
Remembering Everyday Experience Through the Prism of Self-Esteem

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Two studies examined whether global self-esteem was associated with bias in memory for autobiographical experience. For 7 days, participants described specific events and made ratings of their experience (i.e., state self-esteem, positive and negative emotion, and perceived valence of the event) in response to each event. Later, participants were presented with their event descriptions and were asked to recall their experience ratings from memory. As hypothesized, higher global self-esteem predicted positive shifts in memory for experience, whereas lower global self-esteem predicted negative shifts in memory for experience. Patterns of bias were strongest for remembered state self-esteem, moderate for positive emotion, and minimal for event valence. Self-esteem did not predict bias for negative emotion. Mood at the time of recall (measured in Study 2) generally did not account for the patterns. These findings strengthen the view that self-esteem is a rich source of knowledge about the self that can influence memory for some kinds of autobiographical experience.

In 1973, John Dean, the legal counsel to President Richard Nixon, testified before the Senate committee investigating the Watergate scandal. During his testimony, Dean recounted specific conversations he had with President Nixon. Later, when it was revealed that all of the conversations in the Oval Office had been tape recorded, Ulric Neisser (1981) recognized a remarkable opportunity to examine the workings of human memory: He compared John Dean's memory for specific events, as revealed in his testimony, with what had actually transpired in those events, as recorded on tape. Neisser concluded that Dean's testimony had been fundamentally accurate in its depiction of how the Watergate "cover-up" had unfolded but that Dean had colored his recollections in self-aggrandizing ways. For example, Dean incor-

rectly recalled having the prescience and courage to warn Nixon of the unraveling of the cover-up long before he actually had done so. Neisser surmised that Dean was not lying to the senators—he was portraying the events as he truly recalled them—but that his memory had distorted events positively to conform to his self-image. As Neisser asked, "Are we all like this? Is everyone's memory constructed, staged, self-centered?" (p. 19).

Considerable research points to a pervasive tendency to revise history in self-aggrandizing ways (Greenwald, 1980; Ross, 1989). We propose, however, that such revision depends on a person's level of self-esteem. We present two studies that examine this hypothesis.

Memory Is Reconstructed

Researchers have long known that memory does not always provide a veridical copy of events as they occurred; instead, people often reconstruct events and "remember" them in ways that depart from the original event (see Schacter, 1996, for a review). Departures occur, in part, because people draw on semantic knowledge (i.e., general beliefs about oneself or the world) to reconstruct episodic knowledge (i.e., representations of

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particular experiences) (Klein, 2001; Robinson & Clore, 2002-a).

Various types of semantic knowledge may be recruited to help piece together a coherent story of the past. Recall can be biased by theories of one's own emotionality (Feldman Barrett, 1997; Larsen, 1992), especially as it relates to gender (Feldman Barrett, Robin, Pietromonaco, & Eysell, 1998), by theories of menstruation (McFarland, Ross, & Decourville, 1989), or by "mental models" of a current relationship (Holmberg & Holmes, 1994; McFarland & Ross, 1987). For example, in a study of long-term relationships, participants rated their romantic partner on several dimensions and then were asked to recall those ratings 2 months later. People whose positive impressions of their partner grew over time recalled having made more charitable ratings than they had recorded earlier, whereas people whose impressions of their partner worsened recalled having made more negative ratings than they had actually made (McFarland & Ross, 1987; cf. Holmberg & Holmes, 1994).

Self-Esteem As a Personal Theory

We begin with the proposal that self-esteem is a personal belief or theory that can function to influence recollections of previous experience in much the same way. The idea that self-esteem may operate as a theory is not new (for a similar view, see Epstein, 1973). Self-esteem has been called a global attitude toward oneself (e.g., Brown, 1993) or a self-schema (Story, 1998), suggesting that it is associated with a rich source of knowledge about the self. People higher in self-esteem seem to operate under the theory that they are competent and lovable with many strengths and talents, whereas those lower in self-esteem seem to operate under the theory that they are less competent and mediocre, if not undesirable. Perhaps similar to other attitudes, schemata, or theories, self-esteem influences memory for personal experience. The possibility of memory differences in self-esteem also may suggest a new possible mechanism through which self-esteem may be maintained.

Patterns of Bias Associated With Self-Esteem

We propose that self-esteem biases recall, fashioning memories for autobiographical experience to be congruent with one's self-theory or self-beliefs. As such, people higher in self-esteem (whom we will call HSE for high self-esteem)¹ may tend to recall their experiences in self-aggrandizing ways, whereas people lower in self-esteem (whom we will call LSE for low self-esteem) may tend to recall their experiences in self-denigrating ways.

Existing research generally supports this hypothesis for laboratory-induced experiences. For example, HSE individuals exhibit distortion in their recall of unfavor-

able personality feedback, recalling it as more positive than it actually had been (Story, 1998). LSE individuals, by contrast, tend to recall favorable personality feedback as more negative than it was originally (see also Shrauger, 1975, for a review). Similar patterns of distortion have been shown for nondysphoric and dysphoric people in their recall of performance feedback (e.g., Gotlib, 1983; Nelson & Craighead, 1977). Dysphoric individuals, who tend to be low in self-esteem (Tennen & Affleck, 1993), recall being rewarded less for their performance than they actually were, whereas nondysphoric individuals recall being punished less than they actually were (Nelson & Craighead, 1977).

The purpose of the present research is to build on this emerging literature on self-esteem and memory bias in six ways. First, we controlled for differences in participants' initial subjective ratings of experience. Although laboratory-manipulated events such as those used in previous memory studies were objectively equivalent for each participant, they may not have been experienced equivalently by HSE and LSE individuals. HSE and LSE participants often differ in their responses to controlled feedback (e.g., Brown, 1993; Wood, Giordano-Beech, Taylor, & Michela, 1994) and interpret objectively identical events differently when they pertain to the self (e.g., Shrauger & Terbovic, 1976). Such differences in initial experience make it difficult to interpret any differences in recall later. In the present research, we measured participants' initial reactions to an event and controlled for differences in initial experience in our analyses.

Second, we studied memory for one's own reactions to events rather than memory for the events themselves. Most previous research on the memories of HSE/LSE (or nondysphoric/dysphoric) individuals has focused on their recall of events (usually, performance feedback they have received) but not on their experience of that event. We examined participants' memories for their feelings about themselves and their emotional reactions to specific events.

Third, we examined memory for experience in response to specific events rather than for aggregated or global experiences. Many recall studies have required respondents to make summary judgments of multiple previous experiences (e.g., Feldman Barrett, 1997; Feldman Barrett et al., 1998; Larsen, 1992; Thomas & Diener, 1990). For example, Feldman Barrett (1997) asked participants to rate their emotions "over the past three months in general" (pp. 1103). Testing memory for specific experiences provided a conservative test of our hypothesis because situated judgments are probably less vulnerable to bias by personal theories (Robinson & Clore, 2002-b) or by salient peak and end experiences (Fredrickson, 2000).

Fourth, rather than studying recall for a single entity (e.g., performance feedback), we studied memory for a variety of reactions including state self-esteem (how participants felt about themselves following the event), positive and negative emotions, and event valence (how intensely pleasant or unpleasant participants rated the specific event). We predicted that self-esteem would influence most strongly participants' recall for how they felt about themselves in past events (state self-esteem) because evaluations about the self are the core feature of knowledge associated with self-esteem. We predicted that self-esteem also would guide recall for general emotional reactions, but not as strongly as for recall of state self-esteem, because beliefs about emotionality are less central to one's self-esteem. LSE individuals do generally report worse moods than do HSE individuals (e.g., Wood et al., 1994), and they are more prone to anxiety and depression (e.g., Solomon, Greenberg, & Pyszczynski, 1991). Nonetheless, other research has indicated that HSE and LSE individuals differ more in their feelings about themselves (e.g., how humiliated they felt) than in their general emotional reactions (e.g., how sad they felt) (Brown & Dutton, 1995). Finally, we expected little if any bias in recollections of event valence. It seems unlikely that one's personal theory about oneself, as captured by self-esteem, extends as strongly to beliefs about events as it does to more personal reactions to events. Evidence for such systematic variation in the influence of self-esteem would support the idea that self-esteem operates as a theory guiding memory.

Fifth, we chose to focus on bias rather than accuracy issues per se. Previous research has demonstrated quite well that people are more accurate in their recall of controlled feedback that matches their views of self (e.g., when HSE individuals recall positive feedback) and are more distorted in their recall of feedback that does not match their views of self (e.g., when HSE individuals recall negative feedback) (Story, 1998). We were less interested in accuracy and more interested in the magnitude to which self-esteem influences recall judgments. Thus, we used a regression approach. In our regressions, we measured the extent to which self-esteem accounts for unique variance in recall judgments after all variance due to experience is removed (e.g., Feldman Barrett, 1997; Larsen, 1992; Thomas & Diener, 1990). We call this variance estimate "bias."

Finally, we examined participants' memories for experiences occurring in their everyday lives rather than their memories for laboratory-based experience. Memory bias observed in the lab might be underestimated because controlled events are typically unambiguous—involving feedback that is clearly positive or negative—which may be especially memorable. Bias may operate more strongly for ambiguous, emotionally salient expe-

riences involving important people in one's life and events of personal consequence (cf. Holmberg & Holmes, 1994). Another possibility, however, is that bias has operated unusually strongly in the lab. Bias is often strongest when participants are presented with events that they might not normally encounter in their everyday lives (e.g., positive personality feedback for individuals with low self-regard). Thus, it is important to determine whether self-esteem continues to predict memory bias for experiences that are part of a person's normal repertoire.

OVERVIEW OF PRESENT STUDIES

We used two daily diary studies to test whether people's theories about themselves—as reflected in their global self-esteem—predicted bias in recall for specific experiences in their daily lives. Participants in both studies completed one diary record at the end of each day for 7 days. At each recording, participants wrote about one pleasant and one unpleasant event from their day and then made ratings of their state self-esteem in response to that event, their emotional reactions to the event, and the event valence (its pleasantness or unpleasantness). Later, participants were presented with selected event descriptions and asked to recall their experience ratings from memory.

We hypothesized that participants' global self-esteem, measured prior to the sampling period, would be associated with bias in their recollections. We predicted that HSE individuals would recall reacting to specific events in a positive direction, whereas LSE individuals would recall reacting to specific events in a negative direction. Furthermore, we predicted that strength of bias would vary with the centrality of recalled experience to the self, such that bias would be strongest for state self-esteem, moderate for general emotional reactions, and weakest for event valence. Finally, we predicted that these biases would not be explained simply by participants' mood at the time of recall. Study 2 included a current mood measure at the time of recall to rule out this interpretation.

Measuring Bias

We tested our hypotheses using path analysis (Pedhazér, 1982), as shown in Figure 1. Although we were interested primarily in Path c, bias, we present all paths for clarity. Path c represents the unique relation between global self-esteem and recalled ratings when controlling for diary ratings of experience. Variance due to actual experience was partialled out of both the predictor (global self-esteem) and the criterion (recall ratings), which has the effect of statistically equating differences in any initial diary ratings by HSE and LSE participants. Path b, relative accuracy, represents the unique relation between diary ratings of experience and

recalled ratings, controlling for global self-esteem. Again, variance due to global self-esteem was partialled out of both the predictor (diary ratings) and the criterion (recall ratings). Paths b and c were computed simultaneously by regressing recall ratings onto global self-esteem scores and diary ratings of selected events. Path a represents the variance shared between global self-esteem and diary ratings of experience for selected events. A significant correlation for Path a would indicate that HSE and LSE individuals differed in their initial ratings of events selected for recall. This variance is controlled in the computation of the bias and accuracy paths.

METHOD

Participants

Study 1. Participants were 68 undergraduate psychology students (20 men) enrolled in an introductory statistics course who received extra course credit for participating. The class contained 80 students (24 men) who completed the initial self-esteem measure. Ten of those participants (4 men) did not complete the diary portion of the study and 2 participants did not complete at least one recall measure. Responses from these students were not retained for data analysis.

Study 2. Participants were 117 undergraduate psychology students (26 men) enrolled in the same introductory statistics course 1 year later who also received extra course credit for participating. That class contained a total of 146 students (39 men) who completed the initial self-esteem measure, but 29 of them (13 men) did not complete the diary portion of the study. Responses from these students also were not retained for data analysis. All 117 students completed at least one recall measure. All participants' materials were identified by code names throughout each study.

Measure of Self-Esteem

Participants in both studies took home and completed a series of self-report measures in an initial questionnaire packet. This packet included the Rosenberg Self-Esteem Scale (Rosenberg, 1965), which is a widely used 10-item measure self-esteem. Each item was answered on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Measures of Daily Experience

Participants returned to the classroom 3 days later to turn in the questionnaire packet, to receive seven diary records, and to receive oral and written instructions for completing the diary records. Diary records were exactly the same in both studies, except where noted below. Participants were asked to complete one diary record each

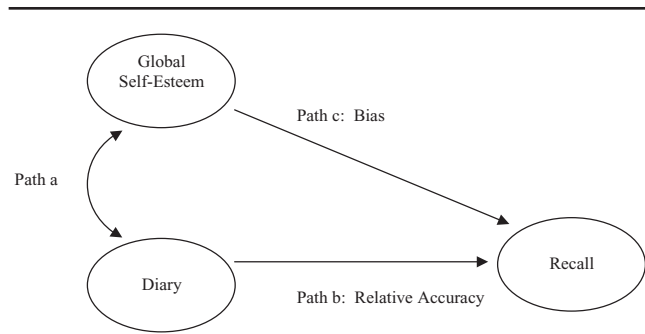


Figure 1 Path model used in both studies.

night for 7 nights. On each record, participants chose one pleasant and one unpleasant event from their day and described each in detail. The record provided eight lines of writing space for each narrative. To avoid floor and ceiling effects in subsequent ratings, participants were asked to select events that were moderately pleasant and unpleasant. In their narratives, participants described who was involved, the sequence of events (with a beginning, middle, and end), and the emotions experienced by themselves and any other persons involved. Participants then answered a series of questions about each narrative.

State self-esteem. First, they indicated how they felt about themselves immediately after the event on four 7-point scales (each anchored by 0 and 6): *very negative/very positive, not worthwhile/worthwhile, incompetent/competent, unacceptable/acceptable*. A state self-esteem index was calculated by summing the ratings for these four scales, with higher numbers indicating higher state self-esteem (Study 1 alphas ranged from .82 to .92, $M = .88$, $SD = .18$; Study 2 alphas ranged from .90 to .92, $M = .91$, $SD = .05$).²

Positive and negative emotions. Next, participants rated the extent to which they experienced 26 emotional states during or immediately after the event. The 26 emotion terms were sampled from the entire space of the affect circumplex and represented all combinations of valence and arousal dimensions (Feldman, 1995). Each term was followed by a 7-point scale (from 0 = *neutral* to 6 = *a lot*). From these ratings, we calculated a positive emotion index by summing the ratings for enthusiastic, happy, joy, amusement, and satisfaction (Study 1 alphas ranged from .71 to .91, $M = .80$, $SD = .31$; Study 2 alphas ranged from .65 to .90, $M = .81$, $SD = .30$).³ We calculated a negative emotion index by summing the ratings for nervous, embarrassed, angry, sad, disappointed, guilt, and shame (Study 1 alphas ranged from .72 to .82, $M = .76$, $SD = .11$; Study 2 alphas ranged from .67 to .85, $M = .75$, $SD = .19$).

Event valence. Then they rated how unpleasant or pleasant the event was on a 7-point scale (from 0 = *very*

unpleasant to 6 = *very pleasant* in Study 1). In Study 2, we changed the event valence scale values to -3 and $+3$ (*very unpleasant/very pleasant*) to clarify anchor points.

Each record took approximately 10 minutes to complete. Participants turned in their diary records following the 2nd and 7th nights.

Recall of Specific Experiences

Twice after the end of the 7-day sampling period, participants completed a surprise recall measure in class for a specific pleasant and unpleasant event that they reported during the sampling period. The two recall sessions occurred 9 and 13 days postsampling (Study 1) or 9 and 21 days postsampling (Study 2). Each recall measure was idiographically tailored. For each participant, we selected two pleasant and two unpleasant written events from his or her original pool of seven diary records. Narratives were selected blind to participants' global self-esteem. Selected narratives had a high level of written detail (i.e., more than three written sentences) as well as moderate and congruent valence and emotion ratings (i.e., pleasant narratives produced moderate but not extreme positive emotion ratings). Events selected for recall in Study 1 ranged in valence from 4 to 6 for pleasant events ($M = 4.7$, $Mdn = 5$) and 0 to 2 for unpleasant events ($M = 1.6$, $Mdn = 2$). Events selected for recall in Study 2 were comparable.

Once selected, pleasant and unpleasant events were randomly assigned for use in either Recall 1 or Recall 2, with the only constraint that pleasant and unpleasant events selected from the same recording day were assigned to different recall sessions. Random assignment of events to the two recall sessions appears to have been moderately successful. In Study 1, paired-samples t tests comparing event ratings across the two recall periods revealed no significant differences in state self-esteem, positive emotion, negative emotion, or event valence for either pleasant or unpleasant events (all Study 1 t s ≤ 1.33). In Study 2, these same tests revealed some differences between events across the two recall sessions. Specifically, unpleasant events assigned to Recall 1 were rated higher in negative emotion than were unpleasant events assigned to Recall 2, $t(109) = 2.289$, $p < .01$, and pleasant events assigned to Recall 1 were rated more positive in valence than were events assigned to Recall 2, $t(103) = 2.262$, $p < .03$.

We also examined whether the events selected for recall were representative of participants' range of reported experiences to an equal degree for HSE and LSE individuals. For each participant, we determined the representativeness of each selected event by standardizing (z scoring) that event's valence rating relative to the valence ratings of all other events in his or her pool. This procedure was done separately for pleasant

and unpleasant events assigned to both Recall 1 and Recall 2. Higher z scores indicate that a selected event was atypical in valence compared to other events described by that person. Correlating each set of z scores with scores on the Rosenberg Self-Esteem scale revealed no significant associations between event representativeness and self-esteem (all Study 1 r s $\leq .17$ and ns ; all Study 2 r s $\leq .15$ and ns). Thus, we can be confident that both HSE and LSE participants were presented with events that were representative of their sampled repertoire of experience.

Participants were presented with new diary forms containing their original event narrative followed by blank rating scales identical to those used during the sampling period. Participants were instructed to read each narrative, to take a moment to remember the event they had described, and to answer the series of questions "exactly as they believed they had answered them the night the event occurred." The same procedure was followed at Recall 2, except that different event narratives were presented. Following the second recall session, participants were debriefed and thanked.

Note that Study 2 used the same recall procedure as did Study 1, except for two changes in protocol. First, the recall occurred 9 and 21 days after the recording period (rather than 9 and 13 days). Second, a mood measure was administered immediately prior to both recall sessions to test mood as a possible mechanism of bias. Participants rated the extent to which they were currently experiencing 26 emotions, using the same emotion scales used in the diary records. From these ratings, we calculated a mood index by summing the ratings for enthusiastic, happy, joy, amusement, and satisfaction (positive mood alphas were .91 for Recall 1 and .87 for Recall 2, $M = .89$, $SD = .12$), and from this number, we subtracted the sum of the ratings for nervous, embarrassed, angry, sad, disappointed, guilt, and shame (negative mood alphas were .86 for Recall 1 and .80 for Recall 2, $M = .83$, $SD = .13$). Higher values indicated a more positive mood at the time of recall.

RESULTS

First, we present descriptive statistics for self-esteem scores and daily events for both studies as well as control analyses (the results for Path a for all ratings). Then, we present the results for relative accuracy (Path b) and bias (Paths c) separately for each domain (state self-esteem, positive and negative emotion, and event valence). Last, we consider mood as an alternative mechanism for the observed bias.

Descriptive Statistics and Control Analyses

Self-esteem and daily events. Scores on the Rosenberg Self Esteem Scale ranged from 21 to 70 in Study 1 ($M =$

49.16, $SD = 10.83$) and from 12 to 70 in Study 2 ($M = 52.90$, $SD = 12.28$). Both distributions were normally distributed, and means were within the range of other student samples reported in the literature (e.g., Baumeister, Tice, & Hutton, 1989). Mean levels were significantly higher in Study 2 than in Study 1, $t(180) = 2.06$, $p < .05$. We believe this difference reflects chance variation in the composition of students across two classes.

Narratives written by participants described pleasant events that ranged in valence from 4 (*slightly pleasant*; e.g., received a package from home) to 6 (*very pleasant*; e.g., boyfriend or girlfriend visited from out of town), with a mean of 4.94 and a median of 5 (*moderately pleasant*; e.g., had dinner with a good friend). Unpleasant events ranged from 0 (*very unpleasant*; e.g., failed an exam) to 2 (*slightly unpleasant*; e.g., drank too much at a party), with a mean of 1.53 and a median of 2. Narratives written by participants in Study 2 were comparable. Successes and failures in the academic arena were especially common in these student samples, as were interactions with friends and romantic partners.

Path a. Path a was estimated by correlating the Rosenberg Self-esteem scores with the diary ratings of events selected for recall. For each study, a total of 16 correlations were computed between global self-esteem and the four experience ratings (state self-esteem, positive emotion, negative emotion, and event valence) for each of the four events recalled (pleasant and unpleasant events at Recall 1 and Recall 2). We did not expect these correlations to be significant because events were selected for recall using the same criteria for all participants, regardless of their self-esteem.

Results were as expected for Study 1. The 16 correlations ranged from $-.002$ to $.235$ and none were significant, $p > .09$. HSE and LSE individuals, for the most part, reported similar initial experiences in their events selected for recall. That meant that very little shared variance between self-esteem and the initial diary ratings would be controlled in the computation of the relative accuracy and bias paths. In Study 2, global self-esteem did systematically predict 7 out of 16 ratings of events selected for recall. Global self-esteem was positively correlated with state self-esteem ratings for all events selected for recall (correlations ranged from $.24$ to $.39$, $M = .31$, $SD = .07$) and negatively correlated with negative emotion ratings for most events selected for recall (correlations ranged from $-.24$ to $-.32$, $M = -.29$, $SD = .05$). These differences in initial diary ratings were controlled in the computation of Paths b (relative accuracy) and c (bias) for state-self esteem and negative emotion. One consequence of these greater statistical controls is that bias would tend to be underestimated in Study 2. Thus, Study 2 was a very conservative test of our hypothesis.

State Self-Esteem

Path b: Relative accuracy. As can be seen in rows 1 and 2 of Table 1, participants' recall of state self-esteem was strongly related to their diary ratings of state self-esteem across both studies. This was true for pleasant and unpleasant events at 9, 13, and 21 days after the recording period. These results are consistent with previous evidence that some variance in recall is accounted for by the ratings as originally made (Feldman Barrett, 1997; Ross, 1989).

Nonetheless, some distortion may have occurred within each study, regardless of individual differences in global self-esteem. Here, we use the term *distortion* to refer to an overall tendency of the entire sample to over- or underestimate experiences in recall. To examine the nature of any such distortion, we compared the predicted recall ratings (from the regression line) to the actual diary ratings using paired-samples t tests. Results are presented in Table 2, rows 1 to 4, and show that distortion occurred for four of the eight events tested across the two studies. The positive t values indicate that participants, as a sample, recalled experiencing higher state self-esteem than they originally reported. Moreover, a more consistent pattern emerged in Study 2 than was observed in Study 1. For pleasant events, participants' recall of their state self-esteem corresponded more closely with their diary ratings, on average. For unpleasant events, however, participants' recall ratings were significantly more positive than their original ratings, suggesting positive distortion was observed in this sample for unpleasant events only. These patterns of distortion will be considered when interpreting any significant effects for Path c, bias.

Path c: Bias. As predicted, global self-esteem was uniquely related to bias in recall of state self-esteem for six of the eight events tested. As can be seen in the top rows of Table 3, as participants' global self-esteem increased, so did their tendency to recall feeling better about themselves following pleasant events at Recall 1 and Recall 2 (Study 1 only). Global self-esteem also predicted bias for unpleasant events, but to a lesser extent than was observed for pleasant events. As expected, bias was noticeably weaker in Study 2, which was a more conservative test of our hypothesis.

These patterns showed that even in the cases of positive distortion identified above—when participants on average remembered feeling more positive about themselves during events than they originally reported—global self-esteem continued to predict bias in state self-esteem over and above that distortion. Thus, bias emerged in both the absence and presence of distortion. In all, higher self-esteem was associated with aggrandizement of self-feelings in memory, whereas lower self-

esteem was associated with either denigration or lesser aggrandizement.

Positive Emotion

Path b: Relative accuracy. Participants' recall of positive emotion was strongly related to their diary ratings of positive emotion. As can be seen in rows 3 and 4 of Table 1, the paths were significant for all events across both studies. Follow-up tests (shown in rows 5 to 8 of Table 2) showed that predicted recall was generally lower than actual diary ratings for most of the events tested, suggesting that, on average, participants recalled less intense positive emotion in memory for specific events than they had reported in their diaries.

Path c: Bias. As can be seen in rows 3 and 4 of Table 3, global self-esteem predicted bias, but only in Study 1 at the second recall session. Higher self-esteem was associated with less underestimation of positive emotion (i.e., less distortion), whereas lower self-esteem was associated with greater underestimation of positive emotion (i.e., more distortion). This effect was in the expected direction at the first recall session but was not significant.

Global self-esteem did not predict bias in Study 2, however. These nonsignificant paths were not likely due to greater statistical controls because little variance was controlled between global self-esteem and positive emotion ratings. Instead, we speculated that this failure to replicate may have been due to the administration of the mood measure immediately prior to recall. Previous research has shown that when mood is primed, current affective state influences judgments and memory (Schwarz & Clore, 1996). Thus, we may have induced participants to use the very memory cue that we were trying to rule out. To test this possibility, we reran the path analyses for positive emotion and substituted positive mood at the time of recall for the Rosenberg Self-Esteem scores. Indeed, mood was a better predictor of recall bias for positive emotion in Study 2 than was self-esteem. Individuals in more positive moods at the time of recall remembered experiencing more positive emotion in response to pleasant events at Recall 2 (Path *c*, $B = .269$, $b = .273$, $t = 3.496$, $p < .001$) and in response to unpleasant events at both Recall 1 (Path *c*, $B = .163$, $b = .057$, $t = 2.121$, $p < .04$) and Recall 2 (Path *c*, $B = .287$, $b = .129$, $t = 3.45$, $p < .001$). Results were in the expected direction, although not significantly so, for pleasant events at Recall 1 (Path *c*, $B = .119$, $b = .095$, $t = 1.438$, $p < .16$).⁴

Thus, the results for remembered positive emotion generally supported our hypothesis that self-esteem influenced recall, but in a manner different than we observed for state self-esteem. First, bias patterns were not as strong as those found for self-esteem, consistent with our predictions. Second, HSE individuals appeared less distorted than LSE individuals in their recall of posi-

tive emotion (whereas the opposite was true for four of six findings for remembered state self-esteem). Third, this effect was eliminated when mood was made salient in Study 2.

Negative Emotion

Path b: Relative accuracy. As can be seen in rows 5 and 6 of Table 1, participants' recall of negative emotion was strongly related to their diary ratings of negative emotion in both studies. As Table 2 indicates, predicted recall was consistently lower than diary ratings, suggesting that participants generally recalled experiencing less negative emotion than they had reported in their diaries. Similar to findings for positive emotion, individuals seemed to underremember their experience of negative emotion.

Path c: Bias. Contrary to predictions, global self-esteem did not predict bias in remembered negative emotion. Lines 5 and 6 of Table 3 indicate that no bias paths were significant. No further analyses were conducted.

Event Valence

Path b: Relative accuracy. Participants' recall of valence was related to their diary ratings of valence for all events, except for unpleasant events in Study 1 (as seen in rows 7 and 8 of Table 1). We suspected that this null result was due to confusion with the response scale. Some participants in Study 1 rated their unpleasant events as pleasant in valence (4s, 5s and 6s). Although we excluded those narratives from the recall task, participants may have confused the anchor points when completing the recall task. Indeed, accuracy increased in Study 2 when anchors were clarified.

Follow-up analyses, as displayed in the bottom four rows of Table 2, showed that predicted recall was generally higher than actual diary ratings for pleasant events, suggesting that participants, as a sample, remembered pleasant events as more positive than they originally reported (positive distortion). No consistent pattern of distortion was found for unpleasant events.

Path c: Bias. We predicted a minimal association between self-esteem and bias for event valence. As predicted, the bottom rows of Table 3 suggest only a trend for participants higher in self-esteem to recall their unpleasant event at Recall 1 as more pleasant than did participants lower in self-esteem. In Study 2, at Recall 1 only, higher self-esteem was associated with recalling pleasant events as more pleasant, over and above the observed positive distortion observed for the sample.

Testing Mood as a Possible Alternative Explanation

Although our results are consistent with the hypothesis that self-esteem biases memory, a competing interpre-

TABLE 1: Path b (relative accuracy): Unique Associations Between Diary Ratings and Recall Ratings

Measure	Event	Study 1				Study 2			
		Recall 1		Recall 2		Recall 1		Recall 2	
		β	(b)	β	(b)	β	(b)	β	(b)
State self-esteem	Pleasant	.259*	(.189)	.300*	(.310)	.551***	(.533)	.612***	(.620)
	Unpleasant	.552***	(.592)	.358**	(.377)	.777***	(.735)	.690***	(.539)
Positive emotion	Pleasant	.262*	(.263)	.552***	(.582)	.504***	(.595)	.573***	(.624)
	Unpleasant	.580***	(.283)	.519***	(.378)	.672***	(.333)	.514***	(.378)
Negative emotion	Pleasant	.683***	(.397)	.740***	(.529)	.618***	(.625)	.420***	(.302)
	Unpleasant	.348*	(.339)	.556***	(.437)	.743***	(.737)	.729***	(.723)
Event valence	Pleasant	.239 [†]	(.292)	.297*	(.340)	.496***	(.526)	.448***	(.503)
	Unpleasant	.198	(.290)	.136	(.183)	.377***	(.259)	.204*	(.274)

NOTE: Standardized betas, β , represent the proportion of variance in recall accounted for by diary ratings, when controlling for global self-esteem. Bold indicates a significant (or trend [t]) coefficient.
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

TABLE 2: Distortion: Comparison of Predicted Recall Ratings With Diary Ratings

Measure	Event	Recall	Study 1						Study 2					
			Predicted		Diary		t	Predicted		Diary		t		
			M	SD	M	SD		M	SD	M	SD			
State self-esteem	Pleasant	1	19.40	(1.30)	18.34	(5.01)	2.360*	19.33	(1.75)	19.37	(3.69)	-0.242		
		2	19.19	(1.44)	19.13	(4.11)	0.175	19.60	(2.24)	19.47	(3.88)	0.807		
	Unpleasant	1	10.55	(3.09)	10.28	(5.25)	0.991	12.28	(4.09)	11.54	(5.75)	4.788***		
		2	11.29	(2.02)	10.36	(5.00)	2.597*	12.33	(3.21)	11.85	(5.44)	2.304*		
Positive emotion	Pleasant	1	17.70	(1.64)	17.65	(5.24)	0.111	16.74	(3.23)	18.01	(5.11)	-7.115***		
		2	17.35	(3.36)	17.87	(5.86)	-1.702[†]	16.36	(3.49)	17.42	(5.90)	-4.711***		
	Unpleasant	1	0.81	(0.51)	1.69	(3.62)	-2.346*	1.15	(1.53)	1.89	(3.55)	-3.866***		
		2	0.57	(0.79)	1.03	(2.10)	-2.928***	1.14	(1.53)	1.88	(3.90)	-3.324**		
Negative emotion	Pleasant	1	1.51	(1.24)	2.88	(4.23)	-3.798***	2.09	(1.94)	2.51	(3.81)	-2.352*		
		2	1.48	(2.43)	2.74	(4.71)	-4.498***	2.12	(1.92)	3.089	(4.81)	-3.574***		
	Unpleasant	1	15.23	(1.83)	17.07	(8.29)	-2.353*	15.96	(5.50)	17.68	(7.82)	-7.924***		
		2	14.16	(3.47)	16.57	(8.57)	-3.898***	14.84	(5.87)	15.53	(8.03)	-3.363***		
Event valence	Pleasant	1	4.88	(0.157)	4.61	(0.58)	5.153***	2.11	(0.252)	2.02	(0.56)	3.005**		
		2	4.88	(0.185)	4.74	(0.616)	2.528*	1.97	(0.223)	1.87	(0.60)	3.066**		
	Unpleasant	1	1.73	(0.13)	1.69	(0.53)	0.838	-1.81	(0.34)	-1.54	(0.96)	-4.601***		
		2	1.81	(0.10)	1.57	(0.58)	4.123***	-1.64	(0.103)	-1.53	(1.00)	-1.382		

NOTE: Paired samples *t* tests were used. Significant positive *t* values indicate overestimation of that experience in recall; significant negative *t* values indicate underestimation of that experience in recall. Bold indicates a significant (or trend [t]) coefficient.
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

tation might be that the observed effects were driven by participants' mood at the time of recall. A large body of evidence suggests that current emotional state influences memory (for a review, see Singer & Salovey, 1988). Participants in positive moods or experimental success conditions recall more positive personal experiences from their pasts (e.g., Natale & Hantas, 1982) than do participants in negative moods or experimental failure conditions. Mood-congruent recall is especially likely for thoughts regarding the self (Sedikedes, 1992). Because people higher in self-esteem are customarily happier than people lower in self-esteem (e.g., Wood et al., 1994), it is possible that these unique relations between

global self-esteem and recall were mediated by mood at the time of recall (cf. Seidlitz & Diener, 1993).

To examine whether these apparent biases in recall were due to mood, we added mood at the time of recall to the original path model (in Study 2 only), such that global self-esteem predicted mood (Path d), which in turn predicted recall (Path e). With these additions, Path c, bias, represented the degree to which global self-esteem predicted unique variance in recall that was not accounted for by diary ratings or by overall mood at the time of recall. If Path c, bias, continues to be significant when Paths d and e are in the model, then this would provide stronger support for our hypothesis that global

TABLE 3: Path c (bias): Unique Associations Between Global Self-Esteem and Recall Ratings

Measure	Event	Study 1				Study 2			
		Recall 1		Recall 2		Recall 1		Recall 2	
		β	(b)	β	(b)	β	(b)	β	(b)
State self-esteem	Pleasant	.365**	(.120)	.394**	(.153)	.208*	(.057)	.042	(.013)
	Unpleasant	.121	(.060)	.297*	(.144)	.154*	(.067)	.120^t	(.042)
Positive emotion	Pleasant	.209	(.094)	.323**	(.184)	.094	(.045)	-.007	(-.004)
	Unpleasant	.165	(.023)	.263*	(.038)	-.081	(-.012)	-.005	(-.001)
Negative emotion	Pleasant	-.122	(-.023)	.039	(.013)	-.067	(-.019)	.072	(.018)
	Unpleasant	.092	(.066)	.007	(.005)	-.058	(-.036)	-.073	(-.047)
Event valence	Pleasant	.086	(.005)	.195	(.012)	.280**	(.013)	.037	(.002)
	Unpleasant	.231^t	(.016)	-.012	(-.001)	.066	(.004)	.024	(.002)

NOTE: Standardized betas, β , represent the proportion of variance in recall accounted for by global self-esteem, when controlling for diary ratings. Bold indicates a significant (or trend [t]) coefficient.

^t $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

self-esteem is influencing memory for reactions to daily events. We ran these path models for each of the four significant bias effects found in Study 2.

Results were generally consistent with our hypothesis. Global self-esteem continued to predict bias in memory in all originally significant cases, including state self-esteem for pleasant events (Recall 1: Path c, $B = .227$, $b = .063$, $t = 2.801$, $p < .01$) and unpleasant events (Recall 1, Path c, $B = .127$, $b = .055$, $t = 2.217$, $p < .03$), and event valence for pleasant events (Recall 1, Path c, $B = .262$, $b = .012$, $t = 3.171$, $p < .01$). Global self-esteem did not continue to predict bias for state self-esteem in response to unpleasant events, which was originally a trend (Recall 2, Path c, $B = .027$, $b = .010$, $t = .360$, $p = .720$). Given these results, we can be more confident that these effects are not driven solely by mood at the time of recall.

Summary

Findings across two studies provide evidence that global self-esteem is related to memory bias for some aspects of autobiographical experience: state self-esteem, positive emotion (under certain circumstances), and more tenuously, event valence. In all instances of bias, HSE individuals recalled experiencing specific daily events more positively relative to the overall tendencies of the sample, whereas LSE individuals recalled experiencing specific daily events more negatively relative to the sample patterns. The strength of bias varied across domains of experience, but not entirely as predicted. Bias was strongest for experiences central to feelings about the self (e.g., state self-esteem) and relatively weaker for experiences less central to the self (e.g., positive emotion and event valence). Contrary to predictions, however, no self-esteem bias occurred for negative emotion.

It is noteworthy that the general relation between recall and diary ratings, Path b, varied by domain. Whereas participants as a sample sometimes remembered feeling

better about themselves in response to events than originally reported, they also recalled experiencing less intense emotion, both positive and negative, in response to the same event. The observation that participants' retrospective reports of emotion for specific events are less intense than their diary reports of the same experience runs counter to much previous research showing that retrospective reports of emotion are often more intense than their momentary ratings (e.g., Cutler, Larsen, & Bunce, 1996; Thomas & Diener, 1990). Previous studies, however, tested recall for emotion in general, or averaged across a time period, which is influenced disproportionately by peak and end moments during that time period (Fredrickson, 2000; Fredrickson & Kahneman, 1993). By testing memory for emotion in response to a specific event, we may have eliminated the use of salient moments in recall. The diminutions in emotional intensity for specific events may be explained by the fading of context and vividness present at the moment ratings were made.

GENERAL DISCUSSION

Self-esteem is a theory that, like other theories, can influence recollections of previous experience. People higher in self-esteem are biased to recall their reactions to specific events mostly in self-aggrandizing ways, whereas those lower in self-esteem are biased to recall their reactions either in less aggrandizing or even in self-denigrating ways. Bias was strongest for feelings about the self and weakest for memory of event evaluation, with memory for positive emotional reactions falling in between (and perhaps more susceptible to salient mood cues). These results are consistent with our reasoning that if self-esteem operates as a theory, it should exert its greatest influence on matters most relevant to the theory—namely, domains central to the self—and exert

less influence on matters less relevant to the theory—namely, domains more peripheral to the self. Thus, self-esteem does not appear to act like rose-colored glasses (for HSEs) or dark glasses (for LSEs), tingeing everything in sight. Rather, self-esteem may color only those memories of experiences relevant to evaluative self-beliefs.

Of interest, global self-esteem did not predict bias for negative emotion in either study. Although unexpected, this finding parallels previous research on the memory biases of depressed people. In Singer and Salovey's (1993) review of that literature, they concluded that depressed people were more likely to have reduced access to positive information in memory than to have increased access to negative information. It is possible, then, that the memory bias for people lower in self-esteem, similar to that of depressed people, "may have more to do with their inability to retrieve positive memories than with their greater access to negative memories" (Singer & Salovey, 1993, p. 108). These results provide further evidence of the disassociation between positive and negative emotions (Fredrickson & Branigan, 2001).

These findings emerged under fairly conservative conditions. First, unlike previous studies that have asked participants to make a summary judgment about their earlier reactions, such as how they had felt, overall, during their interval of recording (e.g., Feldman Barrett, 1997), we had participants remember their reactions to specific events. Second, we presented participants with narratives that they themselves wrote, thus providing rich cues for retrieval, yet we still found shifts in memory. Third, the diary and recall ratings both shared the identical response scale, and shared method variance may well have inflated their association, thereby making it harder to detect bias. Our estimates of bias would not have been inflated by method variance to the same degree because the Rosenberg self-esteem measure and the recall ratings did not share the same response scales. Finally, consider that the patterns of bias generally replicated across both studies (with the exception of positive emotion) even though Study 2 was a more conservative test of our hypotheses. For these reasons, we feel more confident in our results.

To our surprise, the longest delay (Study 2, Recall 2) showed little in the way of bias effects. One might expect that bias would increase with time as memories for particular events fade. In fact, bias did increase with time in Study 1 when memory was tested at 9 and 13 days after the sampling period, but this pattern did not hold for 9 and 21 days in Study 2. One possibility is that bias occurs up to a point that an event is still relevant to the self (and is likely to activate evaluative self-knowledge) and then diminishes as that event loses its relevance. Although this explanation is speculative, it would be interesting to

explore the role of event relevance and the magnitude of bias through time.

Implications

Self-esteem differences in memory bias may help to maintain self-esteem in several ways (Epstein, 1992). First, memory biases may make it difficult for people to change their self-esteem because they cannot distinguish bias from the original memory. People are often asked by friends and spouses to describe their past experiences, such as how they felt about a recent job interview. Each of these storytelling moments offers the opportunity to either confirm or to gradually modify one's self-views. When people with low self-esteem recall their feelings as having been more negative than they actually experienced them originally, these memories reinforce rather than remedy their views of themselves. Second, memory biases may rob LSE people of the pleasure of "basking in their memories" of positive experiences (Fredrickson, 1998). Experiencing personal achievements or feeling loved should boost their self-esteem, but these memories will not have lasting effects if LSE individuals fail to recall how good they felt about themselves during such experiences. Third, memory biases may contribute to self-esteem differences in coping with negative events. Specifically, after a negative experience, HSE people are more likely than LSE people to recall positive memories (Smith & Petty, 1995) and to focus on their strengths and talents (Dodgson & Wood, 1998). The biases that we have observed in the present research may facilitate HSE individuals' ability to recruit such helpful memories. Memory biases, then, may help to explain why attitudes about the self are so hard to change (e.g., Swann, 1990).

Limitations

One limitation of our research is that initial diary reports of experience were made at the end of the day. Therefore, it is possible that participants' written descriptions of events and corresponding experience ratings were already distorted by their self-esteem beliefs. To the extent that self-esteem differences are already reflected in initial diary ratings, this would serve to diminish any additional biasing effect. That self-esteem predicted bias in recall of experiences at a later date argues that self-esteem operates powerfully in memory for experience.

Another limitation of our research is that self-esteem overlaps with a number of other individual difference variables, such as overall affectivity, depression, and neuroticism. Hence, one of these other variables, rather than self-esteem, may have driven the biases that we observed. However, the contrast between our findings and those of Feldman Barrett (1997) alleviate this con-

cern somewhat. Whereas Feldman Barrett (1997) found that neuroticism predicted recall of negative emotions but not positive emotions, we found that global self-esteem most strongly predicted recall of feelings about the self (state self-esteem), less reliably predicted recall of positive emotions, and did not predict recall of negative emotions at all. These results suggest that self-esteem and neuroticism, although certainly overlapping, have distinct effects. In addition, to the extent that one's current mood reflects one's overall affectivity and neuroticism, Study 2's evidence that current mood cannot account for recall biases for state self-esteem also may argue against the causal roles of overall affectivity and neuroticism. Much research needs to be done, however, to disentangle the causal role of self-esteem apart from its correlates.

CONCLUSION

In response, then, to Neisser's (1981) question about John Dean's memory—"Is everyone's memory constructed, staged, self-centered?" (p. 19)—we would say, "yes and no." Yes, everyone's memory is self-centered, in the sense that memories can be biased by self-beliefs. However, those self-beliefs do not always work like John Dean's. Although people higher in self-esteem may recall their experiences as having been more favorable to the self than was actually the case, people lower in self-esteem may not. Indeed, LSEs may sometimes do the opposite, recalling their experiences as having been less favorable to themselves than they experienced in reality.

We view this research as a place to begin, not end. Although we have documented a systematic relation between self-esteem and memory bias, we did not attempt a full explanation of this phenomenon. The next step is to identify the mechanisms that produce this memory bias. It is probable that self-esteem, as a theory, has its influence through a variety of mechanisms at different stages of the memory process, including attention, encoding, rehearsal, and retrieval of experiences. Acting in concert with these cognitive forces may be motivational ones (e.g., Epstein, 1992; Swann, 1990). Future research would do well to identify how these processes configure to produce bias and whether some mechanisms are more influential than others.

NOTES

1. For ease of discussion, we will use the categorical terms HSE (high self-esteem) and LSE (low self-esteem) throughout the article. Although these terms reference types of people, we do not make categorical arguments for the operation of self-esteem theories on memory. All of our analyses use self-esteem as a continuous measure. Thus, any conclusions we may draw about its relation to memory bias should be considered along a continuum.

2. We computed four alpha coefficients (pleasant and unpleasant events at Recall 1 and Recall 2) for each scaled measure in each study.

Means and standard deviations were computed on Fisher transformed alphas.

3. Fourteen of the 26 emotion terms were excluded from the emotion indices because they were either neutral in valence (e.g., "still") or used infrequently (e.g., "peppy"). The positive emotion index contained fewer terms (5) than the negative emotion index (7) because there were fewer positive than negative emotion terms included in the diary record. This asymmetry reflects the population of positive versus negative emotion terms used in natural language (Fredrickson & Branigan, 2001).

4. Overall mood at the time of recall did not predict bias in memory for positive emotion.

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