

Mood as Information: 20 Years Later

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Learning that Schwarz and Clore (1983) had been nominated as a “modern classic” was a great mood induction, one that brightened our day even though the cause was salient. However, responding to the editors’ request to tell the “inside story” of the studies we conducted 2 decades ago turned out to be a challenging exercise in collaborative reconstructive memory. In retrospect, the “story” of our studies seems utterly smooth and our failure to remember disappointing pretests, or bad results that sent us back to the drawing board, stands in stark contrast to our memories of other lines of research, making us wonder if we forgot all the complications or were indeed just plain lucky. We first summarize our recollections and subsequently address theoretical developments.

Behind the Scenes

We conducted the experiments reported in Schwarz and Clore (1983) while Norbert Schwarz was a post doc at the University of Illinois at Urbana-Champaign in 1980–1981. Schwarz became interested in mood effects on judgment through firsthand experience: His life looked better on some days than others, even though nothing of any importance had changed. His first encounter with experimental mood research dates back to an undergraduate class he took from Martin Kumpf at the University of Mannheim, Germany. Clore’s interest stemmed from his research on the role of affect as a mediator of interpersonal attraction (Clore & Byrne, 1974). In the mid 1970s, experimental mood research, pioneered by Alice Isen, focused mostly on prosocial behavior and had little to say about mood effects on judgment. A few years later, however, Isen, Shalke, Clark, and Karp (1978) suggested the existence of a “cognitive loop” by which affect would influence the accessibility of material in memory, an idea also advanced by Bower, Monteiro, and Gilligan (1978) in the context of network models of memory. This approach was consistent with the developing emphasis on information accessibility but did not seem “quite right” intro-

spectively: On good days, things just “felt” better, and this did not seem to involve much selective recall of previous events of mood-congruent valence. Phenomenological analyses in the introspective tradition of German “armchair psychology” (nicely exemplified by Bollnow, 1956), which treated moods as an integrative reflection of current experiences, seemed closer to the mark (for a discussion, see Schwarz, 1987). Such introspections, however, are to be taken with a grain of salt as Nisbett and Wilson (1977) demonstrated at about the same time. As an alternative perspective, Zajonc presented his “affective primacy” hypothesis (later published in Zajonc, 1980) in a colloquium at Mannheim, but the approach lacked a process model specific enough to meet the developing criteria of social cognition research.

A conversation of Schwarz’s with Bob Wyer, who was a frequent visiting professor at the University of Mannheim, provided a different twist. In a then-forthcoming book (*Social Cognition, Inference, and Attribution*) Wyer and Carlston (1979) proposed that affect can serve informational functions, “for example, one’s liking for a person may be based partly on the feelings of pleasantness when the person is around” (p. 192). In addition, they conjectured that affective states may direct our attention to information that is suitable to sorting out the plausible sources of one’s feelings. Although these suggestions were compatible with phenomenological approaches, they were couched in decidedly nonphenomenological terms, which emphasized the role of cognitive representations of experience at the expense of actual current experience. A large body of research into the influence of arousal (from Zillman’s, 1978, arousal-transfer model to Zanna & Cooper’s, 1976, dissonance studies) suggested, however, that the online experience itself may play a crucial role. More important, the arousal literature also suggested that misattribution manipulations would be suitable experimental tools to address the role of current experience in human judgment. To address these issues, Schwarz submitted a proposal on “Cognitive and Affective Influences on Judgments of

Well-Being” to the German Research Council to spend a postdoctoral year with Wyer at Illinois. But, alas, by the time Schwarz arrived in Illinois, Wyer had extended a sabbatical for another term.

Fortunately, however, Wyer suggested spending the first semester with Gerald Clore, who was interested in similar questions. His work with Donn Byrne had documented profound emotional influences on interpersonal attraction, which were couched in learning theory terms in their reinforcement–affect model (Clore, 1966; for an overview, see Clore & Byrne, 1974). From a conditioning perspective, there is nothing surprising about the fact that people like those who reward them. However, the reinforcement–affect model maintained that the key ingredient is the subjective experience of reward and that merely associating positive feelings with others is sufficient to generate liking for them, regardless of whether they are actually the source of the affect. Clore had become interested in studying mood effects after his former college housemate, Charles Gouaux, and his graduate school office mate, Bill Griffitt, tested the model proposed in his dissertation by manipulating mood. Gouaux (1970) showed happy and sad films and Griffitt and Veitch (1971) had participants work in a hot and crowded room to test the hypothesis that the subjective experience of affect was important in attraction over and above people’s beliefs about others. These were the first clear demonstrations of the usefulness of varying feelings independently of evaluative beliefs to study judgment. Since then, of course, mood manipulations have become standard tools in social psychology.

Despite these clear effects, Clore wondered why we do not all end up falling in love with the paymaster if the mere co-occurrence of people with reward was sufficient. Do incidental affective influences only “work” when we are not aware of their source (for an elaboration, see Clore, 1992)? Is the underlying process less automatic than is assumed in either the reinforcement–affect model (Clore, 1966) or the mood-congruent recall models (Bower, 1981; Isen et al., 1978)?

With these converging interests, we embarked on a conceptually straightforward study (Schwarz & Clore, 1983, Experiment 1): We would ask participants to vividly recall and describe a happy or sad event to induce a corresponding mood and would cross these mood inductions with a misattribution manipulation, using judgments of life satisfaction as the dependent variable. This procedure deliberately stacked the deck in favor of content-driven models: By inducing moods through the recall of a happy or sad event, mood-congruent recall would be facilitated both by the content of the recall task and the induced mood. The predictions were straightforward. If mood effects on judgment were a function of mood-congruent recall (Bower, 1981; Isen et al., 1978), we should

observe a strong main effect of the induced mood. If the experience itself served informative functions, on the other hand, its impact should depend on its perceived diagnosticity. That is, mood effects should be attenuated when the mood is attributed to an irrelevant source and hence considered uninformative for evaluating one’s life (a *discounting effect* in Kelley’s, 1972, terms), but should be enhanced when one experiences the mood despite opposite situational influences (an augmentation effect).

The tricky part of the procedures was the misattribution manipulation. Our mood induction would only kick in after some time, as participants got more and more involved with the memory they described. Hence, we needed something that not only could be plausibly portrayed as “causing” elated as well as depressed feelings but also could be said to do so not immediately, but only over some period of time. We entertained placebo pills (and dropped the idea, worried that too many participants would opt out), a story about ions in the air, a story about side effects of the lighting in the room, and many similar ideas stimulated by earlier dissonance and arousal studies (most notably, Fazio, Zanna, & Cooper, 1977). However, eventually a fortuitous circumstance helped us out: Clore’s basement lab space included a small room that was used only for storage. It had been designed for some previous researcher, who conducted audition experiments with monkeys. Because monkeys make few aesthetic demands, the soundproofed and X-ray and electrically shielded room was small and dark, with the sound insulation material stapled to the walls, and its only furniture was a classroom chair. We felt that this room from the “far side” might easily lend itself to all kinds of attributions, and, after removing boxes of old questionnaires, we were ready to go.

Using the givens of the room as a starting point, we developed a cover story that introduced the experiment as an investigation of “memory for sound.” To set up the attribution manipulation, some participants were told that students in earlier studies had complained about feeling “depressed” and “kind of tense” (or “elated” and “kind of high,” respectively) in this room, whereas a control group received no information about “side effects.” Allegedly, the Department of Psychology was quite concerned about these reports and wanted to find out more about the feelings caused by the room. Hence, it had requested that all experimenters using the room administer a questionnaire, either at the beginning of, during, or at the end of the experiment because the room may exert its effect only after some time has been spent in it. Next, participants listened to a series of three-note piano progressions, which Clore had recorded at a friend’s house, and were asked to memorize them for later recognition. At this point, we introduced the mood induction and dependent variables as a filler task. We asked participants to

help us out with the development of a “Life-Event Inventory” by describing a happy (or sad, respectively) life event in great detail, thus making “productive use” of the 25-min wait time until they had to recognize the piano notes. The event-description task was followed by the dependent variables, introduced as “some preliminary general questions that we might want to use in the Life-Event Inventory.” Manipulation checks and a short recognition task pertaining to the piano notes completed the experiment.

Needless to say, our level of worry about whether this ruse would work matched the level of fun we had had cooking it up. To our own surprise, it did work nicely on the first run, and the results showed the predicted interaction of mood and misattribution on judgments of general life satisfaction, although only in the sad mood condition. The latter observation was consistent with the expectation that sad moods require more explanation than happy ones and would hence be more susceptible to attributional manipulations as suggested by Wyer and Carlston’s (1979) discussion of “directive” effects. In short, we had obtained the first evidence for the hypothesized informative as well as directive functions of moods. Most important, the obtained augmentation and discounting effects highlighted the role of inferential processes even under conditions that could be assumed to be stacked in favor of mood-congruent recall processes. After all, we had induced happy and sad moods by having participants recall happy or sad events, thus adding semantic activation to the assumed affective activation of valenced material. Nevertheless, the activated semantic content had little impact when participants discounted the accompanying negative feelings, assigning a crucial role to the subjective experience itself. We return to this issue later.

Admittedly, however, our elaborate procedures had a somewhat artificial flavor, and we felt that a more naturalistic replication not only would be reassuring for us but also would make the package more palatable for readers. Aware of a key source of our own moods, we felt that using the weather as a mood manipulation might do the trick. In fact, Schwarz had already been warned about gray Midwestern winters, known to send whole campuses into temporary depression—and as if proof for this warning was needed, Clore had arranged to spend the winter term in California. Suffice it to say that the weather cooperated, providing the opportunity for a naturalistic follow-up experiment (Schwarz & Clore, 1983, Experiment 2). For this purpose, we sampled phone numbers from the student directory, assigned them to sunny versus rainy conditions and waited for suitable days. The sunny days we used were the first two sunny spring days after a long period of gray, overcast days that brought students out to play Frisbee on the Quad for the first time in months. But sure enough,

winter returned (always something one can count on in the Midwest), and the rainy days we used were several days into a new period of low-hanging clouds and rain.

The experiment itself was utterly simple: The interviewer pretended to call from out of town and asked a few questions about life satisfaction. The crucial manipulation was whether the interviewer first inquired, as an aside, “By the way, how’s the weather down there?” to draw participants’ attention to a plausible source of their present mood. Because we were not sure that this would work, we included a more heavy-handed variant, in which we told respondents that we were interested in “how the weather affects a person’s mood.” Replicating our laboratory results, respondents were more satisfied with their lives on sunny than rainy days—but only when their attention was not drawn to the weather. Moreover, the attribution effects were again limited to the sad mood condition, consistent with the lab results. The consistency of these findings with our own experience was comforting—Schwarz’s winter moods didn’t seem that weird after all, and, yes, Clore was right to leave for California. Comforting also was the fact that our interviewers were properly clueless: None had insight into the effect of the attribution manipulations after the interviews, all of them noting simply that people “obviously” are happier on sunny than on rainy days.

In retrospect, we are surprised by how “painless” these experiments were. Unless our memories fail us, we did not conduct extensive pretests, were spared poor results and new starts, and had the good luck of “things falling into place” on the first trial. The only moment of despair we remember was when a research assistant misplaced the punched cards with the data, sending Schwarz on a wild chase through several offices. In part, we attribute our smooth ride to the wealth of experience with misattribution manipulations that we could draw on from related literatures and in part to the fact that we had firsthand expertise with the phenomenon under study: As experienced “victims” of our moods, we could comfortably rely on mental simulations of our own likely responses in setting up the procedures.

20 Years Later

The results of our experiments were highly compatible with earlier findings in the arousal literature. Zillman’s (1978) work on “arousal transfer” had already documented that the influence of arousal on unrelated judgments was limited to conditions under which people were unaware of the actual source of their arousal. Obviously, we could have couched our results in terms of “affect transfer”—and they would probably not have found the attention they did. Instead,

following Wyer and Carlston's (1979) lead, we offered a process model that was compatible with the developing influence of the information-processing paradigm in social psychology. Going beyond the paradigm's emphasis on semantic information, however, our conceptualization of feelings as experiential sources of information assigned an important role to the subjective experiences that accompany the thought process. Our initial interpretation of the directive effects of moods, on the other hand, was off the mark and needed revision as subsequent research indicated. We address both issues in turn.

There Is More to Thinking Than Thought Content: Informative Functions of Subjective Experiences

When social psychology adopted the computer metaphor of information-processing models in cognitive psychology, it inherited an emphasis on encoding, storage, and retrieval processes that lent itself to conceptualizing the processing of semantic and episodic information (cf. Schwarz, 2000). The subjective experiences that accompany human thinking about the world—such as moods, emotions, or fluency of recall—received limited attention. When they were addressed, their operation was also conceptualized in terms of encoding, storage, and retrieval processes as exemplified by research into mood-congruent memory (Bower, 1981; Isen et al., 1978). In contrast, our 1983 findings highlighted that subjective experiences are a source of information in their own right, consistent with phenomenological approaches to human cognition (cf. Clore, 1992). In the meantime, the informative functions of subjective experiences have received considerable attention in social and cognitive psychology and have taken center stage in many discussions of metacognition (cf. the contributions in Bless & Forgas, 2000; Strack & Deutsch, this issue). In the following, we summarize some of the key lessons learned.

Moods. With regard to moods, our findings showed that evaluative judgments involve people asking themselves (implicitly), "How do I feel about this?" In doing so, they may misread their current feelings as a response to the object of judgment, resulting in more favorable evaluations under positive rather than negative moods, unless their informational value is discredited (for a comprehensive review, see Schwarz & Clore, 1996).

Two aspects of this research proved controversial. First, Martin and his colleagues (e.g., Martin, Abend, Sedikides, & Green, 1997; Martin & Stoner, 1996) suggested that moods are not informative per se but are only informative in context. We agree—if their informational value were not context dependent,

misattribution manipulations would make no sense. Martin et al.'s argument, however, goes beyond the perceived diagnosticity of one's feelings and entails that a positive mood, for example, may convey positive as well as negative information about a target. An example, from their ingenious experiments, is that when we are asked how successful a sad story was at making us feel sad, we are likely to conclude that the story was not successful if we find that we feel happy—a condition under which a positive feeling leads to a negative judgment. In our reading, findings of this type do not reflect changes in the information conveyed by the mood but rather reflect changes in the criterion of judgment: In the story example, our positive feelings inform us that the story was enjoyable (a positive, mood-congruent assessment of the target), consistent with numerous earlier findings. This positive assessment of the target, however, has negative implications for the imposed criterion of judgment, namely, whether the story was successful at making us feel sad. Much as a sweet cookie makes for a poor salty snack, a story that elicits happy feelings is a poor sad story—yet the meaning of the happy feelings themselves changes as little as the sweet taste of the cookie.

A second issue of controversy is the attribution hypothesis itself. In our conceptualization, the use of feelings as a source of information does not require a conscious attribution of the feeling to the target, in contrast to what others have suggested (e.g., Forgas, 1995). Just as we use declarative information that happens to come to mind, we also use experiential information that happens to come to mind. In either case, we assume that the information is relevant to what we think about, or else why would it come to mind? Higgins (1998) discussed this pervasive tendency as the *aboutness principle* of human inference. The related tendency of feelings in particular to be experienced as relevant to whatever is in mind at the time has been called the *immediacy principle* (Clore, Wyer, et al., 2001). However, we do not rely on information that comes to mind when its relevance to the target is called into question. This situation may arise when, for example, we attribute our feelings of mood to an irrelevant source (Schwarz & Clore, 1983) or when we become aware that the declarative information was brought to mind by a preceding priming task (e.g., Clore & Colcombe, in press; Lombardi, Higgins, & Bargh, 1987; Strack, Schwarz, Bless, Kübler, & Wänke, 1993). In short, what comes to mind seems relevant by default. In contrast, assessments that highlight the irrelevance and low diagnosticity of the input have to be triggered by salient features of the situation (cf. Clore, 1992; Schwarz & Bless, 1992; Strack & Hannover, 1996).

Emotions. What renders the influence of moods highly pervasive is that their source is usually not in the

focus of our attention. In contrast, specific emotions are based on appraisals that carry their own source attribution. Thus, whereas we are “in” a bad mood, we are angry “about” something in particular (for a discussion of the conceptual distinctions, see Clore, Schwarz, & Conway, 1994). Hence, emotions inform us about the source entailed in the appraisal and are less likely to be misread as responses to other targets (e.g., Keltner, Locke, & Audrain, 1993). In fact, our anger may be most likely to influence unrelated judgments after it dissipates, leaving us in an irritated mood that is no longer linked to a particular source (Bollnow, 1956). Hence, “the unnoticed emotion is more influential than the noticed,” as Baumeister and Vohs (this issue) put it.

In addition, the appraisals underlying specific emotions provide information that goes beyond the valence information provided by global moods, resulting in differential effects of emotions of the same general valence (e.g., Keltner, Ellsworth, & Edwards, 1993; Lerner & Keltner, 2000). Theoretically, analyses of the appraisal patterns underlying specific emotions (see Ortony, Clore, & Collins, 1988) should go a long way in specifying the information conveyed by a given emotion, making this a highly promising development. Again, however, the impact of specific emotions is eliminated when their informational value for the judgment at hand is undermined (e.g., Gasper & Clore, 1998; Keltner, Locke, & Audrain, 1993; Schwarz, Servay, & Kumpf, 1985).

Cognitive experiences. Further highlighting that human judgment is not always based on accessible declarative information, research into the experienced ease or difficulty of recall established subjective accessibility experiences as a distinct source of information (for a review, see Schwarz, 1998). Content-driven models of judgment would predict, for example, that the more examples of our own assertive behavior we recall, the more we evaluate ourselves as assertive. However, bringing many examples to mind is often experienced as difficult, and this difficulty, in turn, suggests that there cannot be many examples—or else bringing them to mind should be easy. As a result, judgments are consistent with the implications of recalled content only when recall is easy, but opposite to the implications of recalled content when recall is difficult. Hence, people rate themselves as more assertive after recalling few rather than many assertive behaviors, in contrast to common assumptions (e.g., Schwarz, Bless, Strack, et al., 1991). Again, this influence of the subjective experience is eliminated when the informational value of the experience is undermined through misattribution manipulations. Assuming, for example, that recall is difficult only because one is distracted, people turn to recalled content in forming a judgment and report higher assertiveness

after recalling many rather than few examples (Schwarz et al., 1991).

Paralleling the observation that preexisting moods can be misread as a response to the object of judgment, feelings of effort induced by another source can be misread as a reflection of the task. For example, Stepper and Strack (1993) asked all participants to recall five examples of assertive behavior and induced some of them to contract the corrugator (brow) muscles, inducing a feeling of effort. As expected, these participants rated themselves as less assertive, apparently misreading the bodily sensation as indicative of recall difficulty (see also Sanna, Schwarz, & Small, 2002).

This interplay of declarative and experiential information is meanwhile well understood and has been observed for a broad range of judgment tasks, including judgments of frequency (as suggested by Tversky & Kahneman, 1973), probability (e.g., Sanna, Schwarz, & Stocker, 2002), risk (e.g., Rothman & Schwarz, 1998), attitude strength (e.g., Haddock, Rothman, Reber, & Schwarz, 1999), and memory (Winkielman, Schwarz, & Belli, 1998). Paralleling earlier observations, people are likely to rely on their accessibility experiences when processing motivation is low but turn to accessible content when processing motivation is high (e.g., Rothman & Schwarz, 1998).

Extending this theme, a large body of research into perceptual fluency, pioneered by Jacoby and colleagues (see Jacoby & Kelley, 1987), documented that the ease with which new information can be processed is also informative in its own right (for a review, see Winkielman, Schwarz, Fazendeiro, & Reber, 2003). In fact, even basic concept priming experiments in the tradition of Higgins, Rholes, and Jones (1977) have a crucial phenomenological component as noted earlier: When we are aware that the primed concepts may only come to mind due to a contextual influence, we are unlikely to use them in forming a judgment (e.g., Martin, 1986; Strack et al., 1993). Throughout, these findings highlight that we cannot understand human judgment without taking the phenomenal experiences that accompany thinking into account (cf. Clore, 1992; Schwarz, Bless, Wänke, & Winkielman, in press).

Directive Functions of Feeling

Whereas the informative functions logic has held up well over the years, our initial thinking about the directive functions of moods, stimulated by Wyer and Carlston (1979), needed revision. Recall that we obtained misattribution effects only in the sad mood conditions of the Schwarz and Clore (1983) experiments. We accounted for this asymmetrical impact of (mis)attribution manipulations by suggesting that sad moods are more likely than happy moods to deviate from one’s “usual” feelings, which are mildly positive for

most people most of the time (e.g., Matlin & Stang, 1979). Accordingly, sad moods may be more likely to need explanation than good moods, making them differentially susceptible to (mis)attribution manipulations. If so, being in an unexplained sad mood should interfere with other cognitive tasks, because of the competing demands of explaining one's mood. This hypothesis led to many surprises (see Schwarz, 1987, chapter 9). In an initial test (conducted as part of the 1986 diploma theses of Herbert Bless and Gerd Bohner and later reported as Experiment 1 of Bless, Bohner, Schwarz, & Strack, 1990), we exposed participants in a happy or sad mood to strong or weak persuasive arguments and assumed that sad moods would reduce systematic message elaboration. To our surprise, we found the opposite pattern: Sad participants engaged in message elaboration, whereas happy participants did not, by now a familiar and frequently replicated finding (for reviews, see Mackie, Asuncion, & Rosselli, 1992; Schwarz, Bless, & Bohner, 1991). At about the same time, Sinclair (1988) reported strong evidence that being in a sad mood reduced halo effects in impression formation. Clearly, sad moods did not pose an explanation problem that interfered with other processing demands; to the contrary, sad moods increased, and happy moods decreased, systematic processing in these studies.

To account for findings of this type, Schwarz (1990) suggested that the informative function of moods may be more general than we had captured in our initial research, which focused solely on the implications of feelings for evaluative judgments. In daily life, we usually feel bad when we encounter a threat of negative or a lack of positive outcomes and feel good when we obtain positive outcomes and are not threatened by negative ones. Hence, our moods reflect the state of our environment. If so, being in a bad mood may signal a problematic situation, whereas being in a good mood may signal a benign situation. Given the situated nature of human cognition, we may expect that our thought processes are tuned to meet the processing requirements apparently posed by the situation, resulting in systematically different processing strategies under happy and sad moods. Sad moods may foster a systematic processing style that is characterized by bottom-up processing, attention to the details at hand, and limited playfulness and creativity. Happy moods, on the other hand, may foster a top-down processing style that relies more on general knowledge structures and is accompanied by less focused attention and higher playfulness and creativity (cf. Bless & Schwarz, 1999; Clore, Gasper, & Garvin, 2001).

The cognitive tuning hypothesis concerns cases in which affective cues of mood serve as information about one's situation. Subsequent research showed, however, that the specific object about which our feelings provide information depends on what we happen

to be attending to at the time (Clore & Colcombe, 2003). For example, among self-focused individuals, affective cues may appear to provide information about themselves, resulting in feelings of self-esteem. More generally, in task situations, as people implicitly assess their current understanding, expectations, and inclinations, positive affective feelings may be experienced as self-efficacy. Such positive information about one's own inclinations leads to a greater likelihood of relying on expectations (Gasper, 2000), scripts (Bless et al., 1996), and stereotypes (Bodenhausen, Sheppard, & Kramer, 1994; Isbell, 2000), but also results in a greater tendency to engage in global rather than local perception (Gasper & Clore, 2002) and to respond in novel and creative ways (Gasper, in press).

The results of recent research (Clore & Colcombe, 2003) support the hypothesis that changes in what one attends to lead to corresponding changes in affective influence. Consistent with the feelings-as-information hypothesis, feelings serve as embodied information about one's immediate concerns. In this process, the evaluative information conveyed is unflinchingly congruent with the feelings conveying it. However, the object of the feelings, and hence their situated information value, can be as variable as the attention of the person experiencing them. The bulk of the available data is consistent with these assumptions (for recent reviews, see Bless, 2001; Clore, Gasper, & Garvin, 2001; Clore, Wyer, et al., 2001; Schwarz, 2002), and the cognitive tuning logic has been successfully extended to other sources of experiential information, including bodily approach and avoidance signals (e.g., Friedman & Förster, 2000) and specific emotions (e.g., Tiedens & Linton, 2001). Nevertheless, our follow-up work on the influence of moods on processing style has remained more challenging, and more controversial, than our account of their informative functions in evaluative judgment as the diverse contributions to Martin and Clore's (2001) *Theories of Mood and Cognition* illustrate. But disagreement is the mother of progress, and we are delighted that work stimulated by our 1983 article (Schwarz & Clore, 1983) continues to attract interest in the field.

Note

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