We also computed the measures of sensitivity (*d’*) and response bias (*C*) from signal detection theory (MacMillan & Creelman, 1991; see Table 1). *d’* was higher in the self-referent condition than in the other-referent condition, $F(1, 34) = 5.38$, $p <$

.05, $r = .39$ (95% CI: .07 to .64), and was higher for negative than for positive adjectives, $F(1, 34) = 10.40$, $p < .005$, $r = .48$ (95% CI: .18 to .70); the interaction between encoding condition and valence was not significant, $F < 1$. Participants' response criterion (*C*) was more liberal for positive than for negative adjectives, $F(1, 34) = 13.96$, $p < .001$, $r = .54$ (95% CI: .26 to .74). The main effect of encoding condition and the interaction between valence and encoding condition were not significant, *F*s < 1.

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We then examined qualitative indices of recognition memory. Mean proportions of correct and false R, K, and G responses are shown in Table 1 as a function of valence and encoding condition. We first performed separate 2 X 2 ANOVAs on correct R, K and G responses. The effect of encoding condition on R responses was marginally significant, $F(1, 34) = 3.03$, $p = .09$, $r = .26$ (95% CI: -.07 to .54), with R responses tending to be more frequent in the self-referent group than in the other-referent group. The effect of valence failed to reach statistical significance, $F(1, 34) = 2.37$, $p = .13$, $r = .25$ (95% CI: -.09 to .53), and the interaction between encoding condition and valence was not significant either, $F < 1$. For K responses, the effect of valence was marginally significant, $F(1, 34) = 3.23$, $p = .08$, $r = .30$ (95% CI: -.03 to .57), with positive adjectives being associated with more K responses than negative adjectives. The effect of encoding condition and interaction between valence and encoding condition were not significant, *F*s < 1. The ANOVA computed for G responses did not reveal any significant effect (all *p*s > .12).

ANOVAs on false R, K, and G responses indicated that the main effect of valence was significant for R responses, $F(1, 34) = 12.02$, $p = .001$, $r = .51$ (95% CI: .22 to .72), marginally significant for K responses, $F(1, 34) = 3.55$, $p = .07$, $r = .30$ (95% CI: -.03 to .57), and significant for G responses, $F(1, 34) = 11.76$, $p = .001$, $r = .50$ (95% CI: .21 to .71), with positive adjectives leading to higher proportions of false alarms compared to negative adjectives in the three cases. The main effect of encoding condition was significant for false K responses, $F(1, 34) = 6.32$, $p = .02$, $r = -.40$ (95% CI: -.64 to -.08), and marginally significant for false G responses, $F(1, 34) = 3.46$, $p = .07$, $r = -.30$ (95% CI: -.57 to .03), with proportions being higher in the other-referent group than in the self-referent group. However, the encoding condition by valence interaction was not significant for false R, false K, and false G responses (all *p*s > .20).

General Discussion

The purpose of this study was to examine the influence of retrieval conditions on memory for positive and negative self-referent information. We made the assumption that the difference in memory for positive and negative self-referent information would be modulated by retrieval conditions, with the difference being more pronounced when there are few retrieval cues, as in a free recall task, than when retrieval cues are provided, as in a recognition task. Participants were asked to process positive and negative trait adjectives either in reference to themselves or in reference to a celebrity and were then asked to recall (Experiment 1) or to recognise (Experiment 2) these adjectives. Consistent with our predictions, a significant interaction between encoding condition and valence was observed in the recall task: participants in the self-referent condition correctly recalled more positive adjectives than participants in the other-referent condition, whereas the two groups did not differ in correct recall for negative adjectives. In addition, positive adjectives were better recalled than negative adjectives for participants in the self-referent group, whereas recall performance for positive and negative adjectives did not differ for participants in the other-referent group. Overall, these findings are consistent with previous studies that have examined memory for positive and negative self-referent information by means of a recall task (Denny & Hunt, 1992; Kuiper & Derry, 1982; Sanz, 1996; Sedikides & Green, 2000, 2004).

On the other hand, the results were quite different when memory was assessed by means of a recognition task (Experiment 2). In this case, encoding condition did not interact with valence**,** either for total proportions of hits, for measure of sensitivity (*d'*) or for qualitative aspects of recognition memory (R/K/G responses). The measure of sensitivity (*d'*) was higher in the self-referent condition than in the other-referent condition, which is consistent with previous studies on the SRE (Symons & Johnson, 1997). In addition, “Remember” responses tended to be more frequent in the self-referent condition than in the other-referent condition. This difference was only marginally significant and effect size indicator suggested that the effect was moderate ($r = .26$), but it is nonetheless consistent with previous studies (e.g., Conway, Dewhurst, Pearson & Sapute, 2001). Importantly, this effect of self-reference did not interact with valence of the adjectives. In both encoding conditions, sensitivity (*d'*) was higher for negative than for positive adjectives, and this was mainly due to false alarms being more frequent for positive than for negative adjectives (proportions of hits did not differ between positive and negative adjectives). The measure of response bias (*C*) further indicated that participants' response criterion was more liberal for positive than for negative adjectives (i.e., participants were more willing to accept an item as old when it was a positive rather than a negative adjective) but, again, this was the case in both encoding conditions.

Together, the findings of experiments 1 and 2 suggest that the difference in memory for positive and negative self-referent information is, at least in part, a consequence of processes occurring at retrieval. When confronted with a free recall task, people have to generate their own retrieval cues in order to search for and access information stored in memory. The motivation, shared by most people, to construct and maintain a positive view of the self (Baumeister, 1998;

Taylor & Brown, 1988) might influence this process, either by reducing access to negative information that is likely to threaten people's positive image of themselves, or by enhancing access to positive information that is compatible with self-enhancement goals. In other words, the self might either inhibit access to negative self-referent information or facilitate access to positive self-referent information during memory retrieval. The present findings do not enable us to determine the precise mechanisms that are involved (inhibition or facilitation or both), but they suggest the following: first, that these mechanisms are not recruited when information was encoded in reference to another person, and second, that the process occurs during retrieval rather than encoding, because when participants were provided with sufficient retrieval cues (i.e., in the recognition task), their memory for negative and positive adjectives did not differ. It should be noted that this latter conclusion may apply to trait information (e.g., "dishonest"), but not necessarily to stimuli in the format of behavioural information that exemplifies those traits (e.g., "I would not pay back money that I owed to a friend"). There is indeed evidence suggesting that, in the case of behavioural information, the encoding of positive information is more elaborated than the encoding of negative information (Sedikides & Green, 2000).

Although unexpected, another interesting finding was that both intrusions in the free recall task (Experiment 1), and false alarms in the recognition task (Experiment 2), were more frequent for positive than for negative adjectives. For recognition memory, this increase in false alarms translated into a decreased ability to discriminate between old and new items (*d'*) for positive than for negative adjectives, and the analysis of response bias (*C*) indicated that participants were more willing to accept an item as old when it was a positive rather than a negative adjective. A tentative explanation for these results may be that positive adjectives are more semantically related to each other than are negative adjectives. Stronger inter-item associations for positive adjectives may have caused semantic associates of presented adjectives to be activated to a greater extent during study, which would have subsequently led to false recall or false recognition of these associates. Indeed, it has repeatedly been found that intrusions in recall and false alarms in recognition are more frequent for semantic associates of studied words than for words that are semantically unrelated to studied items (see Roediger, McDermott, & Robinson, 1998, for review). Be that as it may, the important point for our purpose is that, contrary to the results for correct recall, the effect of valence on false recall and false recognition occurred in both encoding conditions. Thus, this effect appears to be rather general and is not modulated by self-referential processing.

Finally, one should note that differences in mood may have been a source of error variance in the present study. It has indeed been shown that, following a self-referential encoding task, depressed participants recall more negative adjectives or less positive adjectives compared to nondepressed participants (e.g., Denny & Hunt, 1992; Kuiper & Derry, 1982; Sanz, 1996; for a review of memory differences in depression, see Hertel, 2004). Mood was not assessed in the present study, therefore it might be that some of the participants were actually depressed. However, given random assignment to groups, this potential source of error variance was probably shared by the two encoding conditions, thus leaving the main conclusions of the present study unchanged. Nevertheless, it would be interesting in future studies to investigate mood-related differences in memory for positive and negative self-referent information with both a free recall and a recognition task in order to determine whether these differences are modulated by retrieval conditions.

In conclusion, the present study provides some clues that help understand the processes involved in memory difference between positive and negative self-referent trait information. We found that better memory for positive as compared to negative self-referent information manifested itself during free recall, but not during recognition. This suggests that the memory difference results from a control of memory retrieval rather than from differences in the processing of positive and negative trait information during encoding.

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Table 1

Memory Measures as a Function of Encoding condition and Valence in Experiments 1 and 2

		Self		Other	
		Positive	Negative	Positive	Negative
Experiment 1 (free recall)					
Proportion of correct responses		.32 (.16)	.25 (.14)	.20 (.13)	.23 (.10)
Number of intrusions		1.44 (1.62)	0.72 (0.89)	1.94 (1.39)	0.56 (0.51)
Experiment 2 (recognition)					
Hits	R	.66 (.19)	.68 (.24)	.51 (.24)	.58 (.27)
	K	.15 (.12)	.12 (.11)	.18 (.11)	.15 (.10)
	G	.10 (.11)	.10 (.11)	.17 (.11)	.13 (.11)
	Total	.91 (.09)	.90 (.10)	.86 (.13)	.84 (.17)
False alarms	R	.12 (.16)	.06 (.10)	.12 (.11)	.06 (.06)
	K	.06 (.06)	.03 (.03)	.10 (.10)	.06 (.04)
	G	.15 (.09)	.08 (.05)	.20 (.14)	.16 (.15)
	Total	.33 (.16)	.17 (.11)	.42 (.25)	.28 (.19)
d'		1.96 (0.65)	2.38 (0.59)	1.46 (0.76)	1.90 (0.95)
C		-0.47 (0.37)	-0.20 (0.33)	-0.47 (0.55)	-0.27 (0.50)

Note: Standard deviations are shown in parentheses.