

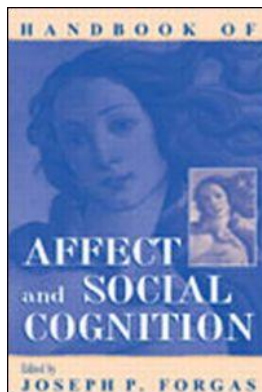
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Joseph P. Forgas

Affective Influences on Social Information Processing

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III

Affective Influences on Social Information Processing

8

Affective Influences on Social Information Processing

Klaus Fiedler
University of Heidelberg
Heidelberg, Germany

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The systematic study of emotional influences on social information processing is a rather recent topic of research, even though its origins can be traced to the beginning of the 20th century. Among these precursors are Freud's (1915) notion of repressed memories for unpleasant materials, early emotion theories that emphasize the interrupt function of emotional reactions (cf. Frijda, 1986), the Yerkes-Dodson (1908) law that posits an inverted U-function between emotional arousal and cognitive performance, McDougall's (1928) emphasis on the communicative-informative function of emotions, and behaviorist research on conditioned emotional reactions (Watson & Rayner, 1920). Later, after World War

Address for correspondence: Klaus Fiedler, Psychologisches Institut, Universität Heidelberg, Hauptst. 47–51, D-69117 Heidelberg, Germany. Email: kf@psi-sv2.psi.uni-heidelberg.de

II, important additional impulses came from Easterbrook's (1959) thesis that span of apprehension decreases with increasing arousal, and from Janis and Feshbach's (1953) seminal work on the disruptive effects of fear appeals in persuasive communication.

Although the lasting contribution of these studies is not clear and remains a matter for historical interpretation, there can be no doubt that elements of all of the previously mentioned ideas can be recognized in the modern research literature on affect and cognition. However, it is important to point out one noteworthy difference between these historical antecedents and the contemporary approaches to be reviewed in the present chapter. These pioneer researchers were concerned mainly with the ways in which emotions inhibit, restrict, interrupt, or interfere with perception, memory, and goal-directed action. Apart from this quantitative reduction in cognitive resources, early theorists were not interested in the influence of affect on cognitive processes and structures. Only after the ascent of the so-called cognitive revolution (Dember, 1974) in the 1960s and 1970s did new theoretical developments in cognitive psychology offer the concepts and research tools to investigate affective influences on cognitive functions under experimental control. In these studies, the focus was no longer on the disruptive cognitive side effects of emotions, but on the analysis of cognitive processes as a function of manipulated emotions or moods.

The present chapter presents an empirical overview and a theoretical integration of what we now know about the influence of affective states on social information processing (see also Clore, Schwarz, & Conway, 1994; Fiedler, 1990; Forgas, 1995; Martin & Clore, in press). It is argued that the fundamental links between affect and information processing are also relevant to a proper understanding of affect congruity effects in social thinking and judgments, topics that are covered in several other chapters in this book (see especially Bodenhausen, Mussweiler, Gabriel, & Moreno, chap. 15, this volume; Bower & Forgas, chap. 5, this volume; Clore, Gasper, & Garvin, chap. 6, this volume; and Petty, DeSteno, & Rucker, chap. 10, this volume).

A FUNDAMENTAL PROCESSING DICHOTOMY

In order to understand affective influences on social cognition, we must first understand on which dimension information-processing styles may differ. Consistent with past research, it is argued here that the influence of affect on social thinking can best be understood in terms of a fundamental processing

dichotomy between accommodation and assimilation. *Accommodation* is an adaptive process in which the organism is focused on the demands of the external world; *assimilation*, in contrast, is a complementary process in which the organism actively adapts to the external world, relying on well-established internal structures and representations. In information-processing terms, accommodation requires the rather careful, exhaustive perception and conservation of stimulus information. Assimilation, in contrast, involves the active cognitive elaboration and transformation of stimuli using internal schemata and knowledge structures. In principle, every cognitive task involves both of these adaptive processing strategies, albeit in different proportions. We may thus distinguish between “conservation” problems, which require mainly accommodative processing, and “generative” problems, which involve active, creative information processing, “going beyond the information given” (Bruner, 1973).

This processing distinction is relevant because we now know that negative affect and aversive situations and stimuli facilitate an accommodative processing style. In contrast, positive affect promotes a more assimilative, creative, and top-down information-processing style (see also Bless, 2000). Considerable evidence now supports such a processing distinction. We know that high-level schemas and stereotypes are often more likely to be used in a positive mood (Bless, 2000). Happy people produce more creative and unusual associations (Isen, Johnson, Mertz, & Robinson, 1985); are better at encoding active, self-generated memories (Fiedler, Lachnit, Fay, & Krug, 1992); show stronger priming effects for personal characteristics (Bless & Fiedler, 1995); and show stronger congruence effects for self-generated rather than passively received information (Fiedler et al., 1992). In contrast, people experiencing negative moods produce slower and less spontaneous and heuristic decisions (Isen & Means, 1983); are less likely to violate rules of transitivity (Fiedler, 1988); commit fewer constructive memory errors (Fiedler, Asbeck, & Nickel, 1991); and are more likely to produce attitudes and judgments based on a systematic evaluation of information (Bless, Bohner, Schwarz, & Strack, 1980; Fiedler & Fladung, 1987). Extensive reviews of the relevant evidence can be found in Fiedler (1990, 1991), Forgas (1995, 2000), and Martin and Clore (2000).

It is argued that this fundamental distinction between accommodative and assimilative thinking can help us understand not only most of the available evidence for affective influences on information processing, but also extensive evidence showing affect congruence in memory and judgments under certain circumstances. We know that affect congruity effects are generally much stronger and more pronounced in positive

than in negative mood states. As positive mood promotes constructive, assimilative thinking, and assuming that affect congruence is largely driven by affect priming mechanisms that can only operate in the course of generative thinking, greater mood congruity in positive moods is consistent with the processing dichotomy suggested here. Such asymmetric mood effects thus partly reflect the asymmetric processing strategies that positive and negative moods stimulate. In the remainder of this chapter, empirical findings are reviewed that elucidate how affective influences on social information processing operate, and how these effects are related to affect congruence phenomena as well.

Basic Assumptions, Methods, and Findings

In order to investigate emotion influences on cognition, it is essential to manipulate emotions as an antecedent or independent variable and measure the consequent changes in dependent measures of cognitive performance. Most experiments have manipulated more or less enduring positive or negative *mood states*, rather than intense, short-term emotions. Relatively little is known about the impact of single qualitative emotions—such as anger, envy, fear, disgust, or hope—on cognitive functions. There are substantive as well as pragmatic reasons for this restriction. Unlike specific emotions, the origin of mood states is often diffuse and unclear. It is for this reason that the cognitive consequences of mood are more likely to be broad and general, spreading to diverse cognitive contents and strategies. The study of mood effects is thus more relevant to understanding everyday psychological processes than the study of intense emotions, because mood effects last longer, occur more frequently, and are less easily detected than are emotional influences. The concentration of research on positive (elated) versus negative (depressed) moods may thus be justified because it is these states that are likely to explain the greatest amount of variance in everyday changes in cognition.

Several procedures have been used to induce mood states under experimental control. Although all induction techniques have their virtues and vices (Table 8.1), there is now strong evidence that very similar effects can be produced by a variety of mood-induction methods. Naturally occurring moods appear to be more ecologically representative but are often confounded with many other factors (e.g., time of the day, eliciting conditions). Hypnotically induced moods are more intense than moods resulting from reading sad or happy text passages, but hypnosis is only

TABLE 8.1 Overview of Different Procedures Used for the Experimental Induction of Moods

<i>Type of Mood Induction Technique</i>	<i>Operationalized^a</i>	<i>Sample Reference</i>	<i>Restriction/Potential Disadvantage</i>
Experimenter suggestion	Hypnosis	Bower, Gilligan, & Monteiro(1981)	Only applicable to a minority of hypnotizable people
Autosuggestion	Recollecting pleasant vs. unpleasant memories	Fiedler & Stroehm (1986)	Induced mood confounded with priming of particular memory contents
Verbal self-instruction	Velten technique	Snyder & White (1982)	May induce demand effects rather than genuine mood states
Faked performance feedback	Feedback on high vs. low performance on a verbal intelligence test	Forgas & Bower (1987)	Violation of ethical norms
Mood induction by texts	Reading reports of sad events, in newspaper style	Johnson & Tversky (1983)	Priming of particular contents
Mood induction by films	Scenes from comedy series vs. film on death by cancer	Forgas (1992)	Individual differences in reactions to films
Mundane rewards	Free gift in a shopping mall	Isen et al. (1978)	Only applicable to positive mood May be too weak

^a Examples given.

applicable to a minority of people. Faked success versus failure feedback on task performance may also represent a natural source of mood. Fortunately, in spite of the heterogeneity of the manipulations employed, there is convergent evidence that the major empirical phenomena can be obtained with a variety of different mood-induction procedures.

The dependent measures used to operationalize mood effects on social information processing also impose important constraints on the possible empirical findings. By far the most frequently used dependent variables are direct memory tasks (typically free recall) and tests of indirect memory functions, such as judgments, based on previously presented stimulus information, decisions, or attitude change resulting from exposure to persuasive communications. Other, more refined measures directly assessing cognitive processes (e.g., response latencies, sorting tasks, priming effects,

association tests) were used only exceptionally. It is no wonder, then, that the major empirical phenomena are based on evidence for the effects of mood on memory and evaluative judgments.

Most empirical findings of mood effects on social cognition relate either to mood-congruency effects or to mood-dependent changes in cognitive style. The main concern here is with the latter, processing effects. However, as the two classes of phenomena are theoretically related, a brief consideration of mood congruency effects is also necessary.

Mood-Congruency Effects

Mood congruency occurs when the individual's current mood facilitates the activation of mood-congruent concepts in memory and possibly inhibits the activation of concepts that are incongruent with the current mood. This basic prediction extends the general Gestalt notion of congruity or consistency to the affect-cognition domain. Controlled demonstrations of mood congruency include evidence for the mood-congruent recall of stories (Bower, Gilligan, & Monteiro, 1981), the better recall of mood-congruent words (Isen, Shalcker, Clark, & Karp, 1978), and the production of mood-congruent judgments (Forgas, 1992, 1995). Further support for both encoding and retrieval mood effects was found in many subsequent studies, using various procedures to induce positive, neutral, and negative mood states (Fiedler & Stroehm, 1986). Moreover, the phenomenon was shown to generalize from recall tests to other memory-based cognitive functions, such as person-impression ratings (Forgas & Bower, 1987), risk appraisals (Johnson & Tversky, 1983), and judgments of well-being (Schwarz & Clore, 1988). If mood states serve to prime affectively congruent materials in memory, the selective accessibility of mood-congruent knowledge should not only affect recall performance, but knowledge-based judgments and decisions as well. The associative network model proposed by Bower (1981) explains most of these effects in terms of the affective priming of concepts and stored stimulus representations. This network metaphor highlights a basic associative assumption that is implicitly or explicitly shared by many other theories (see also Bower & Forgas, chap. 5, and Smith & Kirby, chap. 4, this volume).

Within an associative framework, mood-state dependency can also be understood as a special case of mood congruency. *Mood-state dependency* means that retrieval from memory is enhanced if the mood at the time of retrieval is the same as the mood at the time of learning (Bower, 1981; Eich, 1980). If one assumes that the same stimuli are subjectively encoded

as more positive (negative) when a person is in a positive (negative) mood, then the same stimuli should be more easily retrieved in the same congruent mood.

One troubling issue is that mood-congruency effects are not equally powerful in positive and negative moods. Generally, congruency is stronger in positive moods and is often weak or absent in negative moods. Why should this be the case? To understand this asymmetry, we first must look at the effects of mood on information-processing strategies.

Mood Effects on Information-Processing Style

The second class of empirical phenomena show that people in different moods tend to adopt different cognitive styles. People in a negative mood tend to be more careful and sensitive to stimulus details, whereas people in a positive mood are characterized by a more creative, spontaneous, and top-down processing style (Bless, 2000; Clore et al., 1994; Fiedler, 2000; Isen, 1984). Unlike mood congruency, which suggests that people in good or bad mood selectively attend to pleasant and unpleasant information, the second phenomenon indicates that mood states make people differentially sensitive to different tasks. Negative mood creates an advantage on tasks that call for scrutiny and carefulness, whereas positive mood should benefit tasks calling for creative ideas and unconventional behavior.

Originally, this phenomenon was discovered in two areas, decision making and persuasion. Isen, Means, Patrick, and Nowicki (1982) were the first to demonstrate that consumer decisions were based on a more extensive search of information and a longer period of hesitation when participants were in a negative rather than positive state. The notion that people in a negative mood engage in more systematic information processing has also guided many persuasion experiments (Bless, Bohner, Schwarz, & Strack, 1980; Mackie & Worth, 1989; see also Petty et al., chap. 10, this volume). When the recipients of a persuasive communication are in a negative mood, they are more sensitive to the quality of the presented arguments: strong arguments produce more attitude change than weak arguments. In contrast, those in positive mood are equally responsive to strong and weak arguments.

However, evidence for different processing styles comes from many different paradigms. Other studies demonstrated that people in a positive mood produce more unusual word associations (Isen, Johnson, Mertz, & Robinson, 1985), construct broader and more varied categories on sorting tasks (Isen & Daubman, 1984; Murray, Sujun, Hirt, & Sujun, 1990), show

more flexibility in multiattribute decisions (Conway & Giannopoulos, 1993) and dilemma games (Hertel & Fiedler, 1994), and perform better on productive problem-solving tasks like Duncker's candle problem (Isen et al., 1982). Conversely, under negative mood, judgments remain closer to the stimulus input (Fiedler & Fladung, 1987), people produce less intransitivities on preference tasks (Fiedler, 1988), are less prone to optimistic biases and wishful thinking (Alloy & Abramson, 1979), and take longer to make decisions (Isen & Means, 1983).

It seems that the associative network metaphor that can explain most mood congruity effects cannot account for these changes in cognitive style. At first sight, the two classes of empirical phenomena appear to be fundamentally different and difficult to link within a common theoretical model. Mood effects on information processing strategies were thus typically explained within a fully independent theoretical framework. For example, Schwarz (1990) suggested that good or bad moods may convey evolutionary signals that trigger more or less vigilant processing, as if negative affect told us to "stop" and think before acting, whereas positive affect conveys a "go" signal (see Clore, Wyer, Dienes, Gasper, Gohm, & Isbell, 2000).

However, closer analyses of mood congruency reveal a number of boundary conditions that severely restrict the phenomenon. Several authors report failures to replicate congruency effects, or the effect turned out to be confined to specific experimental conditions pointing to important moderator variables (Bower & Mayer, 1985; Fiedler, 1990; Isen, 1984). It is these boundary conditions that led theorists to propose integrative explanations of the affect-cognition interface that finally demonstrate how the two phenomena may be linked. In other words, mood effects on cognitive style may play a critical role in congruency effects as well.

Boundary Conditions of Mood-Congruent Memory and Judgment

One challenging problem with the congruency effect is its asymmetry. The effect is usually much stronger for positive than for negative mood (Isen, 1984). This reduction or even reversal of congruency under negative mood is sometimes attributed to *mood repair*, suggesting deliberate attempts to improve one's own average affect. Another potent moderator of mood congruency is the demandingness or unusualness of the task. In the case of memory experiments, if the task is too easy because other, mood-independent associative pathways guarantee effective recall, little latitude is left for mood to influence performance. The same principle also applies

to judgment tasks. Mood-related cues are more likely to influence social judgments if the target is unusual or strange than if the target is common or familiar. One pertinent investigation stems from Forgas (1995). Participants were induced into elated or depressed moods before watching images showing couples that appeared either normal or strange. Mood congruency on subsequent impression judgments was more pronounced for strange than for normal couples. Apparently, judgments of normal, prototypical couples arise so easy and with so little need for elaborative processing that mood-congruency effects have very little chance to intrude into the evaluation process. This conclusion is corroborated by a number of other experiments showing stronger mood influences for demanding, unstructured, novel tasks than for simple, highly prestructured, familiar tasks. This holds for mood congruency in recall (Fiedler & Stroehm, 1986) and in social judgments (Forgas, 1995, 1998) as well as for other types of memory effects (Eich, 1980; Ellis & Ashbrook, 1988).

The restriction of mood-congruent memory to recall as opposed to recognition tests (Bower & Cohen, 1982; Fiedler, 1990) may be understood as a special case of the same rule. A recognition test is highly prestructured, and the active search process is cut short by presenting the complete item and leaving only one bit of decision (i.e., to answer “old” or “new”) for the participant to make. In such a restricted process, which is not driven by the individual’s internal knowledge but by the presented recognition item itself, there is little chance for mood influences to intrude, unlike in the rich memory search that characterizes free recall. A further challenging finding is that affective influences on social judgments are sometimes stronger than, or independent of, a corresponding bias in memory tests (Mayer & Salovey, 1988; Schwarz & Clore, 1988). Thus, an up-to-date theoretical conception of affective influences on cognition must explain not only the basic congruency phenomena, but also these various moderator conditions. It turns out that different information-processing strategies seem to play a key role in explaining different patterns of mood congruency, as the next section suggests.

Integrating the Evidence in Terms of Processing Differences: The Affect Infusion Model (AIM)

One way of dealing with moderator effects and partially inconsistent findings is to divide the phenomena into separate categories representing qualitatively different psychological processes. With such an approach, different psychological laws apply to different subdomains, so that several

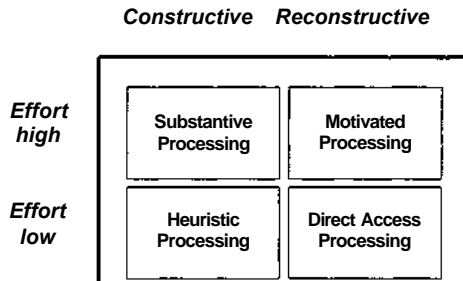


FIG. 8.1. The four processing strategies of the Affect Infusion Model. (Forgas, J.P., 1995. Mood and Judgment: The Affect infusion Model (AIM). *Psychological Bulletin*, 117, 39–66.)

theories of restricted scope can coexist but do not really conflict with each other. The Affect Infusion Model (AIM) by Forgas (1995) offers a rather refined solution of this kind, highlighting the role that different information-processing strategies play in producing different kinds of mood congruent outcomes. The AIM is based on a twofold distinction (Fig. 8.1) that has decisive implications regarding the nature of mood effects on cognitive process. First, the amount of effort expenditure (high vs. low) refers to the time and resources an individual is motivated to invest in a problem at hand, depending on such factors as personal involvement, time pressure, seriousness of consequences, familiarity, and task complexity. Although degree of effort determines the quantitative aspect of the cognitive strategy, the qualitative nature of the process depends on the second distinction. The task may be defined either as an open, constructive problem that calls for the transformation of the given input information into a new (yet unknown) solution. Conversely, the task may be defined as a closed, reconstructive problem, with a predetermined or intuitively apparent solution as a starting point that must be defended against the information given. The combination of these two distinctions, degree of effort and open versus closed problem, produces four basic processing strategies (see Fig. 8.1), for which Forgas (1995) coined the terms *substantive processing* (high effort/open), *motivated processing* (high effort/closed), *heuristic processing* (low effort/open), and *direct access* (low effort/closed). According to the AIM, the infusion of mood into cognitive performance is facilitated by open, constructive tasks—involving substantive or heuristic processing—but mood is unlikely to affect performance on closed, merely reconstructive tasks that call for motivated processing or direct access (see also Fiedler, 1990, 1991).

Direct Access. To illustrate the reasons underlying this central model assumption, consider the simplest case of direct access processing. Many everyday judgments and decisions are handled in a routinized fashion, based on fixed, predetermined solutions. People already know what products they purchase, what train they have to choose, or what they think about their partner or a political candidate. Given that standard reactions to such everyday topics are already preformed and stored in memory, a fixed solution can be retrieved easily and does not have to be created in an open process. It is no wonder that many mundane, routinized judgments are not affected by momentary mood states—nor indeed, by any other extraneous factor.

The failure of normal recognition tasks (Bower & Cohen, 1982) to produce mood congruency can also be explained in terms of direct access. Unlike free recall, a recognition task already provides the solution and only asks for the verification of an item as part of episodic memory. This is a very closed process, under strong semantic constraints, driven by the presented item and rather strict semantic and phonologic rules, leaving little room for mood infusion. It is interesting to note that when the normal recognition paradigm is modified to elicit a more open process—for example, by giving participants semantic cues to infer what recognition stimulus is gradually appearing behind a mask (Fiedler & Bless, 2000)—a typical mood-congruency effect reappears.

Motivated Processing. The consequences of motivated processing are less straightforward. Although this strategy is also closed or reconstructive, it need not be free of affect infusion. When there is only one reasonable motive (e.g., to repress an unpleasant memory; to support a favorite opinion; to promote a positive self- or group identity), and all cognitive activities serve such a predetermined goal, there is no reason to expect mood-dependent effects. Sometimes, however, there is more than one goal to fulfill, and individuals must make a choice between several motives. In one pertinent experiment, Forgas (1991) found that participants in happy, sad, and neutral moods were driven by different motives when they had to choose among eight people in a partner-selection task. Sad persons concentrated on interpersonal, affective information, obviously preferring socially rewarding choices. In contrast, happy persons gave more weight to task-related dimensions, preferring candidates with superior skills. In this case, greater personal relevance and negative mood combined to create a strong motivational goal—finding a rewarding partner.

Motivated processes are certainly relevant to explaining the asymmetry effect. The natural motivation to seek pleasant stimuli and avoid unpleasant experiences supports the associative impact of happy mood, but counteracts the consequences of depressed mood. Even when depressed mood makes unpleasant memories accessible, sad people are often motivated to avoid negative stimuli and repair their unpleasant state. Using such an effective metacognitive strategy (Wegener & Petty, 1997), they seek to overcome the involuntary congruency effect. Such theories conceive of motivated processes as responsible for correction effects that modify mood-congruent influences on associative memory. For example, Wegener, Petty, and Smith's (1995) *hedonic-contingency* view states that sad receivers engage in deeper processing of a persuasive message, but only when message processing serves the hedonic purpose of mood repair.

Heuristic Processing. The theory that most explicitly attributes mood-congruity effects to heuristic processing is Schwarz and Clore's (1983, 1988) mood-as-information approach. When the task is open and there is no predetermined solution, individuals may base their evaluative judgments on primitive rules of thumb, like the "How-do-I-feel-about-it?" heuristic. For example, when judging politicians during an election campaign, people may just ask themselves "How do I feel about it?" and use their momentary feelings as a basis for judgment. The feeling may be evoked by the target itself, but may also be due to some irrelevant source, like the weather or some recent event. To the extent that people use their momentary mood as a heuristic cue to produce a social judgment, affect infusion will occur.

In a typical investigation by Schwarz and Clore (1983), participants were more satisfied with their lives on a sunny day than when the weather was bad. Interestingly, the effect disappeared when respondents were sensitized to the weather as a potential source of bias (by the question "How is the weather today?" prior to the life satisfaction judgment). This discounting effect has been emphasized as a key prediction of the mood-as-information approach. If the informative value of mood for judgment is discredited because an external cause of the affective state (weather) is made salient, mood influences are predicted to disappear. For example, when attention was drawn to the unpleasantness of the tiny uncomfortable cubicle in which the experiment took place, negative mood could be attributed to this cause and its impact on judgments disappeared (Schwarz & Clore, 1983).

Although such projection of internal moods onto external judgment targets clearly contributes to many everyday mood effects, the generality of

the phenomenon is limited in several ways. First, this theory is confined to an all-or-none effect, in which affect is either the sole source of information or is not used at all. Second, the mood-as-information model deals mainly with the consequences of misattributed affect. It is therefore restricted to dysfunctional situations in which the true origin of mood remains unknown. Once affective states are correctly attributed to external sources, their cognitive effects should disappear. However, this is not the case in the majority of experiments in which participants are fully aware of where their moods comes from. Third, the mood-as-information approach remains mute about the specific cognitive process itself by which features of the stimulus information come to be combined with existing knowledge structures.

Finally, it is important to note that the affect-as-information theory is not strictly in conflict with other process theories—such as associative network rules—and the elimination of mood effects through misattribution treatments does not strictly preclude that the original mood effects were caused by another process, such as affect priming (Berkowitz, Jaffee, Jo, & Troccoli 2000). In general, reliance on mood as a heuristic cue is most likely when other, nonheuristic processes are unlikely: when the task is of little personal relevance, when little other information is available, when problems are too complex to be solved systematically, and when time or attentional resources are limited.

Substantive Processing. If the problem is open and effort expenditure is high, a substantive-processing strategy is called for. Like heuristic processing, affect intrusion should be high in this case, but for different reasons. Mood states should not be used directly as cues for judgmental inferences, but mood effects should operate indirectly, through selective facilitation of relevant information. Empirical support for this contention comes from numerous experiments showing that mood congruent memory and judgment increase with processing demands (Fiedler & Stroehm, 1986; Forgas, 1995). The more mental operations and transformations are needed, the more chances there are for mood infusion.

Research on productions of, and reactions to, polite versus impolite requests may illustrate the general principle (Forgas, 1998, 1999). In these experiments, the evaluation of requests was biased in a mood-congruent direction, with more benevolent reactions to speech acts in positive than negative mood. However, this effect was accentuated for impolite requests that were normatively unusual and required more coping activities and mental elaboration than polite requests (Forgas, 1998). Similar effects were obtained for request production (Forgas, 1999), such that sad mood

enhanced and happy mood reduced request politeness. Recall analyses confirmed that these mood effects on verbal behavior increased with the degree of substantive processing. Such a mediating role for processing strategy in the production of mood-congruent memory and judgment biases is a defining feature of the substantive processing style.

The Processing Consequences of Affect

So far, we have seen that the four distinct processing strategies identified by the AIM play a critical role in accounting for the presence or absence of mood congruence in memory and judgments. However, affect itself also has a reverse influence on cognitive strategies, and it is this interaction between affect and information-processing styles that presents some of the greatest theoretical challenges in this field. What theoretical explanations are there for the information-processing consequences of affect? This issue is discussed in the next section.

Capacity Theories. Several theories suggest that the experience of affective states occupies significant cognitive resources. This reduction of capacity may be responsible for a shift from systematic to heuristic strategies. Worth and Mackie (1987) theorized that diminished resources and heuristic processing are characteristic of positive moods, because people use resources to enjoy, extend, and conserve happy situations. In their study, participants received either weak or strong arguments about controlling acid rain from either an expert or a nonexpert (the heuristic cue). Recipients in a positive mood were influenced by strong and weak arguments to a similar degree, suggesting that they did not process the information systematically. Recipients in a neutral mood showed more positive reactions to and changed their attitude more in response to strong rather than weak arguments. In contrast, people in a positive mood were more responsive to the manipulation of sender expertise, again suggesting more heuristic processing. Mackie and Worth (1989) also found that time pressure eliminated greater message elaboration in neutral mood as well.

Note that capacity reduction should impair the entire process across all capacity-demanding tasks. It does not matter whether mood states are attributed to judgment targets or to external causes, or whether the outcome of information processing is hedonically pleasant or unpleasant. Such strong and universal implications make a theory vulnerable and likely to conflict with other theories and to be falsified empirically. In fact, the assumption of lower capacity in positive than negative mood is

incompatible with a number of findings. First, Ellis and Ashbrook (1988) have reviewed evidence for the reverse assumptions, that mental resources are reduced in depressive rather than elated states. Second, if capacity is generally reduced, it is hard to see how happy mood could facilitate creative thinking and cognitive flexibility as has been repeatedly found (Fiedler, 1988; Isen Means, Patrick, & Nowicki, 1982). Third, capacity reduction is not necessary to explain the previously mentioned findings. Even when argument strength does not influence attitude change in happy mood, happy people do nevertheless recognize the different quality of strong and weak arguments (Bless et al., 1990). Most critically, using a dual-task paradigm, Bless, Clore, Schwarz, Golisano, Rabe, and Woelk (1996) reported compelling evidence that the reduced processing of stimulus details in positive mood does not reflect a shortage of cognitive resources, but actually serves to win additional resources for enhanced performance on a secondary task (a concentration test).

Affect, Cognition, and Adaptive Learning: Assimilation versus Accommodation

The AIM as an organizing framework can thus be used to circumscribe the respective subdomains of different theories and to understand why affect infusion can be expected in some but not in other task situations. However, although the AIM predicts *when* affect infusion can be expected, it does not adequately explain *the causes and origins* of affective influences on information-processing strategies. Although the AIM assumes that affect infusion during substantive processing is due to affect priming effects, a number of substantial questions remain open.

For one, the model does not adequately discriminate between qualitatively different kinds of substantive-processing styles. We would expect that substantive processing that is accommodative in character and focuses on the external stimulus information should produce less affect congruency than assimilative processing. It is only when judges think substantively *and* rely on their own internal resources and knowledge structures to produce a response that affect priming and significant mood congruency would be expected to occur. The accommodation/assimilation processing dichotomy should also help us explore whether there is an intrinsic relationship between mood-congruency effects and mood effects on cognitive processing styles? Although a good deal of apparent inconsistency in the literature can be clarified when the four types of processing strategies are distinguished,

the AIM does not fully reveal what actually happens in the affect-cognition interface.

This is further illustrated by evidence that shows that even holding the processing type constant—for example, substantive processing in a free-recall experiment—mood effects may nevertheless vary depending on whether stimuli are categorically structured (Fiedler & Stroehm, 1986). Likewise, the task may constantly involve heuristic judgments in the absence of rational criteria—such as intuitive perceptual judgments (Niedenthal & Setterlund, 1994)—but congruency effects will appear or disappear. Thus, in addition to disentangling the task conditions that make affect infusion more or less likely, a more refined process model is needed that helps to understand the mechanisms and reasons why mood intrudes into cognitive functions.

One pertinent theoretical approach is to consider affect and cognition from an adaptive learning perspective. In phylogenetic and ontogenetic development, positive and negative affective states can be associated

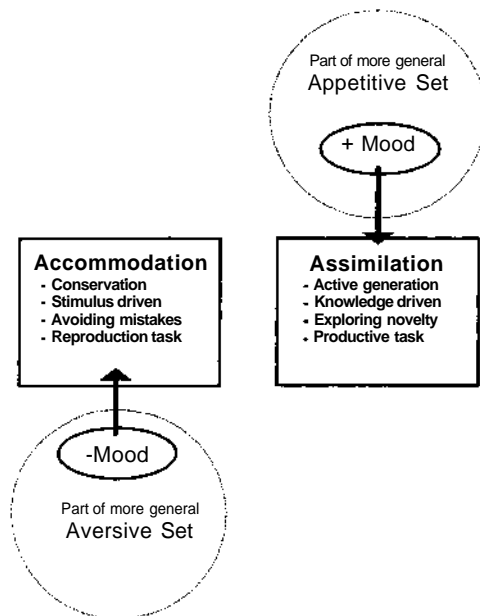


FIG. 8.2. Graphical illustration of assimilation and accommodation as two adaptive functions grounded in different learning sets, governing appetitive and aversive situations (Fiedler, 2000).

with appetitive and aversive situations, respectively. A long tradition of behaviorist research (cf. Kimble, 1961) shows that performance in these situations is governed by different learning sets. The avoidance behavior that characterizes aversive settings must work reliably and error-free, without any reinforcement. A young child who is well adapted to dangerous traffic must have learned to be careful when crossing the street without being reinforced by occasional car accidents. This performance has to be perfectionist and stimulus driven—that is, it is essential to avoid mistakes and potentially significant environmental stimuli must not be overlooked. In contrast to this aversive set, the appetitive set in positive situations is characterized by the rules of exploration behavior that gives more weight to curiosity than to safety and avoidance of mistakes (see also Higgins, chap. 9, this volume).

Borrowing two terms coined by Piaget (1954), these two learning sets, or complementary adaptive styles, can be termed *accommodation* and *assimilation*, respectively (Fig. 8.2). Accommodation is a bottom-up process by which the organism adapts to the affordances of the external stimulus world. Thus, *accommodation* means to stick to the facts, not to miss or lose potentially relevant stimuli, and to validly assess an actually given stimulus setting; in one word, its major function is *conservation*. In contrast, *assimilation* is the reverse adaptive function by which the organism imposes an internal cognitive structure on the external world. This is a top-down process whereby the stimulus input is transformed and enriched using internally activated knowledge structures. The function to be maximized here is *active generation*, rather than passive conservation.

The crucial assumption is that positive and negative mood states can be considered as special cases of appetitive and aversive settings, respectively (Fiedler, 2000; Fiedler & Bless, 2000). Therefore, positive mood states should support assimilative functions, whereas negative states should support accommodative functions, just like other (conditional) stimuli can trigger assimilation versus accommodation. In other words, positive mood should facilitate the top-down process of applying prior knowledge and successful internalized strategies to the active generation of new information. Negative mood should facilitate the bottom-up process of attending to and conserving given stimulus details. There is increasing consensus among several theorists on this issue (Bless, 2000; Clore et al., 1999).

In terms of how people process particular cognitive problems, the present theoretical approach predicts a pervasive interaction between mood (positive vs. negative) and the nature of the task (calling for assimilation

vs. accommodation). Although both assimilation and accommodation must be present to some degree in every cognitive task, the performance on conservative tasks increases under negative mood, whereas positive mood benefits generative tasks. To test this central prediction, ideally we would need a method of scaling different tasks accurately on a conservative to generative continuum. Failing that, strong theoretical tests can be based on ranked tasks that clearly occupy different ordinal positions along this dimension. For example, given two cued-recall tasks, the active-generation component increases as the amount of cued information decreases. In word completion, the generative component increases as the proportion of missing letters increases. A judgment task becomes more generative as it becomes more ill-structured, or as the stimulus information becomes more complex and unusual (Forgas, 1995). It is also clear that free recall is a more generative memory task than recognition. Accordingly, it can be predicted and confirmed by the evidence reviewed previously that mood-congruence effects are stronger for free recall than recognition, for unstructured than prestructured judgment tasks (Forgas, 1995), or when cued recall involves minimal cues (Eich, 1980).

The assimilation-accommodation approach has considerable explanatory power, and it gives rise to novel and distinct implications. It provides a parsimonious integrative account of many affect and cognition phenomena in terms of common rules of adaptive learning. Moreover, both classes of empirical findings—concerning mood congruency and cognitive style—can be related within the same framework. Regarding cognitive style, the convergent evidence for careful processing under negative mood and enhanced creative performance under positive mood can be explained in terms of accommodative or assimilative cognitive styles. Regarding mood congruency, the essential prediction is that any selective influence on memory and judgments coming from the individual's affective state must arise in the assimilation component, for it is this component that is sensitive to influences coming from inside the individual. Accommodation by definition is driven by objective stimulus aspects rather than internal states. The origin of mood congruency can therefore be located in the assimilation component. This helps us to understand the two major boundary conditions of mood congruency: that it is stronger for ill-structured, open tasks (calling for assimilation); and asymmetrically stronger for positive than negative mood (because positive mood supports assimilation).

A more direct test of how mood congruency interacts with task conditions that vary in accommodation versus assimilation comes studies of memory for self-generated versus experimenter-provided information. In several

experiments (Fiedler, 1991), funny or sad films were used to induce mood before the participants were exposed to positive versus negative stimulus words. Within each valence category, half of the words were presented in complete format (experimenter-provided), whereas several letters were missing in the remaining stimulus words, so that the meaning had to be generated by the participants themselves. Reading is obviously a more conservative (stimulus-driven) task than having to recreate a word despite missing letters. Consistent with the predictions, mood congruency on recall was pronounced for self-generated stimuli but was weak or absent for experimenter-provided stimuli. Moreover, the pattern was asymmetrical, such that generating positive (rather than negative) word meanings in positive mood enhanced subsequent recall, whereas negative mood had little effect. Several conceptual replications of this finding are now available (Fiedler, 1991,2000).

Apart from simple mood congruency, positive mood also enhances the general recall advantage of self-generated over experimenter-provided information when stimuli are neutral in valence (Fiedler, Lachnit, Fay, & Krug, 1992; Slamecka & Graf, 1978). This finding is also consistent with the basic assumption that positive mood supports assimilative processes. Note that these findings are unlikely to be explained by alternative models. As the manipulation of self-generated and experimenter-provided stimuli is within participants, an absolute capacity restriction cannot be the cause of a congruency effect that is confined to one subset of stimuli. Also, it is hard to see why any heuristic tendency—to search for mood-congruent items in memory—should be restricted to the self-generated part only. As substantive processing (i.e., the same AIM slot) is characteristic of the entire recall task, the task-dependent variation within participants cannot be due to grossly different processing strategies.

One interesting corollary of this adaptive learning approach is that affective influences on cognition are not dependent on strong and intense emotions. Subtle affective cues and rather weak experiential states may be sufficient to produce the same effects. This could explain the intriguing fact that successful mood treatments are often very weak (Isen et al., 1978), and genuine mood variations may fail to produce the typical effects under natural conditions, when mood cues are easily overridden by stronger situational cues (Hasher, Rose, Zacks, Sanft, & Doren, 1985). At the same time, this view of affect as an informative cue (or a conditioned stimulus) that triggers different kinds of learning sets is less restrictive than the mood-as-information approach. It is compatible with countless experiments showing that mood effects need not disappear when affective states are obviously

due to an experimental manipulation, and it can account for mood effects during both heuristic and substantive processing conditions.

SUMMARY AND CONCLUSIONS

The present chapter provided an overview of research on affective influences on social information-processing strategies. Based on an analysis of several research paradigms and their underlying assumptions, research evidence about two basic empirical phenomena was reviewed and illustrated, namely, mood congruency and affective influences on cognitive-processing styles. Several boundary conditions were identified that restrict the occurrence of these phenomena and theoretical approaches to account for the pattern of empirical evidence were outlined. Within the framework of the Affect Infusion Model (AIM), it was clarified that different theoretical approaches need not be incompatible, but may refer to different subdomains of findings. However, although the AIM predicts that affect infusion is generally more likely for substantive and heuristic processing than for motivated processing and direct access, it does not spell out important additional conditions for affect infusion to occur—that an open, assimilative, and top-down processing style be adopted. A more explicit process model was proposed, based on the adaptive distinction between assimilative and accommodative processing as the key to understanding the role of affective states in regulating cognitive-processing styles. This model is based on extensive evidence suggesting that opposite moods serve different adaptive functions: Positive moods facilitate assimilation, whereas negative moods facilitate accommodative processes. A variety of different research findings were reviewed and interpreted from this integrative perspective.

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