

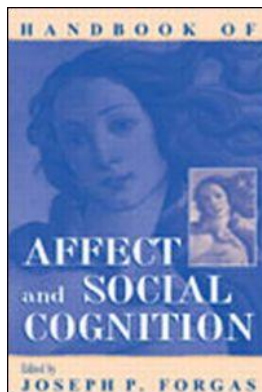
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## **Handbook of Affect and Social Cognition**

Joseph P. Forgas

### **Mood and Social Memory**

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## II

# Affective Influences on the Content of Cognition



## 5

## Mood and Social Memory

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Our memory makes us who we are. People who have lost their memory, as happens to many victims of Alzheimer's disease, have also lost their personal identity. Just as we become unrecognizable to them, so do they become unrecognizable to us. Major forces in shaping our memory are emotion and motivation: we remember better events that had motivational significance and about which we had intense feelings.

Recent investigation of how feelings influence memory have proceeded in two directions—toward exploring the biological substrates, and toward identifying the social causes and consequences of emotion. Neuropsychological investigations, reviewed in Chapter 2 by Adolphs

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and Damasio, have identified critical neuroendocrine and brain systems mediating enhanced memory for emotional compared to nonemotional events. We know, for example, that emotionally arousing events release a cascade of neuroendocrine processes in catecholamine systems that have a major impact on the brain's amygdaloid complex, whose activity modulates consolidation of the memory of an emotional event (see Cahill, 1996; McGaugh & Cahill, 1997).

The other direction for research is toward exploring the social causes and consequences of emotion, and that is the major theme of this book. Many of the contributors to this book share the belief that for humans, it is social interaction that provides the predominant force that shapes an individual's emotional and affective life. In this chapter, we argue that people's affective states also play a key role in determining their memory for and processing of social information, their social judgments, and their social behaviors.

### **AFFECTIVE FEATURES OF SOCIAL EPISODE REPRESENTATIONS**

We begin our discussion of affect and social memory by noting that most of our memory of everyday social interactions can be parsed into a collection of social episodes. These are the frequently recurring, well-rehearsed interaction routines of everyday life—chatting with a friend over coffee, purchasing a gift, sending messages by electronic mail, making a business phone call, taking the car in for repair, going out to a restaurant and movie, or attending a party. It is the routine nature of these interactions that makes social life predictable and generally unchallenging. Indeed, it may be said that shared knowledge about such episodes is what holds individuals, groups, and societies together (Forgas, 1981, p. 165).

When sufficiently routinized, such social episodes come to be represented in memory as abstracted stereotypes or social scripts (Abelson, 1981). Social scripts thus refer to stereotyped collections of actions having particular goals, standardized acts with some modest variations in quality and sequence, a set of social roles for the other participants, and a standardized way of proceeding. A particular episode (e.g., one's visit today to the dentist) can then be represented in memory as an instantiated version of the general script (see, e.g., Bower, Black, & Turner, 1979; Graesser, Woll, Kowalski, & Smith, 1980).

Studies by Magnusson (1971), Pervin (1976), and Forgas (1979, 1981) systematically explored how people think about and mentally represent standard social situations and episodes. These investigators treat social

episodes as stimuli that can be judged, compared, and scaled according to their perceived features, just as persons are stimuli in studies of person perception. For example, Forgas (1979, 1981) analyzed the episode domains of several different subgroups ranging from Oxford housewives, university students, and academic staff to rugby teams. For each target subgroup, a collection of representative social episodes was sampled from interviews and diaries. These episodes were then rated for similarity, and these ratings submitted to multidimensional scaling.

A major finding of these studies is that people's mental representations of social episodes are largely dominated by the affective (connotative) characteristics of these encounters, rather than their actual descriptive features. Such characteristics as the pleasantness of the interaction, its intimacy, one's sense of personal involvement, and self-confidence in the situation seem to have emerged as key features defining episode representations in all such studies. In comparing episodes with one another, people tend to automatically rely on how they feel about the encounters in question, and pay little attention to the different settings, actors, props, and goals. As Pervin (1976) noted: "what is striking is the extent to which situations are described in terms of affects (e.g., threatening, warm, interesting, dull, tense, calm, rejecting) and organized in terms of similarity of affects aroused by them" (p. 471).

For example, a study of Oxford undergraduates' perceptions of social episodes showed that attending a tutorial, a formal wedding, and a psychology experiment were seen as highly similar. Why? Because the three situations involved very similar affective reactions—they are formal, strictly regulated, nonintimate, demanding, and slightly stressful situations, and are entered by the students with reduced self-confidence.

The principle that affective experiences play a key role in how social information is stored and represented in memory was further confirmed in a series of experiments by Niedenthal and Halberstadt (2000), who argue that affective reactions provide a basic and so far largely neglected source of cognitive categorization. According to Niedenthal and Halberstadt, social categories are almost never devoid of emotion, and affect often determines the use and the evaluation of categories of persons and situations. In fact, it was Bruner, Goodnow, and Austin (1956) who, in their seminal work, *A Study of Thinking*, first proposed that in social categorization of people, situations, and experiences, what holds them together and what leads one to say that some new experience "reminds one of such and such weather, people, and states" is the evocation of a defining affective response (p. 4). As Forgas (1979, 1981) and Niedenthal and Halberstadt (2000) found,

apparently unrelated social stimuli can cohere and form a distinct category, even when they have nothing at all in common except for the similar emotional response they elicit.

Such results reinforce the position espoused by Zajonc (1980), among others, who advocated the primacy of affective reactions in social impressions. He wrote: “When we try to recall, recognize or retrieve an episode, a person, a piece of music, a story, a name...the affective quality of the original input is the first element to emerge” (p. 154).

The research demonstrating the strongly emotional character of social episodes and other social categories suggests that a person’s current emotional state could also have a major impact on the way social events are attended to, interpreted, stored in memory, and subsequently retrieved. In a word, emotion and mood should have a profound impact on social memories and their reconstruction. This chapter reviews some of the research collected around this theme.

## **MEMORY FOR EMOTIONAL EPISODES**

A well-established fact is that people’s memory for social episodes is significantly influenced by the intensity of the emotion aroused by the episode. Emotional reactions play at least four important functional roles in directing how people learn and process such emotional events. First, emotional reactions frequently accompany failed expectations (and interruptions of goal strivings), and thus direct attention to the preceding and accompanying events as important items to be learned. Second, emotions mobilize attention to those features of an external situation that the learners judge to be significant or causative of the failed expectation and, in so doing, leads people to encode and learn about these features. Third, the inertial persistence of an emotional arousal and its slow decay (doubtless linked to endocrine discharges) facilitate the continued recycling, rehearsal, and continued consolidation of those encoded events that the person sees as causally belonging to the aroused emotion. Fourth, by their nature, highly emotional events are relatively rare, unusual, and distinctive amid the crowd of routine happenings of everyday life. Indeed, people arrange their daily world so that their goals are routinely satisfied and so they can avoid unpleasant surprises. The occasional upsets of people’s social routines are not only emotionally arousing, but also rare; it is their rarity that makes them less subject to forgetting compared to the myriad routine happenings of their everyday life that are buried under massive interference from similar events.

The validity of this general analysis has been supported by considerable research, with both human and nonhuman subjects, both inside and outside the laboratory (for a review, see Bower, 1992; Christianson, 1992). Consider just one line of research relevant to social memory, namely, autobiographic memory. In several studies, subjects were recruited to record personal events in a daily diary and describe a number of their features (who, what, where, when, and how they felt about the event). After several weeks of recording, they turned in their diaries. Several days later, they were asked to recall or recognize the recorded incidents when given various cues about the incidents. Nearly all such studies have found that participants' recollections are higher for highly emotional events compared to nonemotional events. This result holds for both positive and negative events. Although the emotion felt is not an especially useful cue for a specific memory (who and where are better cues), the emotion felt at the time (and still felt when recollecting it) is a strong predictor of the recallability of the memory when given the effective cues.

### **AFFECTIVE RECALL WITHOUT FACTUAL RECALL**

Robert Zajonc (1980, 2000) has long argued for the primacy of one's emotional reaction when asked to recollect some person or episode. After researching this topic since the 1980s (for a recent review, see Zajonc, 2000), there are now a large number of experiments that show that people tend to selectively remember their affective reactions to and evaluations of stimuli, even when they have no recollection of ever seeing that stimulus before, and have no memory for the reasons for their preferences. Indeed, it is a common experience in everyday life that we can recall how we felt about some person, place, happening, or attitude-object without being able to recall much in the way of specific supporting facts to justify our feelings.

A dramatic demonstration of this dissociation between evaluation and memory for supporting evidence occurred in a study of patients with severe memory impairments associated with Korsakoff's syndrome (Johnson, Kim, & Riff, 1985). Patients were shown a pair of photographs of neutral male faces and provided descriptions of prosocial (or antisocial) behaviors designed to make one man appear a likable "good guy" and the other a reprehensible "bad guy." Some days later, when shown each face, these amnesic patients were unable to recognize having seen the faces before or to recall any specific behavioral facts they had been told about these persons. Nonetheless, when asked to judge whether the photograph depicted someone



who seemed like a nice or not-so-nice person, the patients' evaluations were consistent with the positive or negative descriptions they had heard earlier about each face, even though they had no recollection of any of the information that gave rise to the evaluation in the first place.

The demonstration with amnesic patients, illustrating the dissociation between storage of affective versus cognitive information, is just an extreme version of what often happens with all of us. This common observation turns out to have a simple explanation in associative network theories of the type long popular in cognitive psychology (see Anderson, 1983; Anderson & Bower, 1973). The basic idea (Fig. 5.1) is that as each fact (or belief with supporting evidence) about the person or place is encountered and thought about, our memory system stores a brief description of that information as well as a corresponding evaluation (positive, negative, or neutral) of it that is rendered automatically by the perceiver's affective appraisal system. As more episodes or facts about the object occur, each has just one fleeting opportunity to be learned, so the memory trace of the individual details (such as Positive Fact #1 and #7 in Fig. 5.1) is weak and easily forgotten. However, if each individual fact causes the same, for instance, positive evaluation, then a very strong association (labelled #1 in Fig. 5.1) is built up between the attitude-object and the positive valence node in memory. The more personally important a given fact is, the more it is thought about, and the more it causes a strengthening of the corresponding object-to-valence link. A given attitude-object, of course, may have a mixture of positive-, neutral-, and negative-valenced facts associated with it. The point is that the number and importance of these individual facts are accumulated and ultimately reflected in the strengths of the two object-to-valence links depicted in Fig. 5.1.

When the model is asked about the attitude-object ("What's your opinion of Harry?"), the various associations and memories come to mind (become available to consciousness) according to their relative strengths. The strongest one is likely to be the oft-repeated, oft-strengthened association to the predominant valence node. Thus, the model produces the primacy of affect phenomenon mentioned earlier. In fact, the model predicts that one should on some occasions be able to recall a strong evaluation without being able to recall any specific supporting facts (due to their weak traces). In terms of this analysis, there is no need to assume that affective reactions are somehow primary and separate from cognitive processes, as Zajonc (1980) proposed. Quite the opposite—it is the very close interdependence between how cognitive facts and affective evaluations are processed by

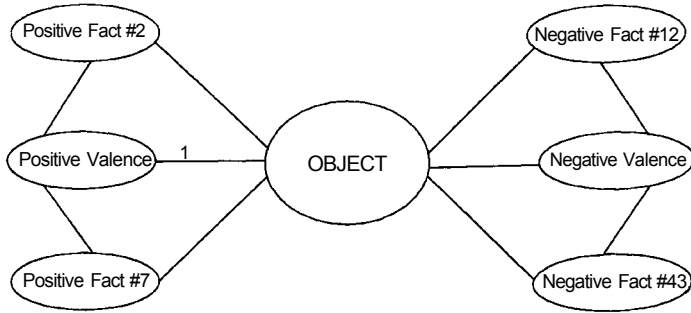


FIG.5.1. Fragment of the associative network representing some person's beliefs (facts) and evaluations surrounding an attitude object, such as a person ("Harry") or a city ("New York"). Consideration of each valenced fact about this object causes simultaneous activation of and associations between the object and the corresponding valence node. Net evaluation of a concept depends on the strengths of its associations to the positive versus negative valence nodes. (Adapted from Bower, G.H., 1991. Mood congruity of social judgments, in J.P.Forgas (Ed.), *Emotion and social judgments* (pp. 31–53). Oxford: Pergamon Press.)

the memory system that is largely responsible for the apparent primacy of affective evaluations.

When asked to give a balanced evaluation of a mixed attitude-object, the model essentially assesses the difference in strengths of associations from the object-node to the positive versus negative valence nodes. This can be achieved by activating the object concept ("thinking about Harry") and then checking to see how much activation accumulates at the positive versus negative valence nodes. A judgment may then be rendered depending on the difference in activation between the positive minus negative valence nodes. We should note that this valence-comparison process may well give rise to the phenomenologic experience of producing an evaluative response through the "How do I feel about it?" heuristic. Although several theorists argued that directly "consulting our feelings" involves no affect-priming and no memory-based processes (Clore, Schwarz, & Conway, 1994), our analysis suggests that the "How do I feel about it?" strategy may simply be the last and phenomenologically recognized stage in the kind of memory-based valence-comparison process we described here.

This associative network model provides the ingredients of an algebraic model of attitude and impression formation, like those proposed by Anderson (1974, 1996) and Fishbein and Ajzen (1975). As new beliefs are added (become associated with) to an existing attitude-object, the learner's judgment is shifted slightly in the evaluative direction of the new

fact to a degree that depends on its personal significance (the intensity of emotional arousal it causes). The more facts that become known about a given attitude-object, the less in general is the impact of an additional fact on the summary judgment. This kind of algebraic model of information integration can also be elaborated to explain the effects of transient positive or negative moods on various evaluative judgments (see, for example, Abele & Petzold, 1994).

The network theory has several implications regarding social memory and social judgments. To begin with, the model implies that the extremity of an evaluative response should be greater, and the latency of its recall and expression should be shorter, to the extent that its association to one valenced node predominates over the other valence node. This relationship between decision latency and attitude extremity is well known in the survey and attitude-measurement literature. Several well-established models of recall and decision latency would predict this relationship between extremity of opinion and latency of judgment (see, e.g., Ratcliff, 1978).

A second implication of the associative network model is the existence of robust affective priming of the kind reported by Fazio, Sanbonmatsu, Powell, and Kardes (1986). The time subjects require to classify a given evaluative word such as *lovely* or *putrid* is reduced when these words are preceded by a matching positively or negatively valenced attitude item (such as *racist*, *abortion*, or *disarmament*). Positive judgments are speeded by positive primes, but are slowed by negative primes; negative judgments show the reverse pattern.

Such results flow naturally from the associative network model in Fig. 5.1. The evaluative decision about a target word is directly based on the strength of that word's long-term associations to the positive versus negative nodes in memory. The positive prime provides a headstart in activation accumulating at the positive valence node, so a positive target word (*pretty*) more quickly accumulates the differential activation needed to trigger a positive judgment. Conversely, a positive prime produces an initial handicap in valence that a negative target word (*putrid*) must overcome to reach the negative-judgment threshold—and this increases decision time for incongruous prime-target pairs of words.

### EMOTIONAL UNITS IN ASSOCIATIVE NETWORKS

The evaluation model outlined in Fig. 5.1 is one of a family of general network models proposed by the first author (Bower, 1981) and by Isen

and associates (Clark & Isen, 1982; Isen, 1984; Isen et al., 1978) to account for mood effects on memory. This view is best summarized in Fig. 5.2, which depicts an emotion unit or node in an associative memory network (for example, #3 in Fig. 5.2 might correspond to anger or sadness). Bower presumed that there were about six (plus or minus two) “basic” emotion nodes that are biologically wired into the brain, each with several situational triggers, with each trigger becoming greatly elaborated and differentiated throughout the lifespan as a result of the person’s socialization and cultural learning. Consistent with this view, Bower and Cohen (1982) proposed that the process of emotional elicitation could be modeled in terms of a collection of production rules that appraised and “recognized” particular situations calling for different emotional reactions. The specific content of such emotion production rules, and the cognitive mechanisms involved in emotion appraisal have been the subject of intensive research (see Smith and Kirby, 2000, for a review).

Once an emotion is aroused due to the person appraising an emotional situation, that node spreads excitation to a variety of indicators to which it is connected. These indicators include physiological and autonomic reactions characteristic of that emotion, facial and postural expressions, verbal labels for one’s state, a collection of action tendencies, and a set of memories of

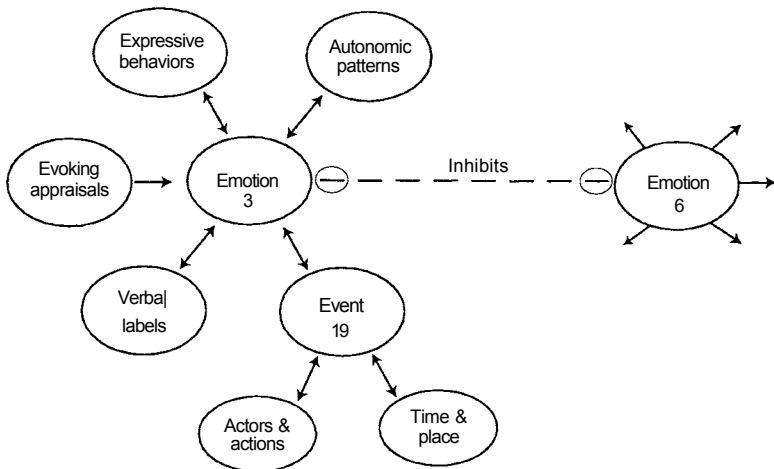


FIG. 5.2. A fragment of the associative network surrounding an emotion node in memory. For example, node 3 might represent sadness and inhibits emotion 6 for happiness. (Reproduced with permission from Bower, G.H., 1981. Mood and memory. *American Psychologist*, 36, 129–148.)

episodes that had been associated with that emotion in the past. These would ordinarily be events that causally evoked (and “belonged to”) that emotion. For example, assume that one event recorded in this memory structure is a description of a scene from a friend’s funeral that caused a man to feel sad. If that man is later asked about his friend at a time when he is feeling sad, the funeral memory may receive more total activation from the retrieval cue plus his current emotion. As a result, this scene is more likely to come to mind and be reported than are other recollections about the friend (such as happy times spent together). This kind of summation of activation at the intersection between a retrieval cue and a current emotion node predicts that memory will be mood dependent or emotion dependent. In particular, the memory record of an event should be stored in association with the emotion evoked and experienced during that event. This implies that one efficient way for people to retrieve a memory later is for them to get back into the same (or similar) emotional or mood state as they were when they learned it.

### **MOOD-DEPENDENT RETRIEVAL**

The story of research on mood-dependent retrieval began in the arid confines of standard laboratory investigations of context effects in human memory. In fact, these studies investigated memory for stimuli (lists of neutral, unrelated nouns) that were the very antithesis of realistic social episodes. In an early experiment of this kind, Bower, Monteiro, and Gilligan (1978) wondered whether a person’s emotional mood would serve as a context to which the word lists would become associated. To this end, they conducted a two-phase experiment that has since become a prototype for such procedures. In a first phase, half the subjects were persuaded to get into a feeling state of happiness and the other half of the subjects were persuaded to get into a feeling state of sadness. In this first study, the mood induction consisted of having hypnotized college students replay slowly in their imagination some autobiographic events when they had felt happy or sad (these were typically interpersonal episodes). In later experiments, many different methods for inducing moods have been used, showing that the memory effects are not dependent on any particular mood induction technique.

Following a first mood induction, subjects studied then recalled a list of 16 unrelated nouns. Then a second, opposite mood was induced and subjects studied and recalled a second list of unrelated words. After a brief interpolated task, half the subjects were induced to feel happy and half to feel sad (via different remembered events than used initially) and were asked

to free recall the first list of words, and then recall the second list. The order of learning and recall of the mood lists was counterbalanced over subjects. Results (Fig. 5.3) showed that subjects remembered the words better when their mood at recall matched the mood they were in when learning the list initially. The gist of this result was repeated in several other studies conducted around that time (Bower, 1981).

If such mood-dependent retrieval occurred only with unrelated word lists in the laboratory, it would be of limited interest. However, mood-dependent retrieval was soon shown also to arise in recall of autobiographic emotional episodes. When asked to recall events from their past, people recall a selected sample of memories whose valence agrees with their emotional state during recall. For example, when subjects were hypnotically induced to experience happy or sad moods and were asked to recall episodes from their childhood, their memories were predominantly consistent with their current mood. Happy subjects recalled more happy childhood episodes, and sad subjects remembered more sad episodes (Bower, 1981). In another experiment, recollections of emotional social events recorded in

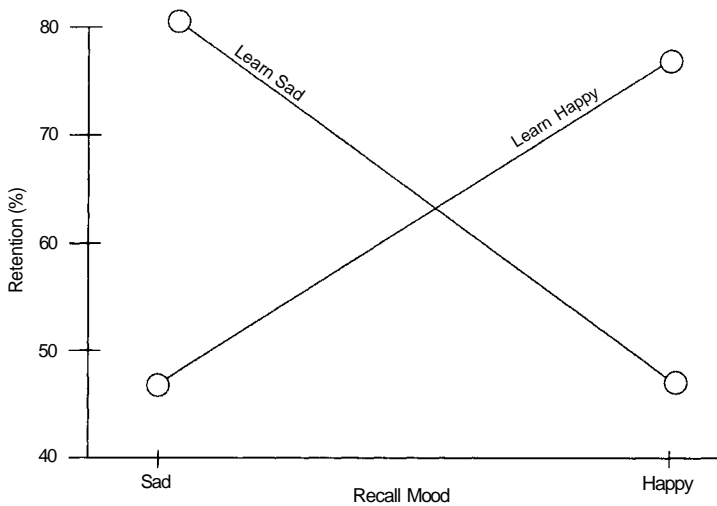


FIG. 5.3. Recall of lists of unrelated words learned earlier when subjects were happy or sad, and then recalled when they were feeling happy or sad. The better recall procured by matching of learning and recall moods is dubbed *mood-dependent retrieval*. (Reproduced with permission from Bower, G.H., Monteiro, K.P., & Gilligan, S.G., 1978. Emotional mood as a context for learning and recall. *Journal of Verbal Learning and Verbal Behavior*, 17, 573–585.)

a diary were also significantly biased in the direction of subjects' current mood state (Bower, 1981). An experiment by Snyder and White (1982) illustrated similar mood-dependent biases in recall of recent autobiographic events. They induced their college-student subjects to feel happy or sad, then asked them to recall any autobiographic episodes from the previous 2 weeks. Figure 5.4 shows that when happy, subjects retrieved relatively more happy events; when sad, they retrieved more sad events. This result illustrates a mood-dependent retrieval pattern because presumably subjects felt appropriately happy or sad earlier when these events originally occurred in their lives.

A similar bias in recall also occurs for people who exhibit sadness as a long-term affective disorder. When recalling their recent past, psychiatrically depressed patients have a strong bias to recall mainly negative, depressing episodes (Lewinsohn & Rosenbaum, 1987). This mood-dependent recall bias contributes to the downward spiral of negative recollections feeding into a preexisting state of dysphoria, and is one of the obstacles to be overcome by effective psychotherapy. Similarly, highly anxious patients recall primarily frightening and/or threatening events from their past, often centered around some social area of particular concern to them (Burke & Mathews, 1992).

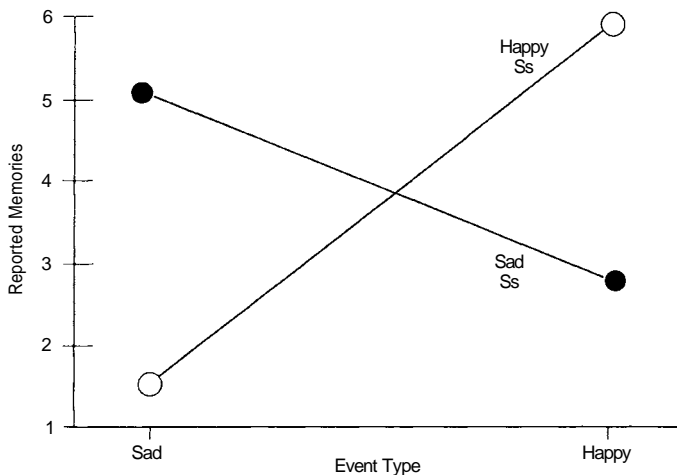


FIG. 5.4. Number of happy and sad memories of recent events reported by subjects made temporarily happy or sad. (Based on Snyder, M., & White, P., 1982. Moods and memories: Elation, depression and the remembering of the events of one's life. *Journal of Personality*, 50, 149–167. Adapted with permission.)

Research using implicit rather than explicit memory tasks (when subjects are not consciously trying to recall information) also provide convergent support for mood-dependent retrieval as predicted by network theories. For example, when asked to complete ambiguous word stems, depressed people tend to produce negative rather than positive words, consistent with the selective priming of negative information by their depressed mood (Ruiz-Caballero & Gonzalez, 1994). This mood-priming effect also influences the time it takes to retrieve emotional memories; it appears that depressed people take less time to retrieve unpleasant rather than pleasant memories, whereas nondepressed people show the opposite pattern (Lloyd & Lishman, 1975; Teasdale & Fogarty, 1979).

The original idea in proposing an explanation of such instances of mood-dependent retrieval was that an aroused emotion would become associated by temporal contiguity to whatever ideas or thoughts occupied short-term memory at the time. However, this simple and broad account relying on associations based on contiguity alone encountered some serious difficulties, and was later revised to restrict learning to associations between an episode and the emotional reaction that it caused. That is, for an association to occur, the person must causally attribute the emotional reaction to the episode that caused it (for a review, see Bower, 1992; Eich, 1995; Eich & Macauley, 2000). This is why, for example, mood-dependent retrieval occurs most reliably when happy or sad people recall autobiographic events. Remembering mood-congruent events is presumably easier because there is likely to be a causal link between the event and the mood elicited by it at the time.

Mood-dependent retrieval is also reliably obtained in many experiments looking at realistic social judgments (see Forgas & Bower, 1988). When the information to be encoded is about people, events, or complex social situations rather than word lists, subjects are more likely to perceive a degree of causal belonging between the material and their mood than would be the case with simple and personally uninvolved stimuli. Studies of social judgment provide subjects with a much richer and more elaborate set of encoding and retrieval cues than is the case in word-list experiments, increasing the likelihood that affective cues can effectively function as a useful and differentiating context in learning and recall.

### MOOD-CONGRUENT PROCESSING

A second main effect of emotion implied by the network model in Fig. 5.2 is what has been called *mood-congruent processing*. This occurs when



people become selectively sensitized to take in information that agrees with their prevailing emotional state. In an earlier paper, Bower (1983) wrote:

When emotions are strongly aroused, concepts, words, themes, and rules of inference that are associated with that emotion will become primed and highly available for use by the emotional subject. We can thus expect the emotional person to use top-down or expectation-driven processing of his social environment. That is, his emotional state will bring into readiness certain perceptual categories, certain themes, certain ways of interpreting the world that are congruent with his emotional state; these mental sets then act as interpretive filters of reality and as biases in his judgments. (p. 395)

One implication of the associative network model is that mood-congruent material should become more salient, so that people should attend to it more and process it more deeply. This prediction has been verified several times (see Eich et al., in press). People who are made to feel happy versus sad spend more time looking at happy versus sad pictures, watch more happy versus sad television shows, listen more to happy versus sad music, and seek out more pleasant social activities versus somber solitary activities, respectively.

As a consequence of deeper processing of emotionally congruent material, subjects also tend to engage in greater associative elaboration of such information, and thus learn it better. Thus, when happy persons are exposed to a mixture of pleasant and unpleasant materials, they learn more about pleasant materials; when sad, they learn more about the unpleasant stimuli in their mixed environment. This result has been found in many studies. In one experiment that directly tested this effect, subjects read behavioral descriptions about target characters in an impression-formation experiment (Forgas & Bower, 1987). Participants in a happy mood spent longer reading and learning about positive characteristics and later remembered more of the positive, socially desirable behaviors and traits ascribed to a target stranger. Participants in a sad mood spent longer reading and remembered more of the socially undesirable behaviors and traits ascribed to the stranger. In a similar manner, depressed psychiatric patients show better learning and memory for depressive words (Watkins, Mathews, Williamson, & Fuller, 1992), a bias that disappears once the depressive symptoms are relieved (Bradley & Mathews, 1983). However, mood-congruent learning seems to be an evanescent phenomenon in patients suffering from anxiety (Burke & Mathews, 1992), possibly because anxious patients are particularly prone to use vigilant, motivated processing strategies designed to filter out anxiety arousing information (Mathews & MacLeod, 1994).

Mood congruence also arises when subjects produce free associations and imaginative fantasies. In free associations to ambiguous words like *my career, life, or future*, happy subjects tend to produce pleasant associations, whereas sad or angry subjects produce sad or unpleasant associations (Bower, 1981). A similar result occurs when subjects made temporarily happy or sad generate stories about inherently ambiguous social scenes depicted in Thematic Aperception Test (TAT) cards. Happy subjects tend to generate positive stories about success and romance; sad subjects produce negative stories about struggles, hardships, and failure. In terms of an associative network memory model, these mood-dependent effects arise because the emotion primes into readiness and facilitates the recall and use of mood-congruent valenced themes around which they begin to weave a story.

These associative effects also produce affect-congruent distortions in many real-life situations due to naturally occurring moods (Mayer & Volanth, 1985; Mayer et al., 1992). Mood congruence appears to be a reliable phenomenon when people recall and evaluate their possessions, their career, their marriage, their health status, their satisfaction with their lives, their prospects for the future, the likelihood of good or bad things happening in the near future, the acceptance of positive versus negative feedback about their personality, their manner of explaining their successes and failures, and estimates of their personal skills in social and nonsocial areas (for a review, see Eich et al, in press). Temporary happy or sad moods can also produce a marked congruent effect on many social judgments, such as perceptions of human faces (Schiffenbauer, 1974), impressions about people (Forgas, 1992; Forgas & Bower, 1987), attractiveness of verbally described characters (Gouaux, 1971; Gouaux & Summers, 1973), stereotypes of ethnic groups (Forgas & Moylan, 1991), and self-perceptions (Forgas, Bower, & Krantz, 1984; Sedikides, 1995).

### LIMITATIONS ON MOOD CONGRUITY

Although there is substantial confirming evidence for affect priming and mood congruence, several studies found that mood congruence is sometimes absent or even reversed. Although the emotion network theory supposes that mood-congruent processing is the “natural tendency” whenever people experience a powerful emotion, it is clear that people can—and often do—overcome their natural tendencies. Indeed, socialization throughout childhood often requires learning to limit and even reverse natural emotional impulses. As a result, children do learn to sit still in school, even though

they are excited; they learn to stifle giggles in church and suppress anger or sadness when such feelings are socially inappropriate. Most people have learned various cognitive tricks to control their emotional states and expressions—to suppress loud sobbing at the movies, to withstand the pain of the dentist's drill, to count to 10 when angered, to feign interest when bored, and to express gratitude for an unwanted gift. Such motivated strategies for controlling affect are an essential prerequisite for effective functioning within polite society. These cognitive tricks often make use of distractions and the imagined rehearsal of countervailing scenes, and selectively focusing on more positive thoughts. Momentarily depressed people usually know that they can improve their mood by watching comedies, talking to friends, and thinking over more pleasant times. In fact, these are the kinds of mental habits that many kinds of cognitive therapy seek to instill in clients suffering from chronic mood disorders such as depression.

Research has shown that to the extent that such mood-repair strategems are likely to be activated, mood-congruity effects on memory, perceptions, and social judgments are ameliorated, eliminated, or occasionally reversed. Indeed, it seems that merely shifting attentional focus toward internal states seems sufficient to trigger motivated processing and eliminate mood congruence (Berkowitz et al., 2000). Of course, not all individuals are equally effective in engaging in such motivated mood control. For example, Smith and Petty (1995) found that the mood-congruent influence of a negative mood (after watching a film about cancer) on composing a brief fictional story was moderated by subjects' self-esteem. Subjects with low self-esteem showed simple mood congruity by writing sad stories. In contrast, subjects with high self-esteem were not influenced by their prevailing mood. In a similar vein, people who score high on traits such as machiavellianism and social desirability were also found to be more likely to engage in motivated processing, showing reduced mood-congruity effects in the way they perceived, planned, and performed in social encounters (Forgas, 1998). There is growing evidence that personality and individual differences play a critical role in moderating many affect-priming effects due to the targeted, motivated processing strategies they elicit (see Rusting, 1998, for a review of this issue).

It seems then that mood-congruent priming effects can be overridden when people have a clear motivation to do so (see Kunda, 1990). The occasional observations of mood-incongruent memory can perhaps be explained in this way. For example, Parrott and Sabini (1990) found mood-incongruent memory when students were asked to recall autobiographic events while being interviewed outdoors during a sunny versus an overcast

day. People rated themselves as happier on the sunny day; yet, the first memory retrieved on an overcast day was more likely to be a pleasant one (even though later memories became more mood congruent). These mood-incongruent effects were explained by the authors as due to people trying to repair the bad mood that a rainy, overcast day instills.

These outcomes plus numerous other studies have suggested that affect priming and mood congruence are not a universal finding. Rather, affect priming effects vary widely depending on contextual factors such as the nature of the task, the complexity of the information, the personality and motivation of the subjects, and the features of the situation (Blaney, 1986; Fiedler, 1991; Forgas et al., 1984). For example, in experiments by Forgas (1992, 1994, 1995b, 1999), mood congruence was diminished as the targets to be judged became more clear-cut and thus required less constructive processing. Based on person-perception experiments showing variations in mood congruence, Fiedler (1991) had earlier suggested that mood congruence was best demonstrated when the subject's judgment or expression of opinion was about a somewhat ambiguous, vague, or amorphous topic that required some amount of open, constructive processing of information. Examples are such topics as satisfaction with one's life, career, marriage, or prospects for peace in some conflict arena. Constructing or arriving at an opinion about such vague topics requires the generation and use of previously stored and affectively primed information. In contrast, temporary affective states have less impact on memories and judgments when people express familiar, crystallized attitudes that they had stored previously, or when their responses are about a clear and strongly valenced stimulus that does not require cognitive elaboration. A further complication was reported by Schwarz (1990) and by Clore and coworkers (1994), who found that if the irrelevant source of a negative or positive mood was brought to the participant's attention, mood-congruity effects on life-satisfaction judgments were considerably weakened or even eliminated. These authors suggested that by bringing the current mood to subjects' attention, subjects could thereby discount its impact on their judgment.

### **INFORMATION-PROCESSING STRATEGIES THAT MODERATE MOOD EFFECTS ON MEMORY**

The kind of associative network model of mood effects on memory discussed here (see also Figs. 5.1 and 5.2) is based on the assumption that people employ an open, unbiased search of their memory structures

when producing a response. If a response can be generated in an alternate way that does not require the active and constructive search of preexisting memory representations, there is little reason to expect mood-congruity effects. The kind of information-processing strategy people adopt when dealing with a memory task may thus be critical to understanding why mood-congruent memory effects are obtained in some circumstances, but are absent in others. It was with this goal in mind that Forgas (1995a) proposed the affect infusion model (AIM; see also chap. 14, this volume), designed to specify the circumstances in which mood congruity is likely or unlikely to occur.

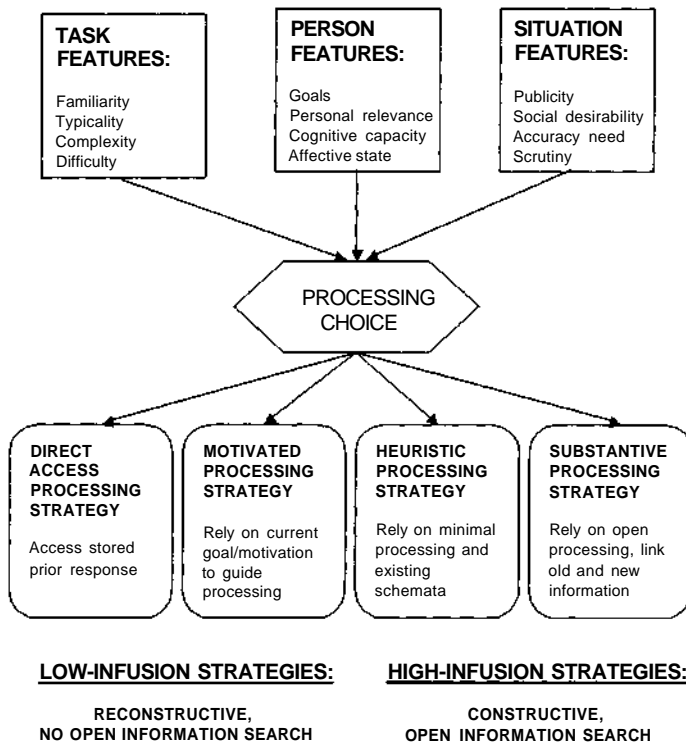


FIG. 5.5. Schematic outline of the multiprocess affect infusion model (AIM): Affect infusion in social cognition depends on which of four alternative processing strategies is adopted in response to target, judge, and situational features. The flowchart illustrates the hierarchical relationships among factors determining processing choices, and the multiple informational and processing effects influence of affect on judgments. (After Forgas, J.P., 1995a. Mood and judgment: The Affect Infusion Model (AIM). *Psychological Bulletin*, 117, 1–28.)

The AIM seeks to define and systematize what is now known about the boundary conditions of mood congruity effects as predicted by network theories. The AIM makes explicit what was, in fact, always an implicit assumption of the original network formulations: That it is only under conditions that lead to open and unbiased information search and processing strategies that the mood-congruent predictions of associative network models should arise. In effect, the AIM is a hybrid model that incorporates ideas from both cognitive and social psychology. Its key emphasis is on different information-processing strategies (a cognitive construct), but it predicts that these different information-processing styles are adopted in response to such social variables as the personal relevance of the topic, situational complexity, and the individual characteristics of the judge (e.g., expertise).

The AIM distinguishes among four distinct processing strategies, as depicted in Fig. 5.5. Two of these strategies (direct access and motivated processing) involve relatively closed, directed information-search processes that limit the opportunity for affect priming and affect infusion. The other two strategies (heuristic and substantive processing) require more constructive and open-ended thinking, which allows multiple avenues and opportunities for affect infusion. Affect priming is most likely in circumstances conducive to open, substantive processing. It is during substantive processing that people must constructively select, learn, interpret, and process information about a task and then relate this information to preexisting knowledge structures in memory. The AIM states that the likelihood of substantive processing is greater when the task is complex or atypical, personally relevant, and when subjects have adequate processing capacity but no specific countervailing motivational goal. Furthermore, the more extensive processing is required to compute a judgment, the more likely it is that affect infusion will influence the outcome.

This counterintuitive prediction—that more substantive processing should increase rather than reduce the extent of affect infusion—has been supported in several experiments (Fiedler, 1991; Forgas, 1992, 1993, 1994, 1995b). In these studies, happy or sad subjects encoded and later recalled and evaluated more or less typical others (Forgas, 1992), formed impressions about more or less well-matched dating couples (Forgas, 1993, 1995b; Forgas & Moylan, 1991), and explained more or less serious relationship conflicts (Forgas, 1994). In all cases, affect priming was observed mainly in circumstances conducive to substantive processing, as expected by the AIM. Furthermore, these studies also showed—consistent with associative network explanations—that the extent of mood congruity was directly

related to the complexity and ambiguity of the task and to the extent that an open, constructive processing strategy was required to compose an opinion. Thus, judging atypical people, mismatched couples, and difficult marital conflicts took longer and produced greater mood congruity than did judging typical people, well-matched couples, and routine conflicts.

In terms of the AIM, rapid heuristic processing may also produce mood-congruent judgmental outcomes in circumstances in which subjects rely directly on their mood as a proxy to infer their evaluation of a topic. However, heuristic processing does not offer a plausible explanation for the kind of mood-congruent learning and memory effects discussed here, as it assumes the absence of extensive memory search processes.

Whether heuristic or substantive processing was used in producing a particular mood-congruent response can be evaluated empirically by recording latency of the opinion response, thus rendering the processing predictions of the AIM empirically falsifiable (Forgas & Bower, 1987). The evidence suggests that mood-congruent recall and judgment effects are greater when processing latency increases, a result suggesting that fast, heuristic processing is not producing these effects. In fact, affect priming typically occurs in the course of substantive, elaborate processing (when reaction times are slow) and disappears when other (heuristic, direct access, or motivated) processing strategies are used (Forgas, 1994, 1995b, 1998). Thus, the AIM provides a general framework within which the affect-priming influences on memory and judgments predicted by network theory can be delineated, and also explains the boundary conditions that limit affect priming.

## SUMMARY AND CONCLUSIONS

Throughout history, philosophers, artists, and laypersons have long speculated about the close interdependence between feeling and thinking, and between affect and cognition (Hilgard, 1980). Associative network theories provide a conceptual framework for understanding the mechanisms that link affect and social cognition. These ideas have stimulated an impressive amount of research during the last few decades. The associative network model (Bower, 1981, 1991; Clark & Isen, 1982; Isen, 1984) explains how affect can facilitate access to related cognitions, and thus offers a simple and parsimonious explanation for a broad range of mood congruity effects on memory and judgments.

This chapter reviewed some of the basic explanations for affective influences on social memory and considered some of the empirical evidence supporting the associative network model. As accumulating research



showed the absence or even reversal of mood-congruity effects on memory in occasional circumstances, a critical review of the network model has become necessary. Integrative theories such as the affect infusion model (AIM; Forgas, 1995a) seek to define the boundary conditions for the emotion network theory; AIM expects mood congruity to occur only when people adopt open, constructive, and substantive processing (Fiedler, 1991). Affect priming of social judgments is unlikely when heuristic, direct access, or motivated processing strategies are adopted. Such strategies preclude the open, constructive information processing that is a prerequisite for affect infusion (Forgas, 1995a).

Based on the available evidence, associative network theories continue to provide the most general and parsimonious explanation for the influence of affective states on memory and other cognitive processes. Specifically, counterintuitive results showing that more extensive, substantive processing enhances mood congruity provide particularly strong support for network models (Forgas, 1992, 1994, 1995b). The implications of network theories apply not only in the laboratory, but also in many real-life cognitive tasks. Numerous studies found affect-infusion effects on memory and thinking in organizational decisions, personnel selection choices, consumer preferences, clinical practice, and health-related judgments that support network theories (Bower, 1995; Eich et al., in press; Forgas, 2000; Mayer et al., 1992). Paradoxically, the more people need to engage in open, constructive processing in order to deal with a problem—that is, to “reason” about it—the more likely their affective state will influence their memory, judgments, and decisions. These effects can even influence such involved and complex tasks as remembering and seeking an explanation for difficult real-life relationship conflicts (Forgas, 1994).

Most of the evidence considered here deals with the cognitive consequences of affective states. However, associative network principles also describe how affective states are elicited as a result of the activation of emotion production rules that instantiate appraisal rules (Bower & Cohen, 1982). Indeed, recent theorizing within the emotional appraisal literature explicitly suggests that associative network models of memory provide the most promising integrative link between research concerned with the cognitive antecedents of emotion and research on the cognitive consequences of affect (Smith & Kirby, 2000).

To conclude, the associative network framework provides a general approach for understanding both affect-appraisal and affect-infusion effects. We now recognize that these effects depend on several aspects of the personal and social context. We believe that evidence suggesting the absence or even



reversal of mood-congruity effects in some circumstances should not be interpreted as inconsistent with and disconfirming of associative network theory. The AIM approach offers an integrative framework for delineating the boundary conditions under which open and constructive memory search strategies are most likely to be used, so that affect-priming and mood-congruent outcomes should be obtained. By clarifying the characteristics and conditions of affective influences on social memory, we hope that this chapter will encourage further research in this important domain.

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