

Mood Effects on Cognition: Affective Influences on the Content and Process of Information Processing and Behavior

Joseph P. Forgas

University of New South Wales, Sydney, NSW, Australia

INTRODUCTION

How does affect influence our thinking and behavior? This is an age-old question that philosophers, writers, and artists have struggled with since time immemorial. In the last few decades there have been major advances in the experimental study of the ways that mild, everyday affective states, or moods, may influence the way people process social information—the way they think, remember, and judge the social world around them. Research on the influence of affect on cognition also contributes to the age-old quest to understand the relationship between the rational and the emotional aspects of human nature. These mood-induced influences on the content and process of thinking have very important implications for everyday interpersonal behavior in general, and for human–computer interactions (HCI) in particular.

The evidence increasingly suggests that an evolutionary process shaped the development of all affective responses. Thus, temporary experiences of happiness and sadness, in addition to having a positive or negative hedonic quality, also appear to function as useful signals, spontaneously triggering different information processing strategies that appear to be

highly adaptive to the requirements of different social situations. In this way, positive and negative moods may assist people by recruiting information and processing strategies that are most appropriate to deal with a given situation. In addition, positive or negative affective states also influence the way we access and use information stored in memory (mood congruence). A growing number of studies emphasize the important applied aspects of mood effects on cognition that are particularly relevant in human factors and HCI, as well as in applied settings, such as legal, clinical, forensic, and educational psychology where concern with human performance is crucial.

Understanding the delicate interplay between feeling and thinking or affect and cognition is one of the most important tasks for psychological research. This chapter reviews recent research documenting the multiple roles that moods play in influencing both the *content* and the *process* of cognition. After a brief introduction reviewing early work and theories exploring the links between mood and cognition, the chapter is divided into two main parts. First, research documenting the way moods influence the *content and valence* of cognition is reviewed, focusing on mood congruence in cognition and behavior. The second part of the chapter presents evidence for the *processing effects* of moods, showing that mood states influence the quality of information processing as well. The chapter concludes with a discussion of the theoretical and applied implications of this work, and future prospects for these lines of inquiry are considered.

We need to emphasize at the outset that this review deals with mood effects rather than the influence of more distinct and intense emotions. We may define moods as “relatively low-intensity, diffuse, subconscious, and enduring affective states that have no salient antecedent cause and therefore little cognitive content” (Forgas, 2006, pp. 6–7). Distinct emotions in contrast are more intense, conscious, and short-lived experiences (e.g., fear, anger, or disgust). Moods tend to have relatively more robust, reliable, and enduring cognitive consequences, and the research reported here largely focused on the effects of mild, nonspecific positive and negative moods on thinking and behavior, although more specific states, such as anger have also been studied (Unkelbach et al., 2008).

BACKGROUND

Human beings are a remarkably moody species. Fluctuating positive and negative affective states accompany, underlie, and color everything we think and do, and our thoughts and behaviors are often determined by spontaneous affective reactions. Since the dawn of Western civilization, a long list of writers and philosophers have explored the role of moods in the way we think, remember, and interact with our environment. It is all

the more surprising that empirical research on how moods influence cognition is a relatively recent phenomenon. Apart from some early exceptions (Rapaport, 1961; Razran, 1940), concentrated empirical research on this phenomenon in psychology is but a few decades old, perhaps because the affective nature of human beings has long been considered secondary and inferior to the study of rational thinking (Adolphs and Damasio, 2001; Hilgard, 1980).

Of the two major paradigms that dominated the brief history of our discipline (behaviorism and cognitivism), neither assigned much importance to the study of affective states or moods. Radical behaviorists considered all mental events, such as moods beyond the scope of scientific psychology. The emerging cognitive paradigm in the 1960s was largely directed at the study of cold, affectless mental processes, and initially had little interest in the study of affect and moods. In contrast, research since the 1980s has shown that moods play a central role in how information about the world is represented, and affect determines the cognitive representation of many of our social experiences (Forgas, 1979).

Early evidence. Although radical behaviorists generally showed little interest in exploring the nature of mood effects, Watson's research with Little Albert may be viewed as an early demonstration of affect congruence in judgments (Watson, 1929; Watson and Rayner, 1920). These studies showed that evaluations of a neutral stimulus, such as a furry rabbit, became more negative after it has been associated with threatening stimuli, such as a loud noise. Watson thought that most complex affective reactions are acquired in a similar manner throughout life due to cumulative stimulus associations. In another early mood study, Razran (1940) showed that people evaluated sociopolitical messages more favorably when in a good rather than in a bad mood, induced either by a free lunch or aversive smells. This work also provides an early demonstration of mood congruence (Bousfield, 1950). In another pioneering study, Feshbach and Singer (1957) induced negative affect in subjects through electric shocks and then instructed some of them to suppress their fear. Fearful subjects' evaluations of another person were more negative, and ironically, this effect was even greater when subjects were trying to suppress their fear (Wegner, 1994). Feshbach and Singer (1957) explained this in terms of the psychodynamic mechanism of projection, suggesting that "suppression of fear facilitates the tendency to project fear onto another social object" (p.286). Mood-congruent effects on evaluative judgments were also found by Byrne and Clore (1970) and Clore and Byrne (1974) using a classical conditioning approach. They used pleasant or unpleasant environments (the unconditioned stimuli) to elicit good or bad moods (the unconditioned response), and then assessed evaluations of a person encountered in this environment (the conditioned stimulus; Gouaux, 1971; Gouaux and Summers, 1973; Griffitt, 1970). These early studies provided convergent

evidence for the existence of a mood-congruent pattern in thinking and judgments, but did not as yet offer a clear explanation for the psychological mechanisms responsible for these effects. Nevertheless, these early studies paved the way for the emergence of more focused research on mood congruence in thinking and judgments in the 1980s.

THEORIES OF AFFECT CONGRUENCE

As we have seen, it has long been recognized that affective states may influence the content and valence of thinking, although psychological explanations for this phenomenon have remained scarce until recently. Several early studies demonstrated such informational effects, that is, ways that positive and negative moods may influence the *content* of cognition. Three main theories accounting for mood congruence will be reviewed: (1) *associative network* theories emphasizing memory processes (Bower, 1981; Bower and Forgas, 2000), (2) *affect-as-information* theory relying on inferential processes (Clore et al., 2001; Clore and Storbeck, 2006; Schwarz and Clore, 1983), and (3) an integrative *Affect Infusion Model* (AIM) (Forgas, 1995, 2002).

EMPHASIS ON MEMORY: THE ASSOCIATIVE NETWORK THEORY

Bower (1981) proposed a comprehensive model that assumes that moods are linked to an associative network of memory representations. A mood state may thus automatically prime or activate representations linked to that mood in the past, which in turn are more likely to be used in subsequent constructive cognitive tasks. Several experiments found support for such *affective priming*. For example, happy or sad people were more likely to recall mood-congruent details from their childhood and also remembered better mood-congruent rather than mood-incongruent events that occurred in the past few weeks (Bower, 1981). Mood congruence was also observed in how people interpreted ongoing social behaviors (Forgas et al., 1984) and formed impressions of others (Forgas and Bower, 1987).

Subsequent work found however that mood congruence is also subject to several boundary conditions (Blaney, 1986; Bower, 1987; Singer and Salovey, 1988). Mood-congruence in memory and judgments is most reliable (1) when moods are intense (Bower and Mayer, 1985), (2) meaningful (Bower, 1991), (3) when the cognitive task is self-referential (Blaney, 1986), and (4) when open, elaborate thinking (or constructive processing) is used. In particular, tasks requiring constructive and more elaborate processing,

such as associations, inferences, impression formation, and interpersonal behaviors are most likely to show mood-congruent effects (e.g., [Bower and Forgas, 2000](#); [Fiedler, 1990](#); [Mayer et al., 1992](#)). The reason for this is that an open, elaborate processing strategy amplifies the opportunities for affectively primed incidental memories and associations to become incorporated into a newly constructed cognitive response. Tasks that can be performed automatically, relying on preexisting reactions require little or no constructive processing, and show less mood congruence. For example, tasks involving the simple recognition or reproduction of existing reactions ([Forgas, 1995, 2002, 2006](#)) are impervious to mood effects, because narrow and targeted thinking offers little opportunity for affectively primed information to be incorporated in a response.

MISATTRIBUTION: THE AFFECT-AS-INFORMATION THEORY

An interesting alternative theoretical approach seeks to explain mood congruence by suggesting that “rather than computing a judgment on the basis of recalled features of a target, individuals may ask themselves: ‘how do I feel about it?’ [and] in doing so, they may mistake feelings due to a preexisting state as a reaction to the target” ([Schwarz, 1990](#), p. 529; see also [Schwarz and Clore, 1983](#); [Clore and Storbeck, 2006](#)). In essence, this model suggests that people misattribute a pre-existing mood state as indicative about their reaction to an unrelated target. The model is closely derived from research on misattribution and judgmental heuristics. However, its predictions are often empirically indistinguishable from those derived from earlier conditioning models assumes that blind associations—evaluative conditioning—between a preexisting mood state and another, unrelated stimulus (e.g., [Clore and Byrne, 1974](#)). Evidence shows that people mainly rely on their mood as a simple and convenient heuristic cue to infer their evaluative reactions 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” ([Fiedler, 2001](#), p. 175). In contrast, if the task is of high personal relevance and there are cognitive resources available, then affective priming is the most likely strategy resulting in mood congruence.

The affect-as-information model has been supported by studies that showed, for example, that mood induced by good or bad weather can significantly influence judgments on a variety of unexpected and unfamiliar opinion survey questions in a telephone interview ([Schwarz and Clore, 1983](#)). In another study, [Forgas and Moylan \(1987\)](#) found mood congruence in survey responses of almost 1000 subjects who completed a questionnaire after they had seen funny or sad films at the cinema. As in

the earlier study by Schwarz and Clore (1983), respondents presumably had little time, interest, motivation, or capacity to engage in elaborate constructive processing in such a survey situation requiring rapid responses, and so relied on their mood as a simple and convenient heuristic shortcut to infer their evaluative reactions. There are also some important limitations of this model. As the informational value of a mood state is not fixed but rather depends on the situational context (Martin, 2000), such mood effects may also be highly context-specific. Furthermore, the affect-as-information model mostly applies to valenced evaluative judgments, and may have difficulty accounting for mood congruence in attention, learning, and memory. In one sense misattributing mood to an unrelated target is probably the exception rather than the norm in real-life mood effects on cognition.

TOWARD AN INTEGRATION: THE AFFECT INFUSION MODEL

The AIM (Forgas, 1995, 2002) suggests that mood effects on cognition should depend on the kind of information processing strategy used. The model identifies four processing strategies that vary in terms of (1) their openness and *constructiveness* and (2) the degree of *effort* exerted in seeking a solution:

1. The first, *direct access* strategy involves the simple and direct retrieval of an already stored preexisting response. This is most likely when the task is highly familiar and there is no reason to engage in more elaborate thinking (e.g., retrieving a friend's mobile number). As this is a low-effort and a non-constructive processing strategy, affect infusion should not occur.
2. The second, *motivated processing* strategy refers to effortful, yet highly selective and targeted thinking that is dominated by a specific motivational objective (e.g., making a good impression in a job interview). This strategy is dominated by a powerful motivational objective and involves little open, constructive processing and therefore should be impervious to affect infusion and may even produce mood-incongruent effects (Clark and Isen, 1982; Sedikides, 1994).
3. *Heuristic processing* refers to constructive but truncated, low-effort processing, which is likely to be adopted when time and personal resources such as motivation, interest, attention, and working-memory capacity are scarce (e.g., evaluating your friend's new company car). Heuristic processing may result in mood congruence when affect is used as a heuristic cue as predicted by the affect-as-information

model (Schwarz and Clore, 1983; see also Clore et al., 2001; Clore and Storbeck, 2006).

4. Finally, *substantive processing* involves open, constructive thinking, and is used whenever the task is new and demanding and there are no ready-made direct access responses or motivational goals available to guide the response. Substantive processing is most likely to produce memory-based affect infusion into cognition as mood may selectively prime or enhance the accessibility of mood-congruent thoughts, memories, and interpretations (Forgas, 1994, 1999a,b).

Further, the AIM also identifies a range of contextual variables related to the task, the person, and the situation that jointly determine processing choices (Forgas, 2002; Smith and Petty, 1995), and the model also recognizes that affect itself can influence processing choices (Bless and Fiedler, 2006). The key prediction of the AIM is the *absence* of affect infusion when direct access or motivated processing is used, and the presence of affect infusion during heuristic and substantive processing. Affect infusion is most likely in the course of constructive processing that involves the substantial transformation rather than the mere reproduction of existing information. Such processing requires a relatively open information search strategy and a significant degree of generative elaboration of the available stimulus details. Thus, affect "will influence cognitive processes to the extent that the cognitive task involves the active generation of new information as opposed to the passive conservation of information given" (Fiedler, 1990, pp. 2–3). The implications of this model have now been explored and supported in a number of the experiments considered below. In particular, mood congruence in cognition turns out to be *greater* when *more extensive* and *elaborate* processing is required to deal with a more complex, demanding task (Forgas, 2002; Sedikides, 1995). Conversely, affect infusion is curtailed whenever open, constructive processing is suppressed.

EVIDENCE FOR MOOD CONGRUENCE IN THINKING AND BEHAVIOR

Mood Congruence in Memory and Attention

Mood congruency in memory was one of the first reliable effects demonstrated. Several studies found that people are better at retrieving both early and recent autobiographical memories that happen to match their prevailing mood (Bower, 1981; Miranda and Kihlstrom, 2005). In a similar manner, depressed patients preferentially remember aversive experiences and negative information (Direnfeld and Roberts, 2006). Implicit tests of memory provide particularly good evidence of mood congruence. For example, depressed people complete more word stems (e.g., *can-*) with

negative rather than positive words they had studied earlier (e.g., *cancer* vs. *candy*; Ruiz-Caballero and Gonzalez, 1994). Person memory also is subject to mood congruent effects: happy and sad people selectively remembered more positive and negative details respectively about people they had read about (Forgas and Bower, 1987).

These mood-congruent memory effects occur because of the selective activation of an affect-related associative base, resulting in mood-congruent information receiving greater attention and more extensive processing and encoding (Bower, 1981). That is, people spend longer reading and learning about mood-congruent material, integrating it into a richer network of primed associations, and as a result, they are better able to remember such information later on (Bower and Forgas, 2000). There is also growing evidence for mood congruence at the attention stage. In one recent inattention blindness study (Becker and Leininger, 2011), mood selectively influenced participants' attentional filter, increasing the chance to notice unexpected faces that carried a mood-congruent rather than a mood-incongruent emotional expression. Other research also demonstrated that positive mood leads to an attentional bias toward rewarding words (Tamir and Robinson, 2007), and broadened attention to positive images (Wadlinger and Isaacowitz, 2006). In contrast, depressed patients tend to pay greater attention to negative information (Koster et al., 2005), and show better learning and memory for depressive, negative words (Watkins et al., 1992), and negative facial expressions (Gilboa-Schechtman et al., 2002).

However, selective focus on mood-congruent information does not necessarily lead to an escalating cycle of positivity or negativity. Sad people eventually may escape the vicious circle of focusing on and remembering negative information by means of deliberately employing *mood-incongruent* attention and memory. Consistent with the hypothesis of such motivational *mood repair* (Isen, 1985), Josephson et al. (1996) showed that after initially retrieving negative memories, nondepressed participants in a negative mood deliberately shifted to retrieving positive memories in order to lift their mood (Detweiler-Bedell and Salovey, 2003; Heimpel et al., 2002).

Mood-State Dependent Memory

In addition to mood-congruence described earlier, mood has another significant influence on memory by selectively facilitating the retrieval of information that has been learnt in a matching rather than a nonmatching mood. Such *mood-state dependent memory* may play a particularly important role in the memory deficits found in patients with alcoholic blackout, chronic depression, dissociative identity and other psychiatric disorders (Goodwin, 1974; Reus et al., 1979; Schacter and Kihlstrom, 1989).

However, the evidence suggests that these effects are rather subtle (Bower and Mayer, 1989; Kihlstrom, 1989; Leight and Ellis, 1981), and there are several moderating factors that influence their occurrence. Constructive tasks, such as free recall are more sensitive to mood-dependent memory effects than are reproductive tasks such as recognition as also suggested by the AIM described earlier (Bower, 1992; Eich, 1995a; Fiedler, 1990; Forgas, 1995; Kenealy, 1997).

The effects are most reliable when people engage in highly constructive processing and generate their own events to be remembered and their own retrieval cues rather than when they are confronted with fixed materials and predetermined retrieval cues (Beck and McBee, 1995; Eich and Metcalfe, 1989). It seems that the more a person needs to rely on self-constructed information, the more likely that memory for corresponding events will be mood-dependent. Eich et al. (1994) confirmed this, reporting that mood dependence effects were markedly greater when the recalled events were self-generated. Recall was consistently better when encoding mood and retrieval mood were matched rather than different, and this effect pattern was obtained with different mood induction methods (Eich et al., 1994; Eich, 1995b). Similar mood dependence in memory was demonstrated in bipolar patients (Eich et al., 1997). Mood-dependent memory is also enhanced when the intensity, authenticity, or distinctiveness of encoding, and retrieval moods is high rather than low (Eich, 1995a; Eich and Macaulay, 2000; Eich and Metcalfe, 1989; Ucros, 1989).

Given that individual differences in personality play an important part in mood-congruent memory (Bower and Forgas, 2000; Smith and Petty, 1995), such factors may also moderate mood-state dependent memory. Thus, mood-state dependent memory is less likely to occur in experiments that employ simple, irrelevant tasks, such as list-learning experiments, and when the mood induction is weak and not particularly distinctive to be effective as a retrieval cue. In terms of the affect infusion model (Forgas, 1995, 2002), the higher the level of constructive processing and affect infusion that occurs both at the encoding and at the retrieval stages, the more likely that mood-dependence can be demonstrated.

Mood Congruence in Inferences and Associations

In terms of the associative network model, the selective priming of mood-consistent materials in memory can have a particularly marked influence on how complex or ambiguous information is interpreted (Bower and Forgas, 2000; Clark and Waddell, 1983). For example, people generated more mood-congruent ideas when daydreaming or free associating to projective thematic apperception test (TAT) pictures, and happy subjects generated more positive than negative associations to words, such as *life* (e.g., *love* and *freedom* vs. *struggle* and *death*) than did sad subjects (Bower, 1981).

The selective priming and activation of mood-congruent constructs can have particularly strong effects on constructive social judgments, such as perceptions of faces (Forgas and East, 2008a; Gilboa-Schechtman et al., 2002; Schiffrinbauer, 1974), impressions of people (Forgas and Bower, 1987), and self-perceptions (Sedikides, 1995). These associative effects on inferences and associations are again diminished when the targets to be judged are more simple and clear-cut (Forgas, 1994, 1995), confirming that open, constructive processing is crucial for mood congruence to occur.

Mood Congruence in Social Judgments

Consistent with the affect infusion model, several studies have found that the more people need to think in order to compute a judgment, the greater the likelihood that affectively primed ideas will influence the outcome. For example, mood had a greater influence on judgments about unusual, complex characters that require more constructive and elaborate processing than on judgments of simple, typical targets (Forgas, 1992). Mood also had a greater influence on judgments about unusual, badly matched couples than on typical, well-matched couples (Forgas, 1993).

Judgments about one's real-life partners showed similar mood congruence (Forgas, 1994). Mood significantly influenced the evaluation of one's partner and relationship conflicts, and paradoxically, these effects were stronger for judgments about complex, difficult conflicts that required more constructive processing, confirming that affect infusion into social judgments depends on the processing strategy recruited by the task at hand. Some personality characteristics, such as trait anxiety, may moderate such mood congruence effects on judgments, as highly anxious people are less likely to process information in an open, constructive manner (Ciarrochi and Forgas, 1999). Affect intensity may be another important trait moderator of mood congruence effects, as people who scored high on measures assessing openness to feelings showed greater mood congruence (Ciarrochi and Forgas, 2000).

Moods also exert an important influence on self-related judgments (Sedikides, 1995). Students in a positive mood were more likely to claim credit for success in a recent exam, and made more internal and stable attributions for their high test scores, but were less willing to assume personal responsibility for failure. Those in a negative mood engaged in more self-deprecating attributions and blamed themselves more for failure and took less credit for success (Forgas et al., 1990). These findings were replicated in a study by Detweiler-Bedell and Detweiler-Bedell (2006), who concluded that consistent with the AIM, "constructive processing accompanying most self-judgments is critical in producing mood-congruent perceptions of personal success" (p. 196).

Social judgments about the self also show similar mood effects. [Sedikides \(1995\)](#) also found support for the AIM, reporting that well-rehearsed “central” conceptions of the self were processed more automatically and less constructively and thus were less influenced by mood than were “peripheral” self-conceptions that required more substantive processing and showed stronger mood congruence. Individual differences in self-esteem may also influence affect infusion into self-judgments, as mood-congruent effects on self-related memories were stronger for low rather than high self-esteem people ([Smith and Petty, 1995](#)). These findings are in line with the principle that low self-esteem persons have a less clearly defined and less stable self-concept that is more likely to be influenced by prevailing mood ([Brown and Mankowski, 1993](#)).

Consistent with the AIM, these results show that low self-esteem is linked to the more open and constructive processing of information about the self, increasing the scope for mood-related associations to influence the outcome. Other work suggests that mood congruence may sometimes be a self-limiting process and can be spontaneously corrected as a result of shifting to the motivated processing strategy. For example, initially mood-congruent thoughts can be spontaneously reversed over time ([Sedikides, 1994](#)). Further research by [Forgas and Ciarrochi \(2002\)](#) replicated these results and found that the spontaneous reversal of negative self-judgments was strongest in people with high self-esteem, suggesting the operation of a homeostatic process of mood management.

Mood-Congruence in Social Behaviors

Social interaction is a complex and cognitively demanding process, and planning strategic social behaviors necessarily requires some degree of constructive, open information processing ([Heider, 1958](#)), suggesting that moods may also produce distinct behavioral effects. Positive mood, by priming positive evaluations and inferences, should elicit more optimistic, positive, confident, and cooperative behaviors, whereas negative mood may produce more avoidant, defensive, and unfriendly behaviors. In one experiment, happy or sad mood was induced in people before they engaged in a strategic negotiation task ([Forgas, 1998a](#)). Those in a happy mood employed more trusting, optimistic, and cooperative negotiating strategies, and achieved better outcomes, while those in a negative mood were more pessimistic and competitive in their negotiating moves. Other experiments examined the effects of induced mood on the way people formulate and use verbal requests ([Forgas, 1999a](#)). These studies found that due to more optimistic inferences about the receptiveness/willingness of the persons receiving the request, positive mood resulted in more confident and less polite request formulations. In contrast, negative affect triggered a more cautious, polite, and elaborate requesting strategy as a

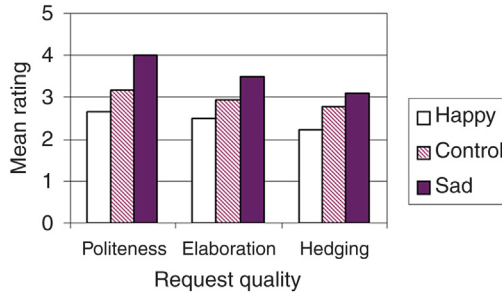


FIGURE 3.1 Mood effects on naturally produced requests. Positive mood increases, and negative mood decreases the degree of politeness, elaboration, and hedging in strategic communications. *Source: After Forgas, J.P., 1999b. Feeling and speaking: mood effects on verbal communication strategies. Person. Soc. Psychol. Bull. 25, 850–863.*

result of rather pessimistic inferences regarding the request’s chance of success (Fig. 3.1).

A further unobtrusive exploration of these mechanisms showed that moods also influence how people *respond* to an impromptu request (Forgas, 1998b). Mood was induced by leaving folders containing mood-inducing materials (pictures as well as text) on empty library desks. After occupying the desks and examining the mood induction materials, students received an unexpected polite or impolite request from a confederate asking for paper needed to complete an essay. Results revealed a clear mood-congruent response pattern: negative mood resulted in less compliance and more critical, negative evaluations of the request and requester, whereas positive mood yielded the opposite results. Again, the effects were stronger when the request was formulated in an unusual and impolite way and therefore recruited more substantive processing.

Some strategic interpersonal behaviors, such as *self-disclosure*, are critical for the development and maintenance of intimate relationships, for mental health, and for social adjustment. It seems that by facilitating mood-congruent associations and inferences about a conversational partner, affective states can directly influence people’s preferred self-disclosure strategies (Forgas, 2011a). Several recent experiments found that, consistent with the predicted mood congruence effects, those in a positive mood are more confident and optimistic and preferred to disclose information that was more intimate, more varied, more abstract, and more positive than was the case for people in a neutral mood. Interestingly, negative affect had exactly the opposite effect and resulted in less intimate, less varied, and less abstract disclosure (Fig. 3.2), and this pattern was even stronger when the conversational partner reciprocated with a high degree of disclosure.

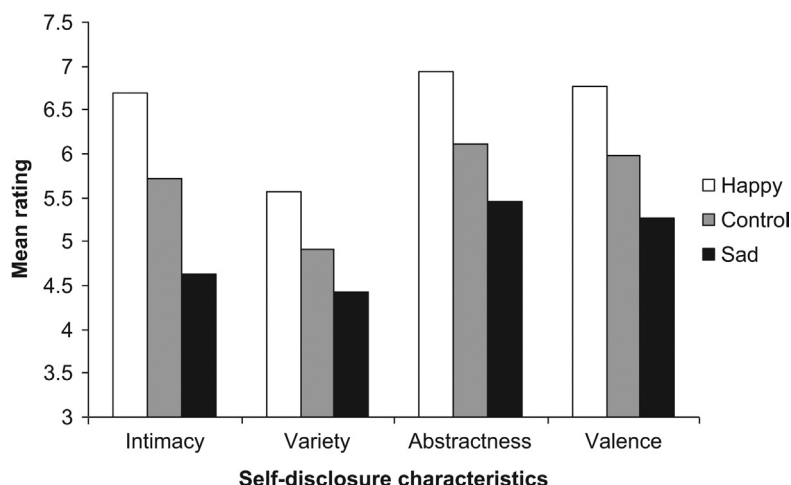


FIGURE 3.2 The effects of positive, neutral, and negative mood on the intimacy, variety, abstractness, and valence of self-disclosing messages. Mean number of target items seen in a shop recalled as a function of the mood (happy vs. sad) induced by the weather.

Thus, these experiments provide convergent evidence that temporary fluctuations in mood can produce marked changes in the quality, valence, and reciprocity of strategic interpersonal behaviors, such as self-disclosure, suggesting that mood congruence is likely to occur in the context of many other unscripted and unpredictable strategic interpersonal behaviors. When considered jointly, the evidence shows that transient moods play an important informative function, influencing the content and valence of memory, attention, associations, inferences, judgments, and social behaviors in a predominantly mood-congruent way.

However, these effects are dependent on the information processing strategy adopted, with open, constructive processing more likely to be influenced by moods than are other kinds of processing strategies (Forgas, 1995, 2002). When such substantive processing is used, affective priming appears to be the most likely mechanism responsible for mood congruence effects (Bower, 1981), while some evaluative judgments made under suboptimal processing conditions may also become mood congruent as a result of the heuristic affect-as-information mechanism. The overall pattern of results seems consistent with the AIM, suggesting that mood congruence is unlikely when a task can be performed using simple, well-rehearsed direct access or motivated processing, as there is little opportunity for moods to influence cognition. According to the AIM, mood congruence is most likely when individuals engage in substantive, constructive processing.

Mood Effects on Information Processing Strategies

We shall now turn to the second major influence that mood has on cognition. The evidence surveyed so far clearly shows that mood states can have a significant *informational* influence on the content and valence of cognition, producing mood-congruent effects on memory, attention, associations, judgments, and social behaviors. In addition to influencing cognitive content, that is, *what* people think, moods may also influence the process of cognition, that is, *how* people think. This section will review evidence for the information processing consequences of moods. In the past few decades, a growing number of studies suggested that people experiencing a positive mood rely on a more superficial and less effortful information processing strategy (Forgas, 2013, 2015).

Those in a good mood were consistently found to reach decisions more quickly, used less information, avoided systematic and demanding thinking, and, ironically, appeared more confident about their decisions. In contrast, negative mood apparently triggered a more effortful, systematic, analytic, and vigilant processing style (Clark and Isen, 1982; Isen, 1984, 1987; Schwarz, 1990). Nevertheless, more recent studies show that positive mood sometimes produces distinct processing advantages. For instance, happy people tend to adopt a more creative, open, and inclusive thinking style, use broader cognitive categories, show greater mental flexibility, and perform better on secondary tasks (Bless and Fiedler, 2006; Fiedler, 2001; Fredrickson, 2009; Hertel and Fiedler, 1994; Isen and Daubman, 1984).

How can we explain these mood-induced processing differences? Early explanations emphasized the *motivational* consequences of good and bad moods. According to the *mood maintenance/mood repair* hypothesis, those in a positive mood may be motivated to maintain this rewarding state by avoiding effortful activity, such as elaborate information processing. In contrast, a negative mood should motivate people to engage in more vigilant, effortful information processing as an adaptive strategy to relieve their aversive state (Clark and Isen, 1982; Isen, 1984, 1987). More recently, several studies also showed that the cognitive consequences of affective states may depend on whether the mood state is high or low in approach motivational intensity. For example, positive affect with low specific approach motivation toward a goal seems to broaden cognitive categorization and attention, but positive affect linked to high approach motivation towards a particular goal tends to narrow cognitive categorization (Fredrickson, 2009).

A somewhat different *cognitive tuning* account (Schwarz, 1990) argues that positive and negative moods have a fundamental signaling/tuning function, informing the person whether a relaxed, effort-minimizing (positive mood) or a vigilant, effortful (negative mood) processing style is

required. Both these models emphasize a functionalist/evolutionary view regarding moods as fulfilling adaptive functions (Forgas et al., 2008).

Yet another theory focuses on the impact of moods on *information processing capacity*, suggesting that mood states may influence processing style because they take up scarce processing capacity. Curiously, both positive mood (Isen, 1984) and negative mood (Ellis and Ashbrook, 1988) are hypothesized to reduce processing capacity. However, as positive and negative mood clearly promote qualitatively different processing styles, it is unlikely that the conflicting capacity reduction explanations put forward by Isen (1984) and Ellis and Ashbrook (1988) are both correct.

THE ASSIMILATION/ACCOMMODATION MODEL

Most of the earlier explanations of mood effects on information processing suggest that moods influence processing style by altering the degree of motivation, vigilance, and effort exerted. However, this view has been challenged by some experiments demonstrating that positive mood does not necessarily impair processing effort, as performance on simultaneously presented secondary tasks was not impaired (Fiedler, 2001; Hertel and Fiedler, 1994). A recent integrative theory, Bless and Fiedler's (2006) assimilation/accommodation model suggests that the fundamental, evolutionary significance of moods lies not so much in regulating processing effort, but rather, in triggering equally effortful but qualitatively different *processing styles*. The model identifies two complementary adaptive functions, *assimilation* and *accommodation* (Piaget, 1954). Assimilation means to impose internalized structures onto the external world, whereas accommodation means to modify internal structures in accordance with external constraints.

Thus, according to the model, "the adaptive function of positive mood is to facilitate assimilation, whereas the role of negative mood is to strengthen accommodation functions" (Bless and Fiedler, 2006; p. 66). Several lines of evidence now support the assimilative/accommodative processing dichotomy. For example, those in a positive mood tend to use broader, more assimilative cognitive categories (Fredrickson, 2009; Isen, 1984), sorted stimuli into fewer and more inclusive groups (Isen and Daubman, 1984), and classified behavioral descriptions into fewer and more inclusive types (Bless et al., 1992a). Positive affect also recruited more assimilative and abstract representations in language choices, as happy people generated more abstract and general event descriptions than did sad participants (Beukeboom, 2003), and were more likely to retrieve a generic rather than specific representation of a persuasive message (Bless et al., 1992b). Negative mood was also found to improve people's ability to detect ambiguous, unclear verbal messages, and to conform more

closely to Grice's conversational postulates (Koch et al., 2013; Matovic et al., 2014). Similar mood-induced effects on processing style were found with nonverbal tasks. For example, happy mood resulted in greater focus on the global rather than the local features of geometric patterns (Gasper and Clore, 2002; Sinclair, 1988).

How can we best explain these pervasive mood-induced differences in processing style? Bless and Fiedler (2006) suggest that moods perform an adaptive function essentially preparing us to respond to different environmental challenges. Positive mood indicates that the situation is safe and familiar, and that existing knowledge can be relied upon. In contrast, negative mood functions like a mild alarm signal, indicating that the situation is novel and unfamiliar, and that the careful monitoring of new, external information is required.

There is supporting evidence suggesting that positive affect increases, and negative affect decreases the tendency to rely on internal knowledge rather than external information in cognitive tasks, resulting in a selective memory bias for self-generated information (Bless et al., 1992b; Fiedler et al., 2003). The theory thus predicts that *both* positive and negative mood can produce processing advantages albeit in response to different situations requiring different processing styles. Given the almost exclusive emphasis on the benefits of positive affect in our culture, this is an important message with some intriguing real-life implications. Numerous studies now suggest that negative mood can produce definite processing advantages in situations when the careful and detailed monitoring of new, external information is required, as we shall see later.

MOOD EFFECT ON MEMORY PERFORMANCE

If negative mood indeed recruits a more accommodative, externally focused processing style, then it should result in improved memory for incidentally encountered information. This is one key area where the processing consequences of good or bad moods have been explored. In one experiment, happy or sad subjects read a variety of essays advocating alternative positions on public policy issues. Later, their cued recall memory of the essays was assessed (Forgas, 1998b, Exp. 3). Results showed that those in a negative mood remembered the details of the essays significantly better than those in a happy mood, consistent with negative mood promoting more externally focused, accommodative thinking.

This effect was subsequently further explored in a field experiment, when happy or sad shoppers (on sunny or rainy days, respectively) saw a variety of small objects displayed on the check-out counter of a local news agency. After leaving the store, they were asked to recall and



FIGURE 3.3 The interaction between mood and the presence or absence of misleading information on eye-witness memory. Positive mood increased and negative mood decreased the tendency to incorporate false, misleading details into eye-witness reports (false alarms).

recognize the objects they had seen on the check-out counter. It turned out that mood, induced by the weather, had a significant effect. Those in a negative mood (on rainy days) had significantly better memory for what they had seen in the shop than did happy people (on sunny days), confirming that mood states have a subtle but reliable memory effect, and negative mood actually improves memory for incidentally encountered information (Fig. 3.3).

A series of further experiments explored mood effects on eye-witness memory, predicting that, due to promoting more assimilative thinking (Isen, 1987), positive affect should increase, and negative affect should decrease, the tendency of eye-witnesses to incorporate false details into their memories (Forgas et al., 2005). In one study (Forgas et al., 2005, Exp. 1), participants viewed pictures of a car crash (negative event) and a wedding party (positive event). After 1 h, they received a mood induction (recalling happy or sad events from their past) and answered questions about the initially viewed scenes that either contained or did not contain misleading, false information. After a further 45-min interval, the accuracy of their eye-witness memory for the two scenes was tested. As predicted, positive mood increased, and negative mood decreased the amount of false, misleading information incorporated (assimilated) into their eye-witness memories. In contrast, negative mood almost completely eliminated this “misinformation effect,” improving eyewitness memory as confirmed by a signal detection analysis.

In a second, more realistic experiment students witnessed a staged 5-min aggressive encounter between a lecturer and a female intruder (Forgas et al., 2005, Exp. 2). One week later, while in a happy or sad mood, they received a questionnaire that either did or did not contain planted,

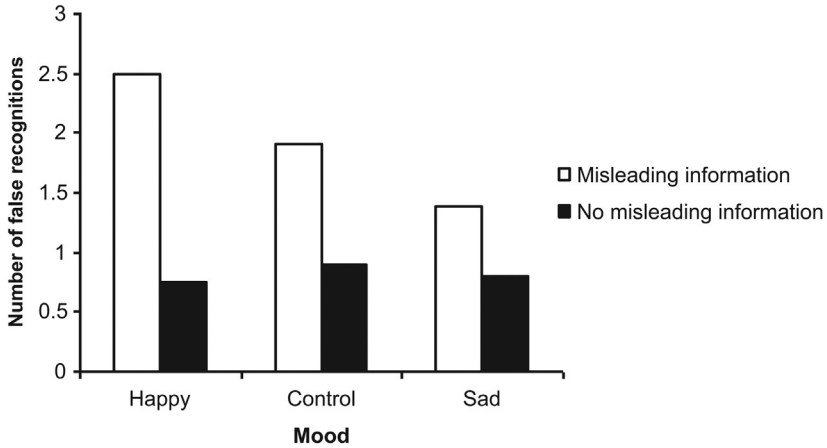


FIGURE 3.4 Mood effects on the tendency to incorporate misleading information into eyewitness memory (Experiment 2). Negative mood reduced, and positive mood increased eyewitness distortions due to misleading information (false alarms) Source: After Forgas, J.P., Vargas, P., Laham, S., 2005. Mood effects on eyewitness memory: affective influences on susceptibility to misinformation. *J. Exp. Soc. Psychol.* 41, 574–588.

misleading information. After a further interval, their eye-witness memory was assessed. Those in a happy mood when exposed to misleading information were more likely to assimilate false details into their memory. In contrast, negative mood eliminated this source of error in eye-witness memory, consistent with negative mood recruiting more accommodative processing and thus improving subject’s ability to discriminate between correct and misleading details (Fig. 3.4).

In a further experiment in this series, participants saw videotapes showing (1) a robbery and (2) a wedding scene. After a 45-min interval, they received an audio-visual mood induction and completed a short questionnaire that either contained or did not contain misleading information about the events. Additionally, some were instructed to “disregard and control their affective states.” Exposure to misleading information reduced eye-witness accuracy most when people were in a happy rather than a sad mood. However, direct instructions to control one’s affect proved ineffective to reduce this mood effect.

Conceptually, similar results were reported by [Storbeck and Clore \(2011\)](#), who found that “individuals in a negative mood were significantly less likely to show false memory effects than those in positive moods” (p. 785). These authors explain their findings in terms of the affect-as-information mechanism. These experiments offer convergent evidence that negative moods recruit more accommodative thinking and therefore can improve memory performance by means of reducing

susceptibility to misleading information. Paradoxically, happy mood *reduced* eye-witness accuracy yet *increased* subjective confidence, suggesting that judges were unaware of the processing consequences of their mood states.

MOOD EFFECTS ON JUDGMENTAL ACCURACY

Is it possible that mood states, through their influence on processing style, may also improve or impair the accuracy of our social judgments? For example, can good or bad mood influence the common tendency for people to form evaluative judgments based on their first impressions? One recent experiment examined mood effects on this “primacy effect,” which occurs because people pay disproportionate attention to early rather than later information when forming impressions (Forgas, 2011b). After an autobiographical mood induction (recalling happy or sad past events), participants formed impressions about a character (Jim) described either in an introvert–extrovert or an extrovert–introvert sequence. As primacy effects occur because of the assimilative processing of later information, the subsequent impression formation judgments revealed that positive mood significantly increased the primacy effect by recruiting more top-down, assimilative processing. In contrast, negative mood, by recruiting a stimulus-based, accommodative processing style, almost eliminated the primacy effect.

Social perceivers are also often influenced by the relative salience or fluency of the targets. More visible and easier to process targets are often perceived as more important and influential than are less visible and fluent targets. It was found in a recent study that moods can also influence these judgmental effects (Forgas, 2015). In this experiment, perceivers had to form impressions about individuals based on a recorded conversation between them. Visual salience and fluency was manipulated by showing one target in a large, color picture and the other target in a small, black and white picture, and these manipulations were counterbalanced. The visual salience of the photos had a significant influence on impressions, with the more visible targets judged as more important and influential. However, mood again significantly mediated this effect: positive mood increased, and negative mood reduced salience effects on impressions (Forgas, 2015).

Many common judgmental errors in everyday life occur because people are imperfect and often inattentive information processors. For example, the *fundamental attribution error* (FAE) or *correspondence bias* refers to the pervasive tendency by people to infer intentionality and internal causation and underestimate the impact of situational constraints and forces when making judgments about the behavior of others (Gilbert

and Malone, 1995). This error occurs because people focus on central and salient information, that is, the actor, whereas they ignore equally relevant but less salient information about external influences on the actor (Gilbert and Malone, 1995).

As negative mood promotes vigilant, detail-oriented processing, it should reduce the incidence of the FAE by directing greater attention to external influences on actors. This prediction was tested in one experiment (Forgas, 1998c) where happy or sad subjects read an essay and made attributions about its writer advocating a popular or unpopular position (for or against nuclear testing). The writer's position was described as either assigned (implies external causation) or freely chosen (implies internal causation). Results showed that happy persons were more likely and sad people were less likely than controls to commit the FAE by incorrectly inferring an internally caused attitude based on a coerced essay. Such mood-induced differences in judgmental accuracy do occur in real life. In a field study (Forgas, 1998c), happy or sad participants (after watching happy or sad movies) read essays and made attributions about writers advocating popular positions (pro recycling) or unpopular positions (contra recycling).

Again, positive affect increased and negative affect decreased the tendency to mistakenly infer internally caused attitudes based on coerced essays. In a further study, recall of the essays was additionally assessed as an index of processing style (Forgas, 1998c, Exp. 3). Negative mood again reduced and positive mood increased the incidence of the FAE. Recall memory data confirmed that those in a negative mood remembered more details, indicating enhanced accommodative processing. Furthermore, a mediation analysis showed that this mood-induced difference in processing style significantly mediated the observed mood effects on the incidence of the FAE. We should note, however, that negative mood only improves judgmental accuracy when relevant stimulus information is actually available. Ambady and Gray (2002) found that in the absence of diagnostic details, "sadness impairs [judgmental] accuracy precisely by promoting a more deliberative information processing style" (p. 947).

MOOD EFFECTS ON SKEPTICISM AND THE DETECTION OF DECEPTION

Many messages, such as most interpersonal communications, are by their very nature ambiguous and not open to objective validation. Much of our knowledge about the world is based on such second-hand information we receive from others. Only some claims (such as "urban myths") can potentially be evaluated against objective evidence, although such

testing is usually not practicable. One of the most important cognitive tasks people face in everyday life is to decide whether to trust and accept, or distrust and reject social information. Rejecting valid information (excessive skepticism) is just as dangerous as accepting invalid information (gullibility).

What determines whether the information we come across in everyday life is judged true or false? There is some recent evidence that by recruiting assimilative or accommodative processing, mood states may significantly influence skepticism and gullibility (Forgas and East, 2008a,b). For example, one study asked happy or sad participants to judge the probable truth of a number of urban legends and rumors. Positive mood promoted greater gullibility for novel and unfamiliar claims, whereas negative mood promoted skepticism, which is consistent with the more externally focused, attentive, and detail-oriented accommodative thinking style. In another experiment, participants' recognition memory was tested 2 weeks after initial exposure to true and false statements taken from a trivia game. Only sad participants were able to correctly distinguish between the true and false claims they had seen previously. In contrast, happy participants tended to rate all previously seen and thus familiar statements as true (in essence, a fluency effect).

This pattern suggests that happy mood produced reliance on the "what is familiar is true" heuristic, whereas negative mood conferred a clear cognitive advantage improving judges' ability to accurately remember the truth or untruth of the statements. Unlike many "urban myths," interpersonal communications are often intrinsically ambiguous and have no objective truth value (Heider, 1958). Accepting or rejecting such messages is particularly problematic, yet critically important for effective social interaction. It turns out that mood effects on processing style may also influence people's tendency to accept or reject interpersonal communications as genuine. People in a negative mood were significantly less likely and those in a positive mood were more likely to accept various facial expressions communicating feelings as authentic (Forgas and East, 2008a). Taking this line of reasoning one step further, does mood, through its effect on processing styles, influence people's ability to detect deception? In one study, happy or sad participants watched videotaped interrogations of suspects accused of theft who were either guilty or not guilty of this offence (Forgas and East, 2008b). Surprisingly, those in a more happy mood were more gullible, as they accepted more denials as true. In contrast, sad mood resulted in more guilty judgments, and actually improved the participants' ability to correctly identify targets as deceptive (guilty) or honest, consistent with a more accommodative processing style (Fig. 3.5). These experiments offer convergent evidence that negative mood increases skepticism, and may significantly improve people's ability to accurately detect deception.

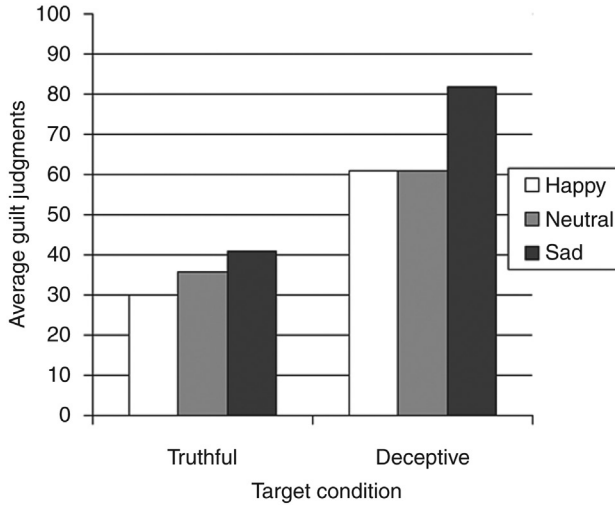


FIGURE 3.5 The effects of mood and the target’s veracity (truthful, deceptive) on judgments of guilt of targets accused of committing a theft (average percentage of targets judged guilty in each condition). *Source: After Forgas, J.P., East, R., 2008. On being happy and gullible: mood effects on skepticism and the detection of deception. Exp. Soc. Psychol. 44, 1362–1367.*

MOOD EFFECTS ON STEREOTYPING

Assimilative processing in positive mood should promote, and accommodative processing in negative mood should reduce the use of pre-existing knowledge structures, such as stereotypes. In several studies, Bodenhausen (1993) and Bodenhausen et al. (1994) found that happy participants relied more on ethnic stereotypes when evaluating a student accused of misconduct, whereas negative mood reduced this tendency. Generally speaking, sad individuals tend to pay greater attention to specific, individuating information when forming impressions of other people (Bless et al., 1996).

Similar effects were demonstrated in a recent experiment where happy or sad subjects had to form impressions about the quality and other aspects of a brief philosophical essay allegedly written by a middle-aged male academic (stereotypical author) or by a young, alternative-looking female writer (atypical author). Results showed that happy mood increased the judges’ tendency to be influenced by irrelevant stereotypical information about the age and gender of the author. In contrast, negative mood eliminated this effect (Forgas, 2011c). Again, this pattern is entirely consistent with the predicted assimilative versus accommodative processing style recruited by good or bad moods, respectively (Fig. 3.6).

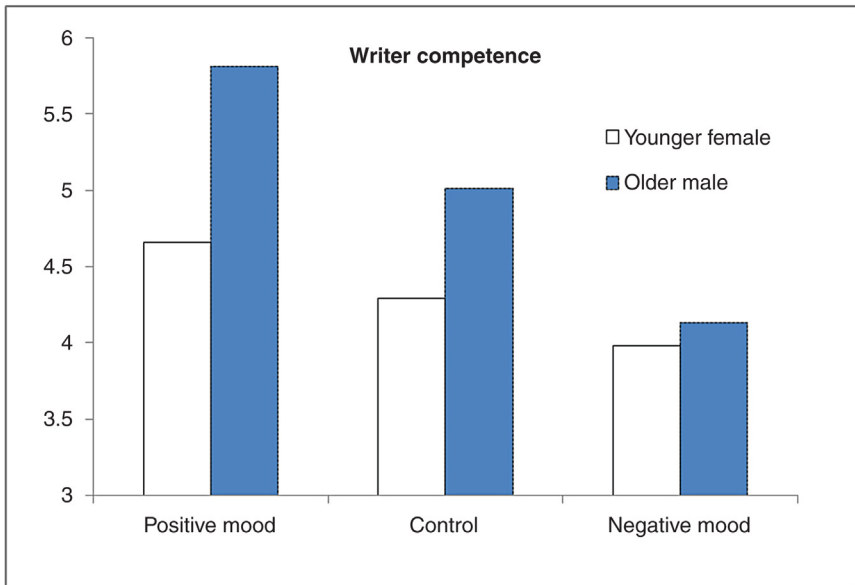


FIGURE 3.6 Mood moderates the incidence of stereotype effects on the evaluation of the writer of an essay. Positive mood increased, and negative mood eliminated the stereotype effects associated with the appearance of the writer. *After Forgas, 2011.*

Could mood-induced differences in processing style also influence reliance on stereotypes in actual social behaviors? We tested this prediction by asking happy or sad people to generate rapid responses to targets that appeared or did not appear to be Muslims, using the “shooter’s bias” paradigm to assess subliminal aggressive tendencies (Correll et al., 2002). In this task, people are instructed to rapidly shoot at targets only when they carry a gun. Prior work with this paradigm showed that US citizens display a strong implicit bias to shoot more at Black rather than White targets (Correll et al., 2002, 2007).

We expected a “turban effect,” that is, Muslim targets may elicit a similar bias. We used morphing software to create targets who did, or did not appear Muslim (wearing or not wearing a turban or the hijab) and who either held a gun, or held a similar object (e.g., a coffee mug; Fig. 3.7). Participants indeed shot more at Muslims rather than non-Muslims, but the most intriguing finding was that negative mood actually *reduced* this selective response tendency fueled by negative stereotypes (Unkelbach et al., 2008). Positive mood in turn increased the shooter’s bias against Muslims, consistent with a more top-down, heuristic assimilative processing style (Bless and Fiedler, 2006; Forgas, 2007). Thus, mood effects on information processing styles may extend to influencing actual aggressive behaviors based on stereotypes as well.

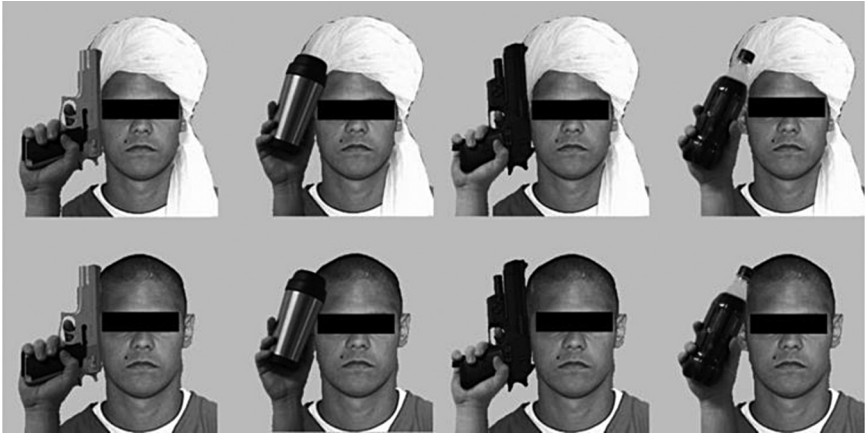


FIGURE 3.7 The turban effect: stimulus figures used to assess the effects of mood and wearing or not wearing a turban on subliminal aggressive responses. Participants had to make rapid shoot/don't shoot decisions in response to targets who did or did not hold a gun, and did or did not wear a Muslim head-dress (a turban).

MOOD EFFECTS ON INTERPERSONAL STRATEGIES

It has long been suspected that one of the possible benefits of negative affect may have to do with its interpersonal functions. Evolutionary psychologists, puzzled by the ubiquity of dysphoria, have speculated that negative affective states may provide hidden cognitive and social benefits (Forgas et al., 2007; Tooby and Cosmides, 1992). In situations where greater attention to new information and more accommodative processing is required, negative mood may provide significant processing benefits (Forgas, 2011a, 2015). However, there is growing evidence that in other situations where more cautious and less assertive behaviors are appropriate, it may be negative affect that produces real interpersonal benefits.

Mood effects on communication strategies. Effective interpersonal communication may be improved by processing external information in a more attentive and accommodative fashion. For instance, moods may optimize the way people process, produce, and respond to persuasive messages. In a number of studies, participants in sad moods showed greater attentiveness to message quality, and were more persuaded by strong rather than weak arguments. In contrast, those in a happy mood were not influenced by message quality, and were equally persuaded by strong and weak arguments (Bless et al., 1990, 1992b; Bohner et al., 1992; Sinclair et al., 1994; Wegener and Petty, 1997).

Further, mood states may also influence the *production* of persuasive messages. In one experiment, participants received an audio-visual mood

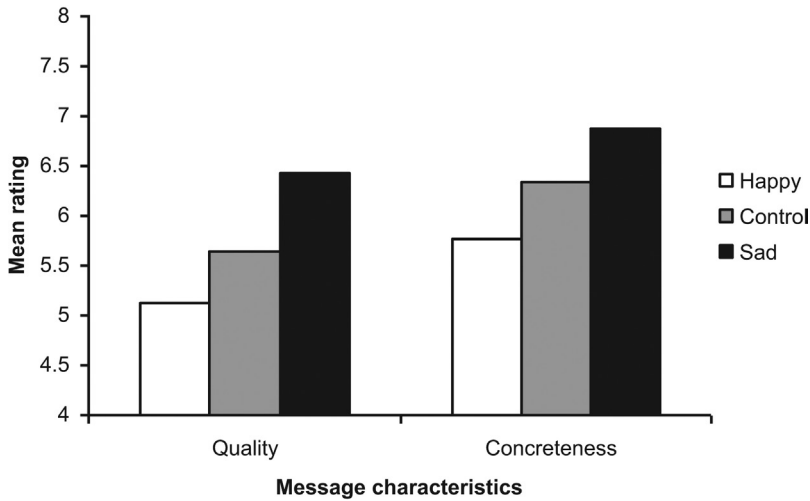


FIGURE 3.8 Mood effects on the quality and concreteness of the persuasive messages produced. Negative affect increased the degree of concreteness of the arguments produced, and arguments produced in negative mood were also rated as more persuasive.

induction and were then asked to produce effective persuasive arguments for or against (1) an increase in student fees, and (2) Aboriginal land rights (Forgas, 2007). As expected, results showed that participants in a sad mood produced higher quality, more effective persuasive arguments on both issues than did happy participants. A mediation analysis revealed that it was mood-induced variations in argument concreteness that mediated the observed differences in argument quality, consistent with the prediction that negative mood should recruit a more externally oriented, concrete, and accommodative processing style (Bless, 2001; Bless and Fiedler, 2006; Fiedler, 2001; Forgas, 2002). Similar effects were found when happy and sad people produced persuasive arguments for a “partner” to volunteer for a boring experiment using e-mail exchanges (Forgas, 2007). Once again, negative affect produced a processing benefit, resulting in more concrete and more effective persuasive messages (Fig. 3.8).

In a series of more recent studies, Koch et al. (2013) looked at the ability of people in positive and negative moods to detect subtle ambiguities in verbal communication. Their results showed that those in a negative mood were significantly better in identifying imprecise and ambiguous messages than were participants in a positive mood. In a further exploration of mood effects on effective communication, Matovic et al. (2014) investigated the effects of mood states on people’s tendency to conform to good communication norms, by obeying Grice’s communicative principles. Once again, negative mood significantly improved communication quality, and messages produced in negative mood were significantly more

compliant with Gricean norms of effective communication. These results clearly support the idea that negative affect, by recruiting more accommodative and attentive processing, can improve communication effectiveness.

Mood effects on selfishness versus fairness. Intriguingly, the possibility that affective states may also influence interpersonal selfishness and fairness has received little attention in the past. Economic games offer a reliable and valid method to study interpersonal strategies, such as fairness, selfishness, trust, and cooperation. Induced moods may influence the degree of *selfishness* versus *fairness* people display when allocating resources among themselves and others (Forgas and Tan, 2013a,b; Tan and Forgas, 2010). Positive mood, by increasing internally focused, assimilative processing may promote greater selfishness, and in contrast, negative mood, by improving attention to external situational norms and expectations, may improve fairness. We investigated these predictions using two economic games, the *dictator game* and the *ultimatum game*. In the dictator game, an allocator can distribute resources to him/herself and to another person any way he/she likes. In the ultimatum game, the recipient also has to approve the decision—if rejected, neither party receives anything. In such games, proposers face a conflict between being selfish or fair (Güth et al., 1982), and their decisions may be open to affective influences.

In several experiments, we tested the hypothesis that (1) positive mood should increase, and negative mood decrease selfishness by allocators in both the dictator, and in the ultimatum games, and (2) receivers in the ultimatum game should also show greater concern with fairness, and paradoxically, should reject unfair offers more when they are in a negative rather than in a positive mood. Tan and Forgas (2010) found that happy allocators in the dictator game were significantly more selfish than sad players. In a follow-up experiment using a series of eight allocation decisions, those in a sad mood were again fairer and less selfish than happy individuals (Fig. 3.9).

These mood effects on fairness also endure in the more complex decisional environment faced by players in the ultimatum game (Forgas and Tan, 2013a). As hypothesized, those in a negative mood allocated significantly more resources to others than did happy individuals, and these mood effects could be directly linked to the predicted differences in processing style, as sad individuals took longer to make allocation decisions than did happy individuals, consistent with their expected more accommodative and attentive processing style.

Mood also influenced the behavior of responders (Forgas and Tan, 2013b) in the ultimatum game. Responders in a negative mood were also more concerned with external fairness norms, and were more likely to reject unfair offers. Overall, 57% of those in negative mood rejected unfair

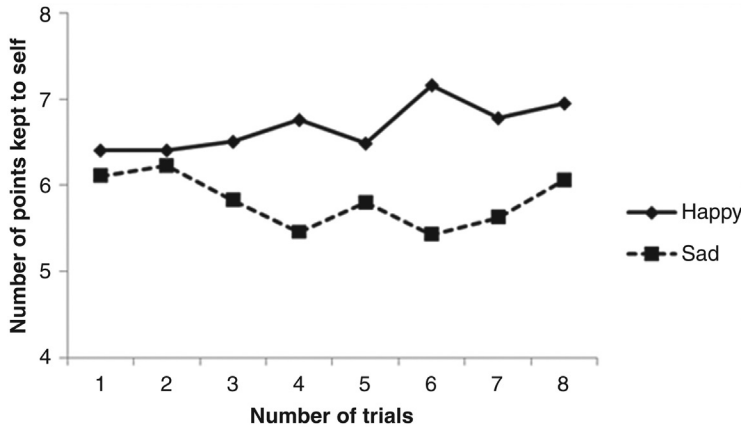


FIGURE 3.9 The effects of mood on selfishness versus fairness. Happy persons kept more rewards to themselves, and negative mood increased fairness toward others in reward allocations over 8 trials, this effect becomes even more pronounced in later trials. *Source: After Tan, H.B., Forgas, J.P., 2010. When happiness makes us selfish, but sadness makes us fair: affective influences on interpersonal strategies in the dictator game. J. Exp. Soc. Psychol. 46, 571–576.*

offers compared to only 45% in the positive condition, consistent with processing theories that predict that negative mood should increase and positive mood reduce attention to external fairness norms. Paying greater attention to external information, such as fairness norms when in a bad mood is also in line with other findings showing that negative mood increases attention to external information and improves eyewitness memory, reduces stereotyping, increases politeness, and reduces judgmental errors (Forgas, 1998a,b, 1999a,b; Forgas et al., 2009; Unkelbach et al., 2008).

These results further challenge the common assumption in much of applied, organizational, clinical and health psychology that positive affect has universally desirable social and interpersonal consequences. Rather, our findings confirm that negative affect often produces adaptive and more socially sensitive outcomes by recruiting a more attentive and accommodative processing style.

SUMMARY AND CONCLUSIONS

Human beings are a remarkably moody species. Affective states influence the way we think, remember and form inferences and judgments, as well as our interpersonal behaviors. So it is not surprising that understanding the relationship between feeling and thinking, affect and cognition has been one of the more enduring puzzles about human nature. From Plato to Pascal and Kant, a long line of Western philosophers have

devoted their time to analyze the ways that affect can influence our thinking and behaviors.

Despite a number of promising early studies, psychologists were relatively late to apply empirical methods to study mood effects on cognition. This chapter reviewed the current status of this important research area. It was suggested that the effects of mood on cognition can be classified into two major kinds of influences: *informational effects* impacting on the content and valence of thinking usually resulting in mood congruence, and mood effects on *processing strategies*, influencing how people deal with information.

Practical implications. Our contemporary culture places a powerful emphasis on the desirability and beneficial effects of positive mood. As even a cursory visit to the popular psychology section of any bookshop will prove, the achievement of positive affect seems to be the objective of most applied psychological interventions. However, as the results reviewed here clearly show, positive affect is not universally beneficial. Numerous experiments now demonstrate the potentially adaptive and beneficial processing consequences of negative moods. For instance, people in a negative mood are less prone to judgmental errors (Forgas, 1998c), are more resistant to eye-witness distortions (Forgas et al., 2005), are less likely to rely on stereotypes (Forgas, 2011c; Unkelbach et al., 2008), and are better at producing high-quality, effective persuasive messages (Forgas, 2007).

Given the consistency of findings across a number of different domains, tasks, and affect inductions, these effects appear reliable. Further, they are broadly consistent with the notion that over evolutionary time, affective states came to operate as adaptive, functional triggers to elicit information processing patterns that are appropriate in a given situation. In a broader sense, the results presented here suggest that the persistent contemporary cultural emphasis on positivity and happiness may be misplaced, given growing evidence for the important, adaptive benefits of both positive and negative mood states. Professionals working in applied areas, such as human factors, and HCI should also benefit from closer attention to the often adaptive benefits of negative mood.

We should also note however that the processing advantages of negative affect reported here apply only to mild, temporary negative moods, and do not necessarily generalize to more intense and enduring negative affective states, such as depression. Depression has debilitating cognitive consequences and does not necessarily produce more accommodative thinking. In a recent review article on the cognitive manifestation of depression, Gotlib and Joormann (2010) concluded that “depression is characterized by increased elaboration of negative information, by difficulties disengaging from negative material, and by deficits in cognitive control when processing negative information” (p. 285). According to this view,

the cognitive dysfunction inherent in depression can rather be described as of prolonged, gridlocked mood-congruent information processing, rather than better accommodation to situational requirements.

In conclusion, this chapter reviewed strong cumulative evidence showing that mood states have a powerful, yet often subconscious influence on *what* people think (content effects) as well as *how* people think (processing effects). As we have seen, research shows that these effects are often subtle and subject to a variety of boundary conditions and contextual influences. A better understanding of the complex interplay between mood and cognition remains one of the most important tasks for psychology as a science. A great deal has been achieved in the last few decades applying empirical methods to exploring this issue, but in a sense, the enterprise has barely begun. Hopefully this chapter, and the collection of papers in this volume in general, will stimulate further research exploring the fascinating relationship between mood and cognition.

References

- Adolphs, R., Damasio, A.R., 2001. The interaction of affect and cognition: a neurobiological perspective. In: Forgas, J.P. (Ed.), *Handbook of Affect and Social Cognition*. Erlbaum, Mahwah, NJ, pp. 27–49.
- Ambady, N., Gray, H., 2002. On being sad and mistaken: mood effects on the accuracy of thin-slice judgments. *J. Person. Soc. Psychol.* 83, 947–961.
- Beck, R.C., McBee, W., 1995. Mood-dependent memory for generated and repeated words: replication and extension. *Cogn. Emot.* 9, 289–307.
- Becker, M. W., Leinenger, M., 2011. Attentional selection is biased toward mood-congruent stimuli. *Emotion*.
- Beukeboom, C., 2003. *How Mood Turns on Language*. Doctoral dissertation, Free University of Amsterdam, Amsterdam.
- Blaney, P.H., 1986. Affect and memory: a review. *Psychol. Bull.* 99, 229–246.
- Bless, H., 2001. Mood and the use of general knowledge structures. In: Martin, L.L. (Ed.), *Theories of Mood and Cognition: A User's Guidebook*. Lawrence Erlbaum Associates, Mahwah, NJ, pp. 9–26.
- Bless, H., Fiedler, K., 2006. Mood and the regulation of information processing and behavior. In: Forgas, J.P. (Ed.), *Hearts and Minds: Affective Influences on Social Cognition and Behaviour*. Psychology Press, New York, pp. 65–84.
- Bless, H., Bohner, G., Schwarz, N., Strack, F., 1990. Mood and persuasion: a cognitive response analysis. *Person. Soc. Psychol. Bull.* 16, 331–345.
- Bless, H., Hamilton, D.L., Mackie, D.M., 1992a. Mood effects on the organization of person information. *Eur. J. Soc. Psychol.* 22, 497–509.
- Bless, H., Mackie, D.M., Schwarz, N., 1992b. Mood effects on encoding and judgmental processes in persuasion. *J. Person. Soc. Psychol.* 63, 585–595.
- Bless, H., Schwarz, N., Wieland, R., 1996. Mood and the impact of category membership and individuating information. *Eur. J. Soc. Psychol.* 26, 935–959.
- Bodenhausen, G.V., 1993. Emotions, arousal, and stereotypic judgments: a heuristic model of affect and stereotyping. In: Mackie, D.M., Hamilton, D.L. (Eds.), *Affect, Cognition, and Stereotyping*. Academic Press, San Diego, CA, pp. 13–37.
- Bodenhausen, G.V., Kramer, G.P., Süsser, K., 1994. Happiness and stereotypic thinking in social judgment. *J. Person. Soc. Psychol.* 66, 621–632.

- Bohner, G., Crow, K., Erb, H.P., Schwarz, N., 1992. Affect and persuasion: mood effects on the processing of message content and context cues. *Eur. J. Soc. Psychol.* 22, 511–530.
- Bousfield, W.A., 1950. The relationship between mood and the production of affectively toned associates. *J. Gen. Psychol.* 42, 67–85.
- Bower, G.H., 1981. Mood and memory. *Am. Psychol.* 36, 129–148.
- Bower, G.H., 1987. Commentary on mood and memory. *Behav. Res. Ther.* 25, 443–455.
- Bower, G.H., 1991. Mood congruity of social judgments. In: Forgas, J.P. (Ed.), *Emotion and Social Judgments*. Pergamon, Oxford, pp. 31–53.
- Bower, G.H., 1992. How might emotions affect learning? In: Christianson, S.A. (Ed.), *Handbook of Emotion and Memory*. Erlbaum, Hillsdale, NJ, pp. 3–31.
- Bower, G.H., Forgas, J.P., 2000. Affect, memory, and social cognition. In: Eich, E., Kihlstrom, J.F., Bower, G.H., Forgas, J.P., Niedenthal, P.M. (Eds.), *Cognition and Emotion*. Oxford University Press, New York, pp. 87–168.
- Bower, G.H., Mayer, J.D., 1985. Failure to replicate mood-dependent retrieval. *Bull. Psychon. Soc.* 23, 39–42.
- Bower, G.H., Mayer, J.D., 1989. In search of mood-dependent retrieval. *J. Soc. Behav. Person.* 4, 121–156.
- Brown, J.D., Mankowski, T.A., 1993. Self-esteem, mood, and self-evaluation: changes in mood and the way you see you. *J. Person. Soc. Psychol.* 64, 421–430.
- Byrne, D., Clore, G.L., 1970. A reinforcement model of evaluation responses. *Person. Int. J.* 1, 103–128.
- Ciarrochi, J.V., Forgas, J.P., 1999. On being tense yet tolerant: the paradoxical effects of trait anxiety and aversive mood on intergroup judgments. *Group Dyn.* 3, 227–238.
- Ciarrochi, J.V., Forgas, J.P., 2000. The pleasure of possessions: affect and consumer judgments. *Eur. J. Soc. Psychol.* 30, 631–649.
- Clark, M.S., Isen, A.M., 1982. Towards understanding the relationship between feeling states and social behavior. In: Hastorf, A.H., Isen, A.M. (Eds.), *Cognitive Social Psychology*. Elsevier, New York, pp. 73–108.
- Clark, M.S., Waddell, B.A., 1983. Effects of moods on thoughts about helping, attraction and information acquisition. *Soc. Psychol. Quart.* 46, 31–35.
- Clore, G.L., Byrne, D., 1974. The reinforcement affect model of attraction. In: Huston, T.L. (Ed.), *Foundations of Interpersonal Attraction*. Academic Press, New York, pp. 143–170.
- Clore, G.L., Storbeck, J., 2006. Affect as information about liking, efficacy and importance. In: Forgas, J.P. (Ed.), *Affect in Social Thinking and Behavior*. Psychology Press, New York, pp. 123–142.
- Clore, G.L., Gasper, K., Garvin, E., 2001. Affect as information. In: Forgas, J.P. (Ed.), *Handbook of Affect and Social Cognition*. Erlbaum, Mahwah, NJ, pp. 121–144.
- Correll, J., Park, B., Judd, C.M., Wittenbrink, B., 2002. The police officer's dilemma: using ethnicity to disambiguate potentially threatening individuals. *J. Person. Soc. Psychol.* 83, 1314–1329.
- Correll, J., Park, B., Judd, C.M., Wittenbrink, B., Sadler, M.S., Keesee, T., 2007. Across the thin blue line: police officers and racial bias in the decision to shoot. *J. Person. Soc. Psychol.* 92, 1006–1023.
- Detweiler-Bedell, B., Detweiler-Bedell, J.B., 2006. Mood-congruent perceptions of success depend on self-other framing. *Cogn. Emot.* 20, 196–216.
- Detweiler-Bedell, J.B., Salovey, P., 2003. Striving for happiness or fleeing from sadness? Motivating mood repair using differentially framed messages. *J. Soc. Clin. Psychol.* 22, 627–664.
- Direnfeld, D.M., Roberts, J.E., 2006. Mood-congruent memory in dysphoria: the roles of state affect and cognitive style. *Behav. Res. Ther.* 44, 1275–1285.
- Eich, E., 1995a. Searching for mood dependent memory. *Psychol. Sci.* 6, 67–75.
- Eich, E., 1995b. Mood as a mediator of place dependent memory. *J. Exp. Psychol. Gen.* 124, 293–308.

- Eich, E., Macaulay, D., 2000. Are real moods required to reveal mood-congruent and mood-dependent memory? *Psychol. Sci.* 11, 244–248.
- Eich, E., Metcalfe, J., 1989. Mood dependent memory for internal versus external events. *J. Exp. Psychol.* 15, 443–455.
- Eich, E., Macaulay, D., Ryan, L., 1994. Mood dependent memory for events of the personal past. *J. Exp. Psychol. Gen.* 123, 201–215.
- Eich, E., Macaulay, D., Lam, R., 1997. Mania, depression, and mood dependent memory. *Cogn. Emot.* 11, 607–618.
- Ellis, H.C., Ashbrook, P.W., 1988. Resource allocation model of the effects of depressed mood states on memory. In: Fiedler, K., Forgas, J.P. (Eds.), *Affect, Cognition and Social Behavior*. Hogrefe, Toronto, pp. 25–43.
- Feshbach, S., Singer, R.D., 1957. The effects of fear arousal and suppression of fear upon social perception. *J. Abnorm. Soc. Psychol.* 55, 283–288.
- Fiedler, K., 1990. Mood-dependent selectivity in social cognition. Stroebe, W., Hewstone, M. (Eds.), *European Review of Social Psychology*, vol.1, Wiley, New York, pp. 1–32.
- Fiedler, K., 2001. Affective influences on social information processing. In: Forgas, J.P. (Ed.), *Handbook of Affect and Social Cognition*. Erlbaum, Mahwah, NJ, pp. 163–185.
- Fiedler, K., Nickel, S., Asbeck, J., Pagel, U., 2003. Mood and the generation effect. *Cogn. Emot.* 17, 585–608.
- Forgas, J.P., 1979. *Social Episodes: The Study of Interaction Routines*. Academic Press, NY.
- Forgas, J.P., 1992. On bad mood and peculiar people: affect and person typicality in impression formation. *J. Person. Soc. Psychol.* 62, 863–875.
- Forgas, J.P., 1993. On making sense of odd couples: mood effects on the perception of mismatched relationships. *Person. Soc. Psychol. Bull.* 19, 59–71.
- Forgas, J.P., 1994. Sad and guilty? Affective influences on the explanation of conflict episodes. *J. Person. Soc. Psychol.* 66, 56–68.
- Forgas, J.P., 1995. Mood and judgment: the affect infusion model (AIM). *Psychol. Bull.* 117, 39–66.
- Forgas, J.P., 1998a. On feeling good and getting your way: mood effects on negotiating strategies and outcomes. *J. Person. Soc. Psychol.* 74, 565–577.
- Forgas, J.P., 1998b. Asking nicely? Mood effects on responding to more or less polite requests. *Person. Soc. Psychol. Bull.* 24, 173–185.
- Forgas, J.P., 1998c. On being happy but mistaken: mood effects on the fundamental attribution error. *J. Person. Soc. Psychol.* 75, 318–331.
- Forgas, J.P., 1999a. On feeling good and being rude: affective influences on language use and requests. *J. Person. Soc. Psychol.* 76, 928–939.
- Forgas, J.P., 1999b. Feeling and speaking: mood effects on verbal communication strategies. *Person. Soc. Psychol. Bull.* 25, 850–863.
- Forgas, J.P., 2002. Feeling and doing: affective influences on interpersonal behavior. *Psychol. Inq.* 13, 1–28.
- Forgas, J.P. (Ed.), 2006. *Affect in Social Thinking and Behavior*. Psychology Press, NY.
- Forgas, J.P., 2007. When sad is better than happy: mood effects on the effectiveness of persuasive messages. *J. Exp. Soc. Psychol.* 43, 513–528.
- Forgas, J.P., 2011a. Affective influences on self-disclosure strategies. *J. Person. Soc. Psychol.* 100 (3), 449–461.
- Forgas, J.P., 2011b. Can negative affect eliminate the power of first impressions? Affective influences on primacy and recency effects in impression formation. *J. Exp. Soc. Psychol.* 47, 425–429.
- Forgas, J.P., 2011c. She just doesn't look like a philosopher...? Affective influences on the halo effect in impression formation. *Eur. J. Soc. Psychol.* 41, 812–817.
- Forgas, J.P., 2013. Don't worry, be sad! On the cognitive, motivational and interpersonal benefits of negative mood. *Curr. Direct. Psychol. Sci.* 22, 225–232.

- Forgas, J.P., 2015. Why do highly visible people appear more important? Affect mediates visual fluency effects in impression formation. *J. Exp. Soc. Psychol.* 58, 136–141.
- Forgas, J.P., Bower, G.H., 1987. Mood effects on person perception judgments. *J. Pers. Soc. Psychol.* 53, 53–60.
- Forgas, J.P., Bower, G.H., Krantz, S., 1984. The influence of mood on perceptions of social interactions. *J. Exp. Soc. Psychol.* 20, 497–513.
- Forgas, J.P., Bower, G.H., Moylan, S.J., 1990. Praise or blame? Affective influences on attributions. *J. Pers. Soc. Psychol.* 59, 809–818.
- Forgas, J.P., Ciarrochi, J.V., 2002. On managing moods: evidence for the role of homeostatic cognitive strategies in affect regulation. *Pers. Soc. Psychol. Bull.* 28, 336–345.
- Forgas, J.P., Dunn, E., Granland, S., 2008. Are you being served? An unobtrusive experiment of affective influences on helping in a department store. *Eur. J. Soc. Psychol.* 38, 333–342.
- Forgas, J.P., East, R., 2008a. How real is that smile? Mood effects on accepting or rejecting the veracity of emotional facial expressions. *J. Nonverbal Behav.* 32, 157–170.
- Forgas, J.P., East, R., 2008b. On being happy and gullible: mood effects on skepticism and the detection of deception. *J. Exp. Soc. Psychol.* 44, 1362–1367.
- Forgas, J.P., Goldenberg, L., Unkelbach, C., 2009. Can bad weather improve your memory? A field study of mood effects on memory in a real-life setting. *J. Exp. Soc. Psychol.* 54, 254–257.
- Forgas, J.P., Haselton, M.G., von Hippel, W. (Eds.), 2007. *Evolution and the social mind*. Psychology Press, New York.
- Forgas, J.P., Moylan, S.J., 1987. After the movies: the effects of transient mood states on social judgments. *Person. Soc. Psychol. Bull.* 13, 478–489.
- Forgas, J.P., Tan, H.B., 2013a. To give or to keep? Affective influences on selfishness and fairness in computer-mediated interactions in the dictator game and the ultimatum game. *Comput. Hum. Behav.* 29, 64–74.
- Forgas, J.P., Tan, H.B., 2013b. Mood effects on selfishness versus fairness: affective influences on social decisions in the ultimatum game. *Soc. Cogn.* 31, 504–517.
- Forgas, J.P., Vargas, P., Laham, S., 2005. Mood effects on eyewitness memory: affective influences on susceptibility to misinformation. *J. Exp. Soc. Psychol.* 41, 574–588.
- Fredrickson, B.L., 2009. *Positivity*. Three Rivers Press, New York.
- Gasper, K., Clore, G.L., 2002. Attending to the big picture: mood and global versus local processing of visual information. *Psychol. Sci.* 13, 34–40.
- Gilbert, D.T., Malone, P.S., 1995. The correspondence bias. *Psychol. Bull.* 117, 21–38.
- Gilboa-Schechtman, E., Erhard-Weiss, D., Jecemien, P., 2002. Interpersonal deficits meet cognitive biases: memory for facial expressions in depressed and anxious men and women. *Psych Res.* 113, 279–293.
- Goodwin, D.W., 1974. Alcoholic blackout and state-dependent learning. *Feder. Proc.* 33, 1833–1835.
- Gotlib, I.H., Joormann, J., 2010. Cognition and depression: current status and future directions. *Ann. Rev. Clin. Psychol.* 6, 285–312.
- Gouaux, C., 1971. Induced affective states and interpersonal attraction. *J. Person. Soc. Psychol.* 20, 37–43.
- Gouaux, C., Summers, K., 1973. Interpersonal attraction as a function of affective states and affective change. *J. Res. Person.* 7, 254–260.
- Griffitt, W., 1970. Environmental effects on interpersonal behavior: temperature and attraction. *J. Person. Soc. Psychol.* 15, 240–244.
- Güth, W., Schmittberger, R., Schwarze, B., 1982. An experimental analysis of ultimatum bargaining. *J. Econ. Behav. Org.* 3 (4), 367–388.
- Heider, F., 1958. *The Psychology of Interpersonal Relations*. Wiley, New York.
- Heimpel, S.A., Wood, J.V., Marshall, M., Brown, J., 2002. Do people with low self-esteem really want to feel better? Self-esteem differences in motivation to repair negative moods. *J. Person. Soc. Psychol.* 82, 128–147.

- Hertel, G., Fiedler, K., 1994. Affective and cognitive influences in a social dilemma game. *Eur. J. Soc. Psychol.* 24, 131–145.
- Hilgard, E.R., 1980. The trilogy of mind: cognition, affection, and conation. *J. Hist. Behav. Sci.* 16, 107–117.
- Isen, A.M., 1984. Towards understanding the role of affect in cognition. Wyer, R.S., Srull, T.K. (Eds.), *Handbook of Social Cognition*, vol. 3, Erlbaum, NJ, pp. 179–236.
- Isen, A.M., 1985. Asymmetry of happiness and sadness in effects on memory in normal college students: comment on Hasher, Rose, Zacks, Sanft, and Doren. *J. Exp. Psychol. Gen.* 114, 388–391.
- Isen, A.M., 1987. Positive affect, cognitive processes and social behaviour. Berkowitz, L. (Ed.), *Advances in Experimental Social Psychology*, vol. 20, Academic Press, New York, pp. 203–253.
- Isen, A.M., Daubman, K.A., 1984. The influence of affect on categorization. *J. Person. Soc. Psychol.* 47, 1206–1217.
- Josephson, B.R., Singer, J.A., Salovey, P., 1996. Mood regulation and memory: repairing sad moods with happy memories. *Cogn. Emot.* 10, 437–444.
- Kenealy, P.M., 1997. Mood-state-dependent retrieval: the effects of induced mood on memory reconsidered. *Quart. J. Exp. Psychol.* 50A, 290–317.
- Kihlstrom, J.F., 1989. On what does mood-dependent memory depend? *J. Soc. Behav. Person.* 4, 23–32.
- Koch, A.S., Forgas, J.P., Matovic, D., 2013. Can negative mood improve your conversation? Affective influences on conforming to Grice's communication norms. *Eur. J. Soc. Psychol.* 43, 326–334.
- Leight, K.A., Ellis, H.C., 1981. Emotional mood states, strategies, and state-dependency in memory. *J. Verbal Learning Verbal Behav.* 20, 251–266.
- Martin, L., 2000. Moods don't convey information: moods in context do. In: Forgas, J.P. (Ed.), *Feeling and Thinking: The Role of Affect in Social Cognition*. Cambridge University Press, New York, pp. 153–177.
- Matovic, D., Koch, A., Forgas, J.P., 2014. Can negative mood improve language understanding? Affective influences on the ability to detect ambiguous communication. *J. Exp. Soc. Psychol.* 52, 44–49.
- Mayer, J.D., Gaschke, Y.N., Braverman, D.L., Evans, T.W., 1992. Mood-congruent judgment is a general effect. *J. Person. Soc. Psychol.* 63, 119–132.
- Miranda, R., Kihlstrom, J., 2005. Mood congruence in childhood and recent autobiographical memory. *Cogn. Emot.* 19, 981–998.
- Piaget, J., 1954. *The Construction of Reality in the Child*. Free Press, New York.
- Rapaport, D., 1961. *Emotions and Memory*. Science Editions, New York.
- Razran, G.H., 1940. Conditioned response changes in rating and appraising sociopolitical slogans. *Psychol. Bull.* 37, 481–493.
- Reus, V.I., Weingartner, H., Post, R.M., 1979. Clinical implications of state-dependent learning. *Am. J. Psych.* 136, 927–931.
- Ruiz-Caballero, J.A., Gonzalez, P., 1994. Implicit and explicit memory bias in depressed and non-depressed subjects. *Cogn. Emot.* 8, 555–570.
- Schacter, D.L., Kihlstrom, J.F., 1989. Functional amnesia. Boller, F., Grafman, J. (Eds.), *Handbook of Neuropsychology*, vol.3, Elsevier, New York, pp. 209–230.
- Schiffenbauer, A.I., 1974. Effect of observer's emotional state on judgments of the emotional state of others. *J. Person. Soc. Psychol.* 30, 31–35.
- Schwarz, N., 1990. Feelings as information: informational and motivational functions of affective states. Higgins, E.T., Sorrentino, R. (Eds.), *Handbook of Motivation and Cognition*, vol. 2, Guilford, New York, pp. 527–561.
- Schwarz, N., Clore, G.L., 1983. Mood, misattribution and judgments of well-being: informative and directive functions of affective states. *J. Person. Soc. Psychol.* 45, 513–523.

- Sedikides, C., 1994. Incongruent effects of sad mood on self-conception valence: it's a matter of time. *Eur. J. Soc. Psychol.* 24, 161–172.
- Sedikides, C., 1995. Central and peripheral self-conceptions are differentially influenced by mood: tests of the differential sensitivity hypothesis. *J. Person. Soc. Psychol.* 69, 759–777.
- Sinclair, R.C., 1988. Mood, categorization breadth, and performance appraisal: the effects of order of information acquisition and affective state on halo, accuracy, and evaluations. *Org. Behav. Hum. Decis. Process.* 42, 22–46.
- Sinclair, R.C., Mark, M.M., Clore, G.L., 1994. Mood-related persuasion depends on misattributions. *Soc. Cogn.* 12, 309–326.
- Singer, J.A., Salovey, P., 1988. Mood and memory: evaluating the network theory of affect. *Clin. Psychol. Rev.* 8, 211–251.
- Smith, S.M., Petty, R.E., 1995. Personality moderators of mood congruency effects on cognition: the role of self-esteem and negative mood regulation. *J. Person. Soc. Psychol.* 68, 1092–1107.
- Storbeck, J., Clore, G.L., 2011. Affect influences false memories at encoding: evidence from recognition data. *Emotion* 11, 981–989.
- Tamir, M., Robinson, M.D., 2007. The happy spotlight: positive mood and selective attention to rewarding information. *Person. Soc. Psychol. Bull.* 33, 1124–1136.
- Tan, H.B., Forgas, J.P., 2010. When happiness makes us selfish, but sadness makes us fair: affective influences on interpersonal strategies in the dictator game. *J. Exp. Soc. Psychol.* 46, 571–576.
- Tooby, J., Cosmides, L., 1992. The psychological foundations of culture. In: Barkow, J.H., Cosmides, L. (Eds.), *The adapted mind: evolutionary psychology and the generation of culture*. Oxford University Press, London, pp. 19–136.
- Uccros, C.G., 1989. Mood state-dependent memory: a meta-analysis. *Cogn. Emot.* 3, 139–167.
- Unkelbach, C., Forgas, J.P., Denson, T.F., 2008. The turban effect: the influence of Muslim headgear and induced affect on aggressive responses in the shooter bias paradigm. *J. Exp. Soc. Psychol.* 44, 1409–1413.
- Wadlinger, H., Isaacowitz, D.M., 2006. Positive affect broadens visual attention to positive stimuli. *Motiv. Emot.* 30, 89–101.
- Watkins, T., Mathews, A.M., Williamson, D.A., Fuller, R., 1992. Mood congruent memory in depression: emotional priming or elaboration. *J. Abnorm. Psychol.* 101, 581–586.
- Watson, J.B., 1929. *Behaviorism*. Norton, New York.
- Watson, J.B., Rayner, R., 1920. Conditioned emotional reactions. *J. Exp. Psychol.* 3, 1–14.
- Wegener, D.T., Petty, R.E., 1997. The flexible correction model: the role of naïve theories of bias in bias correction. Zanna, M.P. (Ed.), *Advances in Experimental Social Psychology*, vol. 29, Academic Press, New York, pp. 141–208.
- Wegner, D.M., 1994. Ironic processes of mental control. *Psychol. Rev.* 101, 34–52.