(1994).In N. Schwarz & S. Sudman (Eds.), Autobiographical memory and the validity of retrospective reports (pp. 71-86). New York: Springer-Verlag.

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Affect and Memory in Retrospective Reports

Mahzarin R. Banaji and Curtis Hardin

Retrospective reports have long served as the warhorses of experimental and nonexperimental psychologists, although in both classic and contemporary discussions of method, the validity of retrospective reports to understand human thought has been questioned (Ericsson & Simon, 1980; James, 1890/1950; Nisbett & Wilson, 1977). Psychological data are often obtained as verbal reports from subjects about an event that occurred in their past, for example, "Whom did you vote for in the last election?" or "How friendly is the person described earlier in the experiment?" Implicit in the research enterprise that characterizes contemporary psychology is the assumption that retrospective reports are informative about mental processes and the actions that they guide. Verbal, retrospective self-reports have served as the tool to understanding human values, beliefs, attitudes, attributions, emotions, perceptions, thought, memory, personality, motives, and goals and as indicators of past and future behavior. As such, retrospective report data have defined the central epistemological questions about psychological knowledge: What can the subject *know* about the past? How can the subject *report* about it?

Investigators whose primary sources of data are questionnaires or surveys have been most cognizant of problems concerning the veracity of the responses produced by their subjects. Recently, systematic investigations have begun to identify the properties of cognitive functioning that not only influence the judgments that psychologists require of their subjects but also demonstrate the mutual practical and intellectual goals of survey methodologists and experimental psychologists interested in the accuracy of retrospective reports (Hippler, Schwarz, & Sudman, 1987; Jabine, Straf, Tanur, & Tourangeau, 1984; Loftus, Fienberg, & Tanur, 1985; Schwarz, 1990a; Tanur, 1992; Tourangeau & Rasinski, 1988). A consequence of this collaboration has been the application of information-processing theory to the study of survey research (Hastie, 1987; Ostrom, 1987), which has provided a framework for posing testable research questions about the processes that produce retrospective reports. Such research

efforts have proved invaluable, and undoubtedly the accumulation of empirical findings will continue to benefit the development of theory about the retrospective report process.

Of the various stages of the information-processing sequence involved in the production of a retrospective report, memory mechanisms have received the most attention (Blair & Burton, 1987; Loftus, Smith, Johnson, & Fiedler, 1988; M. Ross, 1989; Strube, 1987). Factors influencing memory for past events that are examined concern characteristics of the subject (e.g., retrieval strategies, physiological arousal), stimulus (e.g., meaningfulness, frequency, imagery), or situation (e.g., time delay, the source of the stimulus). The role of such factors in the accuracy of retrospective reports of the kind that occur in the course of everyday life has grown as a focus of interest.

Quite recently, an interest in the affective factors that influence retrospective reports of the sort collected in surveys has also emerged (Salovey, Sieber, Jobe, & Willis, chap. 6, and Clark, Collins, & Henry, chap. 18, this volume; Ottati, Riggle, Wyer, Schwarz, & Kuklinski, 1989). In this chapter, we present experimental research on the influence of affect on memory, particularly as it pertains to the collection of retrospective reports. Several investigations have demonstrated that affective states, affective judgments, and the affective properties of the stimulus can influence the way in which information is learned and remembered. Although mainstream coverage of the study of memory largely continues to ignore the role of affect (but see Baddeley, 1990), the research presented here represents a thriving interest among some social and cognitive psychologists who have identified a variety of influences of affect on memory. Conceptions of affect vary as a function of the location of affect (e.g., as a mental or physiological state or a feature of the stimulus) and also the investigators' theoretical and methodological goals, but each approach contributes to an understanding of the affect–memory relationship as well as to the larger question of the processes underlying retrospective reports.

We identify three approaches to the study of affect and memory. Separate reviews of each literature exist, and it is not our intention to provide an exhaustive review of any of these literatures (Blaney, 1986; M. S. Clark, Milberg, & Erber, 1988; Rapaport, 1942/1971; Revelle & Loftus, 1990; Zajonc, 1980). Instead, by treating these traditionally separate investigations concurrently, it is possible to observe the contribution of each approach in relation to others in understanding the larger question of the role of affect and memory in retrospective reports. We focus in particular on an aspect of the affect–memory relationship that can be traced to the earliest experimental research in psychology: What are the influences of the affective properties of an experience on memory for that experience? Do we remember pleasant events with greater facility than we do unpleasant events, or are events associated with greater affective intensity, both pleasant and unpleasant, remembered better? We discuss data that address this longstanding and controversial question in psychology, focusing on two variables that characterize the affective experience, its valence and its intensity. Finally, we speculate about the role of affect on explicit and implicit measures of

past events based on our current knowledge of demonstrable affect–memory findings.

Experimental Approaches to Investigating the Affect–Memory Relationship

We recognize three ways in which the variable "affect" has been conceptualized and operationalized in contemporary experimental examinations of the affect–memory relationship: *affect as mood state*, *affect as arousal state*, and *affect as evaluation*. Both the mood and arousal approaches locate affect as an ambient state within the individual, although the former has focused on valence and the latter on the intensity of the mood state. Some research on evaluation has viewed affect as a feature of the judgment task (e.g., How much do you like this stimulus?), allowing a comparison of the sensitivity of affective and cognitive judgments to events that have occurred in the past. More typically, research on evaluation has viewed affect as a property of the stimulus event, that is, most commonly as a property of the verbal information for which memory or its context is tested.

Affect as Mood State

The mid-1970s witnessed a large-scale effort to investigate the effects of mild positive and negative moods on memory. In fact, the mood–memory approach to understanding the influence of affect and memory has been so dominant that the term "affect" is often used synonymously with "mood." The experimental strategy has involved manipulating mood states at encoding and retrieval and testing memory for material that is evaluatively congruent, incongruent, or neutral relative to the mood state. This basic procedure has allowed investigators to test four kinds of effects: (a) effects of mood states on learning, (b) effects of mood states on retrieval, (c) effects of the match between mood states at learning and retrieval, and (d) effects of the match between mood and material valence. In the large body of research that has accumulated, there is some evidence to support each of these postulated relationships between mood and memory (for reviews, see Blaney, 1986; Bower, 1981; Isen, 1984; Singer & Salovey, 1988), although some effects have proved unreliable and others are known to occur only under limited conditions (Blaney, 1986; Bower & Mayer, 1985).

Two distinct responses to the mixed findings on the influence of mood on memory have emerged, both of which appear quite promising. One approach has capitalized on implicit memory measures to study the mood–memory question. Implicit memory refers to memory effects obtained on tests that do not require the subject to refer to the earlier learning episode (Schacter, 1987). For example, following initial exposure to stimuli (e.g., words), subjects are asked to perform a task on an apparently unrelated set of stimuli, which contains, perhaps in modified form, both previously seen (old) and new items. Facilitation or inhibition on

old items compared with new items on tasks such as perceptual identification, word-fragment completion, free association, and evaluative judgments are interpreted as evidence for implicit memory. The surprising result obtained in several programs of research is that implicit tests reveal effects of prior exposure in the absence of the subject's ability to recall or recognize those items (Richardson-Klaven & Bjork, 1988; Roediger, 1990).

Preliminary research by Tobias, Kihlstrom, and Schacter (1992) compared explicit and implicit measures of memory for material learned and retrieved under varying mood conditions. They found that mood did not influence memory as measured by traditional free and cued recall. However, when subjects were asked to write down the first words that came to mind (under the guise that words had been presented subliminally during mood induction), results revealed the influence of mood on memory. Specifically, better memory for mood-congruent words was found when mood was matched at learning and retrieval compared with unmatched conditions. Thus, although mood did not affect explicit memory, it did produce mood-dependent effects on the implicit measures for mood-congruent words. These findings represent the first attempt to identify mood effects on implicit memory measures, and if these results survive further empirical scrutiny, they will demonstrate that mood can influence memory when subjects do not explicitly remember the learning episode.

The second approach, which has received much empirical support, is offered by Schwarz and his colleagues (Schwarz, 1990b; Schwarz & Clore, 1988). They found that a global mood state influences judgments about seemingly unrelated events. For example, subjects unknowingly misattribute the effects of rainy weather to the quality of their life; that is, they rate the quality of their life as being worse when questioned during rainy weather. For bad moods caused by rainy weather, this misattribution effect is eliminated if subjects rate the weather before performing the quality-of-life judgment. The theoretical interpretation of these findings hinges on the informational value of mood; that is, mood at the time of judgment may be mistakenly used as a cue unless it is obvious that the source of the mood is irrelevant to the task at hand.

This analysis is similar to recent demonstrations by Jacoby and his colleagues (Jacoby & Kelley, 1987; Jacoby, Kelley, & Dywan, 1989) of unconscious influences of the past on memory. They have shown that there are strong misattribution effects on judgment, caused by perceptual familiarity from previous exposure, in the absence of episodic memory for the stimulus. For example, subjects exposed to the names of nonfamous people were later presented these names and new nonfamous names, as well as the names of famous people. In a task that required them to identify the names of famous people, subjects were more likely to falsely judge old nonfamous names as famous compared with new nonfamous names. This increased false alarm rate for familiar nonfamous names occurred only when the subject no longer retained explicit memory for the name but nevertheless retained some degree of perceptual fluency with the name. In other words, familiarity with the nonfamous names was misattributed to fame. Just as Schwarz (1990b) demonstrated the effects of feelings-as-information biases in judgment, Jacoby and his colleagues have documented how the quality of memory acts as a source of information that leads to misattribution biases in judgment. The relevance of this line of research for retrospective reports is that mood at the time of retrieval may affect judgments that are causally unrelated to the mood. Further, because mood effects on judgment occur in the absence of evidence of explicit mood-congruent memory, these findings add to the small literature demonstrating, under some conditions, the independence of explicit memory and judgment.

Although the approaches of Tobias et al. (1992) and Schwarz (1990b) are quite distinct in purpose and design, they are similar in what they reveal about the role of consciousness in judgment. In the research on mood-implicit memory, subjects were not asked to refer to the learning episode but rather to generate the first word that came to mind. Likewise, subjects in the research on mood as information were deliberately not asked to attend to the mood present at the time of judgment. In both cases, effects of mood on memory or judgment were obtained when subjects did not or could not make the correct attributions for a particular psychological experience (e.g., a physiological state, a memory, a mood). Such implicit effects are gaining increased attention in the study of social behavior, where misattribution effects in memory (e.g., due to familiarity through exposure) or affect (e.g., due to the informational value of mood valence) may exert more pervasive effects on social memory and judgment than previously recognized (see Brody, 1987).

To investigators interested in the validity of retrospective reports, unambiguous findings of mood effects on memory could prove very useful. If what can be remembered through an explicit attempt to recall a past event is a function of the mood state at learning and/or retrieval, or the match between mood and material valence, then these variables would be implicated in predictions of the direction and strength of retrospective reports obtained in contexts with known affective properties. Although an understanding of mood and memory will be necessary for a complete understanding of the various influences on retrospective reports, at the present time the empirical uncertainty of several mood and explicit memory effects does not allow clear predictions.

Findings reported by Schwarz (1990b) and the preliminary results of Tobias et al. (1992), on the other hand, suggest an alternative to the current emphasis on retrospective reports that require the subject to refer to a prior target episode. It is possible that implicit measures (including preference judgments of the kind obtained by Zajonc, 1980) are more sensitive to past events and may occur reliably even in the absence of an explicit retrospective report of the event. As observed in Banaji and Greenwald (1991) about the measurement of stereotypes and attitudes, more reliable effects may be obtained when the feature of the stimulus driving the attitude is not the direct focus of judgment. Implicit measures of past events, as a particular form of indirect measures, may be particularly useful if social-desirability concerns are likely to compromise accuracy in self-reports (Dovidio & Fazio, 1992) or if subjects are unaware of internal or external influences on their thoughts, emotions, and behavior.

Affect as Arousal State

As an alternative strategy to examining the influence of valenced mood state on memory, some investigators have viewed affect as the intensity dimension of an arousal state. In some studies, the arousal is generated by a verbal or pictorial stimulus or stimulus context (e.g., neutral words presented in the presence of arousing words or an arousing film), through an ambient arousal manipulation (e.g., white noise), or by physically involving the subject (e.g., exercise). In some studies, the primary interest is in a feature of the test situation, such as the time delay between learning and test, whereas in others the interest is in the effects of arousal-state-dependent memory. In research on arousal, measures of memory have exclusively been explicit tests, and the stimuli have typically consisted of affectively neutral items.

Research on arousal and memory gained attention as a result of an intriguing result reported by Kleinsmith and Kaplan (1963, 1964). They found that affectively neutral items (e.g., digits, nonsense syllables) linked to affectively neutral control words in a paired-associate task showed the expected forgetting curve when recall for the items was measured at various time delays, ranging from 2 minutes to a week. However, items linked to high-arousal words (measured by an ipsative analysis of each subject's galvanic skin responses) showed poorer retention on an immediate test compared with items associated with neutral words. After a delay, however, items linked with high-arousal words showed better retention compared with the neutral condition. More surprisingly, items associated with high-arousal words were better remembered after a delay than immediately. Both findings are of interest. Why is performance in the arousal condition poorer than (a) the control condition after a short delay and (b) the delayed recall condition?

The explanation offered for the interaction hinges on the notion of differential rates of consolidation for material learned under conditions of high and low arousal. This interpretation, offered by Kleinsmith and Kaplan (1963), assumes that the greater the "consolidation of the neural trace," the better the resulting memory; and while consolidation is ongoing, retrieval of that information is inhibited. Items linked to high-arousal material benefit from the higher "reverberation" of such items, which ultimately leads to their superior consolidation as supported by the results at delay. However, if retrieval is attempted while consolidation is ongoing, the consolidation process interferes with successful retrieval. Although no satisfactory evidence for this hypothesis itself exists, and the hypermnesia in the high-arousal condition is not always obtained, there is considerable evidence from a wide variety of procedures and materials that supports the interaction of arousal and time delay on memory (cf. Baddeley, 1990; Eysenck, 1982; Revelle & Loftus, 1990).

More recently, some investigators have become interested in whether arousal produces state-dependent memory effects (M. S. Clark, 1982; M. S. Clark, Milberg, & Erber, 1984; M. S. Clark, Milberg, & Ross, 1983). Manipulating arousal at learning and at retrieval (e.g., through physical exercise or sexually explicit films), Clark and her colleagues found consistent support for arousal-state-dependent memory. Material learned in an autonomically aroused state was recalled better when subjects were also aroused at retrieval; likewise, material learned in a nonaroused state was recalled better when subjects were nonaroused at retrieval. These findings suggest that the relative fragility of mood-state-dependent memory effects (see Bower & Mayer, 1985) may be a function of the fragility of mood valence but not of mood intensity. Recently, E. Eich and Metcalfe (1989) reported limited support for this hypothesis. In their experiments, the valence of the mood alone produced state-dependent effects on memory for internally generated events, although the largest discrepancies in *both* mood and arousal between learning and retrieval events resulted in the poorest recall, suggesting that arousal may be a factor is obtaining the strongest state-dependent effects of affect on memory.

In addition to showing the effects of arousal on memory, Clark and her colleagues have demonstrated that arousal biases perceptions of the emotions of others and other social judgments (see M. S. Clark et al., 1988). This suggests that arousal is a theoretically important variable, too often ignored in research on affect and memory. In particular, Clark et al.'s (1988) research suggests that biased retrospective reports can be expected when obtained under naturally occurring conditions of heightened or depressed states of affective arousal produced through mood states, drug or alcohol states, psychological depression, or situational factors such as accidents or examinations. The more robust findings of arousal compared with mood-valence effects on memory are especially striking when arousal-state-dependent memory effects are obtained with quite distinct manipulations of arousal at learning and retrieval—for example, exercise and sexually explicit films (M. S. Clark et al., 1983).

For retrospective reports, the finding that memory is enhanced for neutral material associated with arousal-producing information is relevant. The consolidation slope for arousing material (compared with neutral material) is lower, but the asymptotic value is higher. Thus, material associated with arousal-producing information should be remembered better over time and could potentially influence judgments if the judgment requires explicit memory for the critical information. The finding of an interaction between arousal and time delay has serious implications for retrospective reports of arousing experiences—for example, those that may constitute eyewitness testimony in a courtroom.

Affect as Evaluation

The preceding discussion indicates that investigations of affect and memory have often operationalized affect as a mood or arousal state in which material is learned and retrieved. Affect takes the form of mood valence or arousal intensity at learning and retrieval, or the match in stimuli and mood valence. This conceptualization of affect, however, represents a relatively recent approach to investigating affect. Historically, the construct "affect" has referred to a property of the information to be remembered and, occasionally, as a property of the

judgment task. Social information is distinctly evaluative in quality. As Osgood, Suci, and Tannenbaum (1957) pointed out, the evaluative component of information accounts for one-half to three-quarters of the variance in extracted meaning. Judging from the nature of the stimuli and dependent variable measures, the evaluative dimension of information is inherent in the fabric of social-psychological phenomena: self and person perception, attributional processes, stereotypes, intergroup perception, and, most obviously, attitudes. The evaluative properties of social knowledge distinguish social-psychological phenomena, although little research has expressly tested the effects of evaluative items on memory. Evidence for the influence of affect as evaluation on memory may be discussed in two parts. First, there are demonstrations of the sensitivity of affective over cognitive judgments as indicators of past events. Second, there are demonstrations of the effects of information valence and intensity on memory.[1]

The Sensitivity of Affective Judgments

Zajonc and his colleagues (Kunst-Wilson & Zajonc, 1980; Moreland & Zajonc, 1979; Zajonc, 1980) demonstrated that prior exposure to neutral stimuli increases the likelihood of preference discriminations (i.e., judgments of liking) in the absence of recognition for the stimuli (but see Brooks & Watkins, 1989, for a critique). Based on this apparent dissociation between judgments of affect and cognition on previously seen stimuli, Zajonc (1980) argued that affect and cognitive measures contribute independent effects to the processing of information. In subsequent research, Mandler, Nakamura, and Van Zandt (1987) demonstrated that after exposure to affectively neutral information, a nonaffective judgment such as a brightness rating was also a more sensitive measure of exposure than of recognition.

Such effects of mere exposure can be interpreted within the more recently available framework of explicit and implicit memory. The recognition test, an explicit measure of memory, is less sensitive to the effects of prior exposure than is the liking judgment, which represents an implicit measure of memory because it does not require the subject to refer explicitly to the earlier exposure episode. Thus, the privileged status of affect in sensitivity to prior exposure exists in much the same way that other implicit measures have been shown to have greater sensitivity compared with explicit measures under certain encoding–retrieval conditions (Roediger, 1990). This interpretation of the mere exposure effect should not detract from the importance of the finding of greater sensitivity of an evaluative measure compared with a recognition measure of previous exposure. However, until comparable measures of affect and cognition

[1]Research on the effects of the evaluative properties of information on perception has a long and controversial history (Erdelyi, 1974; Greenwald, Klinger, & Liu, 1989; Kitayama, 1990). Although we do not wish to draw a strict distinction between processes of perception and memory, based on considerations of space and scope we restrict the present discussion to research conventionally considered to be on memory.

are available (e.g., two otherwise similar implicit measures, one of affect and the other of cognition), the hypothesis of the greater sensitivity of affective judgments to prior exposure ought to be treated with caution.

The dissociation between affect and cognition observed in research by Zajonc bears resemblance to the findings reported by Schwarz (1990b; Schwarz & Clore, 1988). In both lines of research, an evaluative judgment appears to be more sensitive to factors such as mood or previous exposure without the mediation of explicit memory or when the explicit memory measure reveals chance-level performance. Such effects are important because they demonstrate that retrospective reports, especially those involving evaluative judgments, can be influenced by factors about which subjects are unaware.

Effects of Affective Valence and Intensity

In addition to research that examined the effects of affective (preference) versus cognitive (recognition) judgments, the affect–memory relationship has been investigated most by examining the influence of the affective properties of information, specifically valence and intensity, on memory. The tests of memory are of the traditional explicit variety, primarily free recall and recognition, and the focus is on the relative effects on memory of information of varying affective valence and intensity. We turn now to an account of the history of this research and to our own research on the affect–memory relationship.

The first major theoretical articulation of the relationship between affect and memory in psychology is found in Freud's well-known theory of repression (Freud, 1900/1965). Simply stated, ego-threatening information is relegated to an unconscious store from which it cannot be easily retrieved into conscious awareness. Thus, memory for ego-threatening information is poor compared with nonthreatening or ego-enhancing information. The intellectual excitement surrounding psychoanalytic theory and Freud's (1901/1960) own claim that the mechanism of repression operated in ordinary, everyday behaviors created in the experimental psychologists of the day an interest in tests of the repression hypothesis. Through the 1930s and 1940s, an empirically tractable form of the hypothesis motivated much experimental research on the influence of affect on memory (Rapaport, 1942/1971).

Two distinct methodological strategies were used in this research, and the issues that separated them remain today. The first placed a premium on the ecological realism of the events for which memory was tested. Thus, memory was tested for events that had occurred in the life of the subject outside the laboratory. For example, Jersild (1931) asked subjects to record all pleasant and unpleasant experiences of the most recent 3 weeks. When asked 3 weeks later, subjects remembered more pleasant than unpleasant experiences that they had generated in the prior session. In an early influential review, Meltzer (1930) reported that experimental evidence favored the finding of superior memory of affectively pleasant compared with unpleasant everyday experiences. He further argued that the self-relevance of the event was central to tests of repression,

which necessarily involved the investigation of events that had a continuing reality in the subject's life. The finding of superior memory for pleasant everyday events continues to be reported (M. Linton, 1975; Matlin & Stang, 1978).

Despite the apparent success of this method, it posed several threats to the internal validity of the findings. In particular, the lack of control over the initial encoding of the events and the previously established affective value of the to-be-remembered material led some to question the validity of the findings obtained from experiences that had occurred outside the laboratory. Such challenges to interpretation of the findings led Barret (1938) to suggest that memory for experiences over which experimental control could not be exerted shed no light on the affect–memory relationship. To establish better control over the encoding and retrieval of the affective experience, pleasant, unpleasant, and neutral words were learned and tested under controlled conditions. In contrast to studies inspired by Meltzer (1930), the predominant conclusion from studies in this tradition was that memory for affectively charged material, whether pleasant or unpleasant, was superior to memory for affectively neutral material; that is, the intensity of the affective experience, not valence, predicted memory. This method, however, was not without its problems. Besides eliciting some questions about the generalizability of these findings to typically occurring affective events, methodological problems plagued these studies as well. Properties of words such as affective intensity, frequency, and imagery, which are now well established as predictors of memory (Pavio, 1969; Rubin, 1980), were uncontrolled, rendering ambiguous the effects of affect on memory.

In summary, two empirical findings emerged from the early research, each corresponding to the use of a particular methodology. With an emphasis on ecological validity of method, examinations of memory for episodes that occurred outside the laboratory largely supported the hypothesis of *affective asymmetry*, illustrated in Figure 5.1. In contrast, an emphasis on experimental control over the encoding experience led to examinations of memory for episodes created in the laboratory. These experiments largely supported the hypothesis of *affective intensity*, illustrated in Figure 5.2.

In the 1950s, procedures to study the influence of affect on memory involved tests of affectively neutral stimuli such as nonsense syllables, attached to pleasant or unpleasant experiences such as success or failure (Zeller, 1950). Such studies represented an improvement over methods used in previous decades of research because memory was tested for material with no prior affective value. Although some studies reported affective asymmetries in memory, touting support for the repression hypothesis, others did not (e.g., Abom, 1953); and by the mid-1960s, the approach was abandoned, leaving some believers and others unconvinced of empirical support for repression (cf. Erdelyi & Goldberg, 1979; D. Holmes, 1972; Kubie, 1952; Weiner, 1966).

In a monograph on the relationship between affect and memory, Dutta and Kanungo (1975) provided evidence to support affective intensity and offered an interpretation of empirical effects of affective asymmetry in terms of affective intensity. In one of their experiments, subjects learned lists of positive and negative adjectives that were either attributed to an ethnic in-group or a fictitious ethnic out-group. Dutta and Kanungo found that positive adjectives attributed to the in-group were remembered better than negative adjectives. However, for adjectives attributed to the out-group, negative adjectives were remembered better than positive adjectives. Importantly, ratings of the intensity of adjectives revealed that for adjectives attributed to the in-group, positive adjectives were more affectively intense than negative ones. For adjectives attributed to the out-group, negative adjectives were more intense than positive ones. From findings of this sort, Dutta and Kanungo argued that affective asymmetries, whether positively or negatively biased, are actually a product of affective intensity.

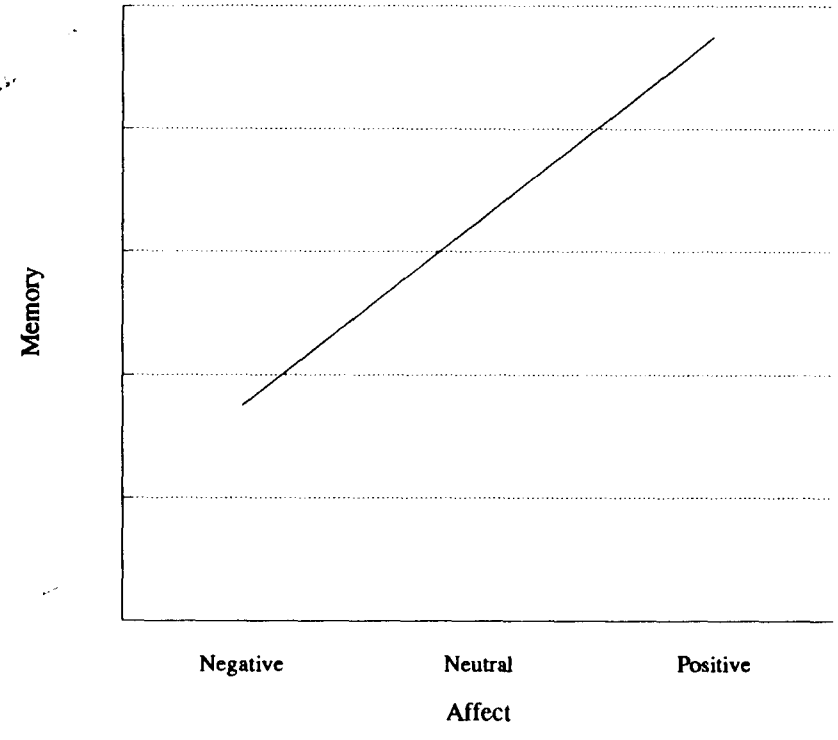

FIGURE 5.1. Affective Symmetry

In response to the tension between experimental control and ecological validity of the task in tests of the affect–memory relationship, one of us (Banaji, 1986) developed a procedure designed to retain the advantages of both. Two issues of method that had posed problems with the early research were addressed. First, experimental control over the encoding of the affective experience was established. Second, the primary measure of memory allowed a test of the influence of affect uncontaminated by previously established affective value

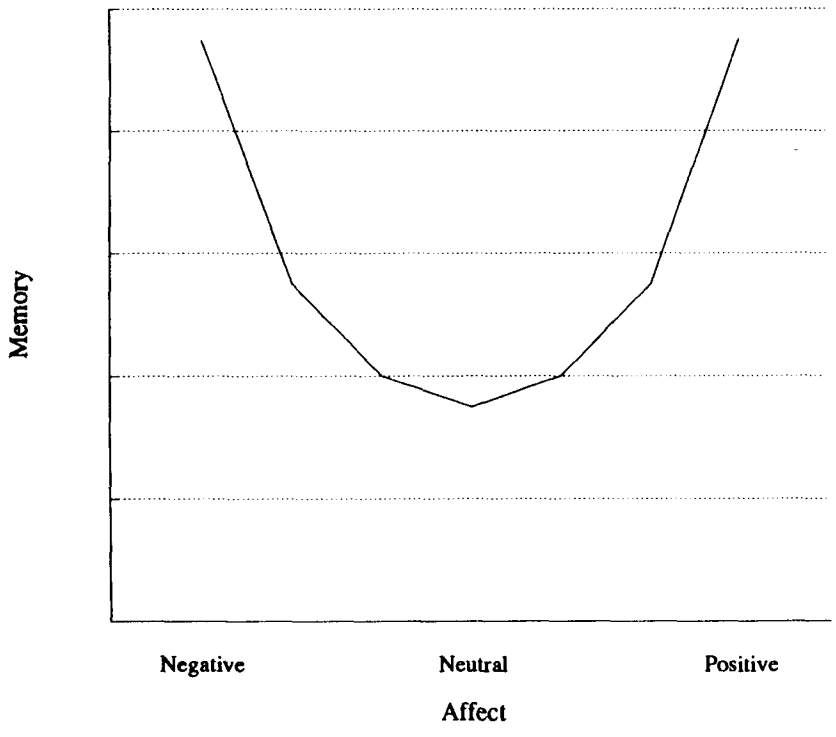

FIGURE 5.2. Affective Intensity

of the material. To establish control over the initial encoding of the affective experience, subjects described ordinary but imagined pleasant, unpleasant, and neutral episodes. The specific episodes had not actually occurred in the subject's life, although they were very plausible future events (e.g., losing a valued item, going to Disneyland). Following Meltzer's (1930) claim that self-relevance of the episode is critical to tests of the repression hypothesis, each episode involved the subject as the agent of the action. To create a retrieval measure not susceptible to the interpretative confounds of previous research, memory was tested for an affectively neutral target word embedded in the episode (e.g., window, magazine). Further, because targets were randomly assigned to the three affect conditions for each subject, differential memory across subjects could be attributed more directly to the affective quality of the events in which they were embedded and not to properties of the words themselves.

The procedure involved subjects in a sentence construction task, each sentence representing a specific event. In constructing each event, subjects (a) incorporated themselves as the agent of the action, (b) described a hypothetical event whose affective valence was specified by the experimenter to be pleasant, unpleasant, or neutral, and (c) incorporated a neutral target noun provided by the experimenter. Pleasant events were happy or exciting, and unpleasant events were unhappy or depressing. For example, a pleasant event using the target word refrigerator was, "I won a brand new refrigerator with a year's supply of food in the Ohio State lottery." An unpleasant event using the same target was, "I found cockroaches all over the refrigerator when I returned home from my vacation." Likewise, a neutral event was, "I opened the refrigerator approximately seven times today." Subjects found the task to be involving and performed it easily. Incidental learning was measured by giving subjects a surprise free-recall test for the affectively neutral target words embedded in the events. After free recall, subjects rated each event on a 7-point scale of +3 through −3 on the degree of affective valence and intensity of each event. This rating allowed a check on the experimental manipulation of affective valence and provided additional data about the affective intensity of each valenced event.

Using this procedure, consistent support for the hypothesis of affective intensity was demonstrated (Banaji, 1986). Free recall for neutral target nouns embedded in affectively intense sentences was better than for targets embedded in less affective and neutral sentences, regardless of valence, reflecting the affective-intensity effect. The intensity effect in memory was obtained when subjects' own ratings of affective intensity were used as the predictor variable. In a variant of the basic procedure, the affective-intensity effect was also obtained for target words embedded in affective events generated by other subjects; that is, when subjects were presented with the events generated by another group of subjects, memory for targets was found to be a function of the affective intensity of the events. The intensity effect was also obtained when an imagined other was used as the agent of the action. In Hardin and Banaji (1990), we replicated the finding of affective intensity when recall and recognition measures were obtained after a 24-hour delay.

We further explored the influence of affect on memory by exploiting the critical role of self-evaluation in the affect–memory relationship. One of us (Banaji, 1986) had identified a relationship between self-esteem and the influence of affective valence on memory. Compared with subjects with moderate self-esteem, subjects with high self-esteem remembered more targets embedded in pleasant events after a 24-hour delay. This result suggested that self-evaluation may moderate the affect–memory relationship. In Hardin and Banaji (1990), we examined this hypothesis more directly by manipulating the importance of events to self-evaluation in the construction of events. We accomplished this by asking subjects to construct hypothetical events in domains empirically identified as important to self-evaluation among college students (e.g., academic performance, social relationships) or unimportant to self-evaluation (e.g., bird-watching, coupon clipping). Instructions requested pleasant events that would reflect positively on the self and unpleasant events that would reflect negatively on the self in both domains. Twenty-four hours after constructing imaginary events in domains that varied in importance to self-evaluation, tests for recognition revealed two findings. When the domain was unimportant to subjects, the

affective-intensity effect was obtained, replicating the finding obtained in several previous experiments. When the domain was identified a priori as important to self- evaluation, target words embedded in affectively positive and neutral events were remembered better than those embedded in affectively negative events. Thus, under conditions in which the information was highly ego involving, an affective-asymmetry effect was obtained.

Discussion

In this chapter, we identified three approaches to the study of the affect–memory relationship. Differing significantly in the location of affect and in method, each nonetheless demonstrates that affect does influence memory. These demonstrations qualify affect as a variable of importance in the retrospective report process, because such reports often involve memory for events to which affect is associated. Not only is affect quite obviously a feature of memory for information about affectively charged events such as an abortion bill or an automobile accident, but it is also more subtly present in imagined events featuring oneself or in encountering a familiar face. What makes affect a critical variable here is that it is an intrinsic and often unnoticed feature of everyday social events about which retrospective reports are elicited.

Retrospective reports have, by definition, referred to measures that require the subject to remember explicitly an earlier episode about which memory or judgments are obtained. To recall a visit to a dentist, to judge the difficulty of an exam, to evaluate the honesty of a friend, all require the subject to recall the time and place of target episodes and their contents to produce a response. Yet, some of the data that we have discussed (Schwarz, 1990b; Tobias et al., 1992; Zajonc, 1980) suggest that it is when subjects do not refer to the earlier episode that strong effects of affect are obtained. In the Tobias et al. research, it is the match between the mood conditions at encoding and retrieval that produces superior implicit (but not explicit) memory for material matched in valence; in the research reported by Schwarz (1990b), a mood state at retrieval influences a judgment on a causally unrelated item; and in research reported by Zajonc (1980), an implicit measure of memory, that is, the evaluative judgment, proves to be a more sensitive measure of memory for the prior episode than does an explicit measure of memory.

Findings such as these lend support to the growing literature on the power of implicit memory measures as reliable indicators of memory for past events. The sensitivity of implicit measures suggests that they ought to be introduced as additional or alternative measures when situations justify and permit their meaningful use. For example, implicit techniques may provide a better index of memory for episodes that are not available to explicit recall or when social-desirability factors in responding may pose a threat. Among the many classes of retrospective reports that are obtained, a widely used category represents measures of attitudes. Attitude methodologists have long recommended the use of

indirect or unobtrusive measures (Webb, Campbell, Schwartz, & Sechrest, 1966), which may allow more accurate measures of the attitude. Such measures have not as yet become well established in practice, although more recent programs of research by investigators such as Dovidio and Fazio (1992) alert social psychologists not only to the value of indirect measures but also to ways in which the practice of obtaining such measures may become a future reality. For example, Dovidio and Fazio argue that response latency measures of attitude are more valid estimates of socially sensitive topics, and while acknowledging the difficulty of implementing such indirect assessment measures, they point to the success of using portable computers to record latency data in field settings.

It is not a trivial task to identify how implicit affect–memory measures may be adapted to aid survey investigators. However, a feature of the survey situation may encourage the use of such measures. Among the factors that often threaten the validity of memory measures obtained on surveys is the lack of control over the encoding conditions of the episode to be remembered; that is, information is often requested from subjects about events that occurred in contexts about which little or nothing is known. Transfer-appropriate procedures to study implicit memory (see Roediger, 1990) emphasize the degree of overlap in the operations that were performed at learning and test. For example, material that is conceptually processed (meaning based) should be better remembered if the test is conceptually driven (recall, recognition); likewise, perceptually processed material should show savings on data-driven (perceptual identification, affective identification) tests. Thus, implicit measures (whether they are affect based or not) can provide an additional measure of memory, and if differential sensitivity of the explicit and implicit test is observed, perhaps they can also divulge the nature of the original learning event.

Affect as a property of the information-processing environment in which retrospective reports are obtained may also acquire greater power when explicit retrieval of information is hindered. Research by Schwarz & Clore (1988) suggests that when the judgment task does not easily allow retrieval of a specific episode (e.g., a judgment of the quality of life), the mood state at retrieval may be used as the basis of an evaluation. Likewise, when memory for prior information is not amenable to explicit memory measures, as in the mere-exposure research, an affective judgment (e.g., "How much do you like X?") is sensitive to the perceptual familiarity of the items. The affective features present in a situation may not be easily amenable to conscious verbal report and may therefore prove to be particularly powerful as implicit influences and implicit measures that, by definition, require the subject to be unaware of the prior episode at retrieval or judgment. In these early years of research on the role of affect in implicit memory and judgments, it is difficult to identify when the presence of affect as a mood or as an evaluative judgment will facilitate or interfere with memory or judgment. For example, in the research by Schwarz (1990b), mood (affect) was shown to produce a *biasing* effect on judgment, whereas the implicit evaluative (affect) measure in the mere-exposure research demonstrated the greater *sensitivity* of the affective measure.

Although important aspects of the affect–memory relationship are revealed through implicit measures, much of the data that we have presented demonstrates that affect influences memory on direct, explicit memory measures. Some findings indicate the more influential role of affective intensity in memory (Banaji, 1986; Dutta & Kanungo, 1975), and other findings suggest the prominence of pleasant over unpleasant events in memory (Hardin & Banaji, 1990; M. Linton, 1975; Matlin & Stang, 1978; Meltzer, 1930). Such findings, we know, often emerge when memory for events outside the laboratory is tested, and questions of interpretation raised by Barret (1938) remain even today. When encoding conditions are unspecified, when time delay between the event and memory test is uncontrolled, and when other variables that may be correlated with pleasant and unpleasant events are unidentified (e.g., rehearsal), there is a tendency for pleasant events to be reported more than unpleasant events. We treat this finding with some skepticism because it is unclear whether the causal factor is affective valence or a multitude of other variables correlated with valence. For those investigators whose goal is to identify the causal factors that produce asymmetry, research must continue to examine the correlates of affective valence and the mechanisms by which affective valence guides memory. However, if the goal is to predict memory for everyday events in the life of a subject—for example, when a survey requires retrospective memory reports of affective events—both intensity and valence ought to be considered as agents of influence.

The important effect of affect on memory, in our judgment, is affective intensity. We know that the match in arousal at encoding and retrieval shows better memory for affectively neutral information (M. Clark et al., 1988), and arousal at encoding also produces better memory for information associated with it after a delay (Revelle & Loftus, 1990). In addition, our own findings suggest that the affective intensity of an event influences immediate and delayed memory for the event. In the widely differing procedures used in investigations of arousal (Revelle & Loftus, 1990) and evaluation (Banaji, 1986), there is evidence that intensity of affect manipulated at the time of encoding alone is sufficient to produce benefits in memory. Together, these findings strongly suggest that affective intensity produces superior memory for information to which it is associated.

We emphasize the importance of the finding on affective intensity because the dimension of intensity appears to have been ignored when compared with affective valence in investigations of the affect–memory relationship. Affective intensity is particularly important because it produces robust and reliable effects on memory across a variety of experimental tasks. For survey investigators, these findings suggest that affective intensity, as an aroused state or as a property of the information event, can influence retrospective reports such that memory for events that have occurred under some conditions of affective intensity will show superior memory.

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Part II
Retrospective Reports of Behaviors