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Emotion and Social Metacognition

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> Emotion is the atmosphere in which thought is steeped, that which lends to thought its tone or temperature, that to which thought is often indebted for half its power.
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> **Hugh Reginald Haweis, "Schubert and Chopin" (1866, p. 92)**

INTRODUCTION

Cognition concerns knowledge about the world, including how it is acquired, organized, and used (Neisser, 1976). It involves knowing that particular objects have particular attributes (e.g., that cats have sharp claws) and whether particular propositions are true or false (e.g., that tigers hate cinnamon). By contrast, metacognition concerns knowledge not about the world, but rather about one's own cognitive processes (Flavell, 1976, 1979; Koriat & Levy-Saldot, 1999). When a person notices that she is finding something difficult to learn, she is engaging in metacognition. This kind of metacognitive feedback is crucial for regulating one's thought processes. Noticing that one is finding something difficult to learn, for example, may lead one to take a different approach to the task.

In this chapter, we are concerned with the metacognitive functions of affect. The realization that one is making poor progress on a cognitive task is likely to elicit not only metacognitive thoughts but also affective feelings, and it is presumably those feelings that would actually motivate a change in tactics. Metacognitive thoughts can lead one to shift mental gears, but the beauty of affective feedback about cognition is that the mental gear shifting is then automated.

Although affect and cognition have been traditionally assumed to be independent or even conflicting forces within the mind, more recent research suggests that they are intimately intertwined and that affect plays important and functional roles in cognitive processing. Indeed, when affective input is silenced or otherwise

disrupted, the ability to make even the most mundane decisions is severely impaired (Damasio, 1994). Thus, whereas we usually think of cognition as having the often thankless task of controlling emotion, in this chapter, we focus on the other side of the relationship. We describe the critical role of affect as a guide to cognition—a metacognitive guide. In taking this perspective, we therefore concur with the Reverend Haweis, author of the quotation at the beginning of this chapter, when he asserts that, without affective input, cognition loses much of its power.

How does affect guide cognition? There are several aspects to its influence. Affective reactions regulate attention, memory, and cognitive processing more generally. The arousal dimension specifically conveys information about the urgency or importance of objects and events, which in turn guides attention and memory (Storbeck & Clore, 2008). One attends to current sources of arousal (Zillman, 1978), and one tends to remember material that is followed by states of arousal (e.g., Cahill & Alkire, 2003). The valence dimension of affect, on the other hand, involves embodied information about value. Information about the goodness or badnesss of objects, including of one's own thoughts, is conveyed in the goodness or badness of affective feelings. Such self-referential evaluation turns out to be a powerful force in shaping our mental lives.

Although much of our research has focused on this ability of affective valence to regulate cognitive processing (e.g., Clore & Huntsinger, 2009), we assume that experiences other than affective valence can have similar influences on thought. A person might feel confident in his thoughts as a result of emotions that implicate certainty, such as anger (Tiedens & Linton, 2001). Arousal, too, is likely to energize people to act on accessible thoughts and inclinations (Corson & Verrier, 2007). And feelings of power (Smith & Trope, 2006) might also promote the use of accessible information. But whether valence, certainty, arousal, or power is the active element in a given situation, the same informational principles apply, so affective influences depend on people's implicit attributions (Schwarz & Clore, 1983) and hence on the particular objects to which the experiences seem to apply (Clore & Huntsinger, 2009).

Research on the affective regulation of thinking styles often employs procedures for inducing emotional moods. Assigning participants randomly to mood conditions and observing performance effects on cognitive tasks allows investigators to map the cognitive consequences of affective states. There now exists an extensive literature on the role of affect in regulating cognitive processing. In general, positive affect tends to lead to top-down processing, including the use of primed cognitions, stereotypes, and expectations, whereas negative affect tends to inhibit their use.

These kinds of cognitive consequences of positive and negative affect have been repeatedly documented, and a variety of explanations have been offered to account for them. Among them is the hypothesis that positive affect elicits heuristic processing (Schwarz & Clore, 2007), a global focus (Gasper & Clore, 2002), relational processing (Storbeck & Clore, 2005), widened attention (Derryberry & Tucker, 1994), substantive processing (Forgas, 2001), or a Piagetian process of assimilation (Fiedler, 2001).

Despite the variety of explanations that have been offered, all have one thing in common. All assume that positive affect elicits a distinctive cognitive style and that negative affect elicits a different cognitive style. Another possibility, however, is that the task-relevant information from affect serves a more general metacognitive function of validating or invalidating whatever processing inclination is accessible at the time.

In this chapter, we review research that leads us to believe that the influence of affect on cognition is like that of reward in that it is not dedicated to any one cognitive outcome. We argue that positive and negative affective states, such as moods, simply signal the value or validity of whatever thoughts and responses happen to be in mind at the moment. Positive affect serves as a "go signal" that encourages the use of mental content and negative affect serves as a "stop signal" that discourages use of such content. Thus, rather than assuming a direct or dedicated connection between affect and styles of cognitive processing, this view implies that the impact of affect on cognition should be quite malleable and depend on what thoughts and responses happen to be in mind at the time (see Clore & Huntsinger, 2009, for a review).

This influence of affect on cognition may usefully be conceived of as metacognitive. Metacognition involves our thoughts about our own thoughts and thought processes (Petty, Briñol, Tormala, & Wegener, 2007). We may, for example, feel confident in our belief that iguanas make fantastic pets, that the Clash is a great band, or that focusing on the details of the situation is appropriate. Such higher order thoughts then guide whether or not accessible mental content and thought processes inform judgments and guide responses.

At first glance it might seem peculiar that we should need information about our own cognitive processes because they are processes that we ourselves have generated. But much of our mental activity occurs beyond the reach of introspection (Wilson, 2002), and an important function of affective experience, then, is to provide conscious feedback or information about the ongoing workings of the cognitive system (Simon, 1967). Because positive affect is pleasant and negative affect is unpleasant, the feedback about the value of current thoughts and thought processes is also motivating. As such, affect acts as a stage manager of cognitive activity, including metacognitive activity, as it unfolds.

This chapter is organized as follows. In the first part, we review research consistent with the idea that affect moves cognition by providing metacognitive information about the value of accessible mental content and thought processes. This research shows that the link between affect and cognition is flexibly responsive to what thoughts and response tendencies happen to be in mind at the moment. The second part focuses on what is termed affective coherence versus affective incoherence. Affective beliefs are hypotheses about the evaluative state of the world or the self that can be either validated or invalidated by other coactivated affective cues like those from feelings or bodily states. Affective coherence occurs when affective and bodily cues validate affective concepts, and affective incoherence occurs when such cues invalidate affective concepts. The picture that emerges from this research is that whether or not embodied affect agrees with

activated concepts about affect plays an important metacognitive role in ongoing cognitive activity.

AFFECT AS METACOGNITIVE INFORMATION

We argue that affect regulates cognition by providing a ready source of information that people draw on when making metacognitive inferences about their own thoughts and thought processes. The information provided about affect is about the value of whatever thoughts and response tendencies happen to be in mind at the moment, which then guides the extent to which people draw on or use such thoughts and responses (Clore & Huntsinger, 2007, 2009). Positive affect signals that accessible thoughts and responses are valuable and encourages their use, whereas negative affect signals that they are not valuable and discourages their use.

From this viewpoint, rather than being dedicated to one or another kind of cognitive process, as is often assumed, the influence of affect on cognition should depend on its object or what it is about. In other words, affective influences on cognition should be flexibly responsive to changing goals, thoughts, and response inclinations. Whether positive or negative affect leads people to focus on the forest or the trees, for example, should depend on which perceptual focus happens to be dominant at the moment. Similarly, whether positive affect or negative affect leads to greater or lesser stereotyping should depend on whether stereotypical thoughts or counterstereotypical thoughts are most accessible in any particular cognitive moment.

Depending on the particular metacognitive question posed, the information about value conferred by affect on accessible thoughts and responses may be experienced in different ways. The positive value conferred on accessible thoughts by positive affect may make them seem particularly valid or it may lead people to have great confidence in them. In terms of accessible responses or styles of cognitive processing, positive affect may lead people to view them as particularly useful or appropriate ways of dealing with incoming information, navigating interactions with other people, or more generally acting on the world. Negative affect should have just the opposite effect. Though the information conveyed by affect about accessible thoughts and responses may be experienced in different ways, in each case it should regulate whether or not people rely on such thoughts and responses.

Au: should "acting on the world" be "acting in the world"?

In what follows, we review research spanning a variety of domains and outcomes that illustrates this metacognitive influence of affect on cognition. Along the way, we pay particular attention to studies that document the flexible impact of affect on cognition, and point out when results of this research are more consistent with a metacognitive influence of affect than with the idea that positive and negative affect promote different cognitive styles.

Thoughts: Signaling the Value of Accessible Attitudes

The idea that affect regulates the use of accessible thoughts by signaling their value is illustrated in recent research examining the influence of mood on the implicit

association task (Huntsinger, Sinclair, & Clore, 2009). After listening to music to induce happy or sad moods, participants completed several implicit measures of attitudes. These included racial attitudes assessed in the implicit association test (IAT) by comparing reaction times to endorse positive and negative associations to typical African American names (e.g., Rashan, Yolanda) in comparison to European American names (e.g., John, Heidi). As in other unselected, largely non-Black samples, mildly negative associations with African American names tend to be the dominant, most accessible responses. An additional experiment also varied mood, but used the IAT to measure gender-relevant attitudes toward English versus math.

Au: is inserted explanation of IAT correct?

Compared to men, the most accessible response for women tended to be negative to math relative to English. Happy moods were found to empower and sad moods to block the use of accessible attitudes toward African Americans and toward academic subjects. Specifically, compared to those in sad moods, participants in happy moods displayed the negative attitudes toward African Americans usually seen on such measures, and female participants in happy moods also displayed a stereotypical pattern of academic attitudes (i.e., favoring English over math).

Follow-up analyses on these data using a process-dissociation procedure (Payne, 2001) revealed that, consistent with the current metacognitive view, these mood effects were in fact due to differences in the use of accessible attitudes, rather than to mood-related differences in style or depth of cognitive processing, as is often assumed (e.g., Schwarz & Clore, 2007).

Goals: Signaling the Value of Goals Versus Goal Progress

When determining whether to pursue a goal, people often reflect on its feasibility or desirability. Such metacognitive judgments about goal feasibility and desirability then shape goal adoption (Gollwitzer & Schaal, 1998). People often draw on their affective reactions to different goals when making judgments about whether or not to pursue them (Schwarz & Bohner, 1996). In such instances, positive affect signals that accessible goals are feasible or desirable, whereas negative affect signals just the opposite. In research consistent with this idea, Fishbach and Labroo (2007) found that happy people worked harder on a task than sad people when a self-improvement goal was accessible, but less hard when a mood-maintenance goal was accessible.

A similar pattern was recently found for adoption or rejection of interpersonal goals—in this case, the goals to affiliate with or gain social distance from others. When people have the goal to affiliate with others, they allow their attitudes, self-beliefs, and affective states to adjust toward those of an interaction partner, a process called "social tuning." As with other goals, this research found that positive moods facilitated the adoption of activated interpersonal goals. When the goal to affiliate with a partner was in mind, positive mood led to the alignment of both implicit and explicit racial attitudes of partners, whereas negative moods did not lead to such alignment (Huntsinger & Sinclair, 2010).

People may also reflect on their progress during goal pursuit or whether goal pursuit is going well or poorly. Judgments about goal progress can then influence

whether people redouble or reduce their efforts to accomplish the goal, depending on the implied information about goal progress. Thus, when positive affect implies better progress than necessary, it leads to reduced effort, and when negative affect implies inadequate progress, it leads to increased effort (Martin, Ward, Achee, & Wyer, 1993).

People can also ask themselves whether their goal pursuit is enjoyable. When positive affect provides a "yes" answer, people continue the goal pursuit. When negative affect provides a "no" answer, this leads people to stop goal pursuit (Martin et al., 1993).

Implicit–Explicit Attitude Relations: Signaling the Value of Implicit Attitudes for Explicit Attitude Reports

Affect also regulates correspondence between implicit attitudes and explicit attitudes by conferring value on accessible implicit attitudes, which then regulate whether they inform explicit attitude reports (Huntsinger & Smith, 2009). Implicit attitudes reflect automatic tendencies to respond in a positive or negative fashion toward an attitude object; explicit attitudes reflect more controlled evaluative tendencies (Gawronski & Bodenhausen, 2006). But people typically base their explicit attitude reports on their automatic or implicit attitudes (Gawronski & Bodenhausen, 2006). Whether this occurs or not depends on the validation or invalidation of the implicit attitude by other accessible thoughts. In addition to such cognitive validation of implicit attitudes, however, factors such as mood may provide affective validation (Huntsinger & Smith, 2009). In multiple studies and in different attitude domains, positive moods have been found to promote congruence between implicit–explicit attitudes, whereas negative moods lead to a dissociation between implicit and explicit attitudes.

In addition, changing the object of affect can reverse the impact of mood on implicit–explicit attitude correspondence. In the research discussed earlier, affect informed people about the value of accessible implicit attitudes, whereas in other research (Huntsinger, 2010), affect informed people about the value of momentarily accessible inclinations to trust or distrust intuition. Whether out of habit or only temporarily, people who trust their intuitions, as compared to those who distrust their intuitions, allow their implicit attitudes to inform their explicit attitude reports (Jordan, Whitfield, & Zeigler-Hill, 2007).

Thus, in that research (e.g., Huntsinger, 2010) priming trust in intuition led people in positive but not negative moods to incorporate their implicit attitudes into their explicit attitude reports. By contrast, priming distrust in intuition resulted in the opposite pattern, so people in positive moods were then less likely than those in negative moods to incorporate their implicit attitudes into their explicit attitude reports. It should be noted that, in this research, both the measurement of participants' implicit attitudes and the priming task occurred before the mood induction, which precludes the possibility that mood influenced either the expression of implicit attitudes or the effectiveness of the priming task.

Persuasion: Signaling the Value of Processing Styles Versus Message-Relevant Thoughts

Some of the research we are discussing concerns metacognitive influences of affect on *how* people think (e.g., processing studies), whereas others concern such influences on *what* people think (e.g., judgment studies). Studies of affect and persuasion involve both. In terms of our current metacognitive analysis, the influence of affect on persuasion should depend on whether affect is experienced as feedback about accessible styles of thought or about specific thoughts while reading a persuasive appeal.

Influences on processing can be seen in many past studies in which moods are induced before receipt of the persuasive appeals (e.g., Bless, Bohner, Schwarz, & Strack, 1990; Mackie & Worth, 1989). In such cases, affect may shape the processing of persuasive messages by conferring value on accessible styles of information processing. If participants are motivated to conserve cognitive effort, as is sometimes assumed, they should process incoming information in a superficial or heuristic fashion. Positive affect would then validate this accessible style of processing, leading to equal persuasion by weak and strong arguments. Negative affect, on the other hand, should invalidate that accessible processing style, leading to more careful attention to the messages and greater persuasion by strong rather than weak arguments (Schwarz, Bless, & Bohner, 1991).

The second kind of influence can be seen in more recent studies in which, rather than moods being induced before receipt of persuasive appeals, they are induced afterward. Under these conditions, affect is experienced not as validation or invalidation of a heuristic or systematic mode of thought, but rather as validation or invalidation of the specific thoughts that came to mind while reading the persuasive messages (Briñol, Petty, & Barden, 2007).

In research by Briñol et al. (2007), for example, participants first were exposed to persuasive appeals consisting of either strong arguments or weak arguments and then wrote down their thoughts, which tended to be positive for strong arguments and negative for weak arguments. Positive or negative moods were then induced and participants rated their agreement with the persuasive appeal. Positive mood validated thoughts about the messages so that participants were persuaded more by strong than by weak arguments. In contrast, negative mood invalidated such thoughts, reversing these effects.

Stereotyping: Signaling the Value of Stereotypes Versus Counterstereotypes

Stereotypes represent knowledge about social groups and they frequently come to mind whenever people encounter or merely consider members of stereotyped groups (Fiske, 1998). As with any other thoughts, when stereotypes are in mind, positive affect confers positive value on them, promoting their use, and negative affect confers negative value on them, blocking their use. Thus, in a jury decision-making task, people in happy moods are more likely than those in sad moods to

impose a harsher sentence on a defendant if that person is a member of a social group associated with criminality or violence (Bodenhausen, Kramer, & Susser, 1994). When people form impressions of others, stereotypes are more likely to creep into the impressions of people in happy moods than into those of people in sad moods (Lambert, Khan, Lickel, & Fricke, 1997).

But this research examined only downstream judgments, leaving open the question of whether affect shapes the activation or application of stereotypes. That is, does affect regulate whether stereotypes come to mind or does it mainly control stereotype use once the stereotype is already activated? Recent research favors the former view, in which the impact of affect occurs at the stereotype activation stage (Huntsinger et al., 2009; Experiment 1). The outcome of interest was performance on Payne's (2001) weapon-identification task, in which participants are briefly exposed to either a Black or a White face and then indicate as quickly as possible whether a briefly presented image is of a weapon or a tool. Typically, errors that occur after exposure to a Black face involve seeing tools as weapons, whereas errors after exposure to a White face involve seeing weapons as tools (Payne, 2001). We found that positive moods led to more of these stereotypical errors than negative moods.

We then applied process-dissociation analyses (Payne, 2001) to decompose that performance into estimates of automatic and controlled processing. They revealed that mood influenced the automatic activation of race-related stereotypes, rather than the controlled application of already activated stereotypes. Our interpretation of this finding is that, in situations likely to elicit a stereotype automatically, negative affect hampers the automatic use and hence the activation of the stereotype, rather than that positive and negative affect are linked to distinctly different styles of processing.

A similar influence of affect on the use of stereotypical knowledge can be seen in recent research on affective regulation of social category priming. When primed with the category "elderly," for example, people walk more slowly down a hallway and express more conservative social attitudes (Dijksterhuis, Chartrand, & Aarts, 2007). If affect confers value on accessible thoughts, including primed social categories, then people in positive moods should be more likely than those in negative moods to display such effects. Several studies support this reasoning (Ashton-James, Huntsinger, Clore, & Chartrand, 2009). Participants in this research experienced a happy or sad mood induction and then completed a task that primed the social category "elderly" or "young." The outcome of interest here was participants' walking speeds and social attitudes. As predicted, happy moods led to slower walking speed and more conservative attitudes after the category "elderly" was primed compared to the category "young." Conversely, sad moods did not lead participants to display the attitudes and behavior stereotypically associated with the primed social category.

The consistent capacity of positive affect to increase reliance on stereotypes compared to negative affect appears to suggest some dedicated or express connection between affect and stereotyping. But another way of understanding this link is that stereotypes often spring to mind whenever people encounter or merely entertain thoughts about members of stereotyped groups (Bargh, 1997); therefore,

positive affect simply confers value on this highly accessible response. If this is the case, then the link between affect and stereotyping should vary according to the accessibility of stereotype-relevant thoughts and responses. When, for example, thoughts and responses that undermine or counter stereotyping are most accessible, positive affect should lead to less stereotyping than negative affect. When such thoughts and responses are not present in the mind, positive affect should lead to more stereotyping than negative affect.

Such flexibility in the link between affect and stereotyping was demonstrated in recent research (e.g., Huntsinger, Sinclair, Dunn, & Clore, 2010). In this research, happy moods reduced stereotyping compared to negative moods among individuals for whom the goal to be egalitarian was chronically or temporarily accessible. In the absence of egalitarian goals, happy moods increased stereotyping compared to negative moods. Similarly, among individuals for whom counterstereotypic thoughts were made accessible from exposure to strong female leaders or through formation of counterstereotypic implementation intentions (e.g., think safe in the presence of African Americans), happy moods reduced stereotyping compared to sad moods. The opposite influence of happy and sad moods was found among individuals for whom such thoughts were not accessible. It should be noted that, in several of these studies, the manipulation of counterstereotypic thoughts occurred prior to the mood manipulation, thereby excluding the possibility that the observed differences in stereotyping occurred because mood influenced the efficacy of the thought manipulation.

The results of this research are difficult to reconcile with perspectives that assume a direct, exclusive connection between affect and the use of stereotypes—whether because positive affect instigates heuristic processing, use of preexisting general knowledge structures, or a global focus. If there were such a connection, then people in positive moods should display greater stereotyping than those in negative moods, regardless of the presence or absence of egalitarian response tendencies or exposure to counterstereotypic exemplars. In contrast, our results suggest that affect is not inextricably connected to the use of stereotypes and that previously observed relationships between affect and stereotyping are reversed when counterstereotypic responses are more accessible.

Global–Local Focus: Signaling the Value of Perceptual Styles

When peering out at the world, people in positive moods tend to focus on the "forest," whereas those in negative moods focus on the "trees." This tendency has been found for a variety of outcomes. When judging the similarity between a series of geometric figures, people in positive moods tend to base their similarity judgments on the global features of the stimuli more than do people in negative moods (Gasper & Clore, 2002). Similarly, when forming impressions of others, people in happy moods are more likely to rely on global information, such as stereotypes, whereas those in negative moods are more likely to rely on local information, such as specific behaviors (Isbell, 2004). A similar pattern emerges in studies of autobiographical recall. People in positive moods describe events from the past using

more global, abstract representations; those in negative moods use more local, concrete representations (Beukeboom & Semin, 2005, 2006).

As with stereotypes, the apparent consistency of the link between positive and negative affect and a global versus local focus, respectively, led many to propose that affect regulates people's focus of attention (see Schwarz & Clore, 2007, for a review). Although people certainly possess the capacity to shift between a global and local focus, in most circumstances a global focus dominates (Navon, 1977), and most experimental contexts only reinforce this tendency. Therefore, rather than instigating a global focus, positive affect may merely be conferring value on this already accessible way of viewing the world. If this is the case, then making a local focus most accessible should reverse the link between affect and a global versus local perceptual focus.

This idea was recently examined in the context of perceptual judgments (Huntsinger, Clore, & Bar-Anan, 2010). Across two different measures of perceptual focus, when a global focus was most accessible, people in happy moods displayed a tendency to focus on the forest, whereas those in sad moods focused on the trees. However, when a local focus was made most accessible, this pattern reversed. Then, people in happy moods focused on the trees, whereas those in sad moods focused on the forest. Importantly, in both studies there was not a hint of a direct effect of mood on perceptual style, and the manipulation of perceptual focus in one experiment occurred prior to the manipulation of mood, thereby ruling out the prospect that the success of the perceptual focus manipulation varied as a consequence of participants' moods.

Creativity: Signaling the Value of Thoughts and Focus

Other than a global versus local focus, perhaps the most commonly assumed direct connection between affect and cognitive processing concerns creativity. Across a variety of different tasks, including Dunker's candle task and the remote associates test, people in positive moods typically display greater creativity and flexibility in their thinking than do those in negative moods (Baas, De Dreu, & Nijstad, 2008; Isen, 1987). Does positive affect directly instigate greater cognitive flexibility and a divergent thinking style? Certainly that is one possibility, but, as with a global–local focus, the affect experienced during creativity tasks may simply be conferring positive or negative value on accessible thoughts and response tendencies.

When contemplating unusual uses for a brick, for example, mood may signal the value of thoughts that come to mind (e.g., "a brick would make a for clever hood ornament"), which then influence whether they are reported during the task. Because they view accessible thoughts as valid and valuable, people in positive moods should be more likely to report those thoughts than people in negative moods. This may then contribute to mood-related differences in divergent and creative thinking. Just such a pattern was found in recent research. While completing a creativity task, people in negative moods were less likely than those in positive moods to report thoughts that came to mind (Gasper, 2004). However, this difference in reporting thoughts, and hence in apparent creativity, disappeared when participants were encouraged to write down whatever thoughts came to mind

while completing the task. Thus, what appears to be an affective influence on what types of thoughts come to mind during a creativity task (e.g., Isen, 1987) may sometimes be an influence on whether or not people rely on whatever thoughts come to mind.

But, presumably, mood can also influence creative generation as well as creative responding on occasion. One alternative approach to understanding mood effects on creative thought generation is to assume that many creativity tasks are probably among the more enjoyable tasks that participants in psychology experiments encounter. If so, participants may spontaneously adopt an enjoyment focus when completing creativity tasks in laboratory experiments, which may underlie many of the mood-related differences in creativity found in past research (see Wyer, Clore, & Isbell, 1999). If this is the case, then manipulating the framing of a creativity task should break the link between affect and creativity. Consistent with this idea, when a task is framed in a way that stresses enjoyment, people in positive moods, compared to those in negative moods, devote more time to the task and thus come up with more creative responses (Martin et al., 1993). But when performance rather than enjoyment is stressed, people in positive moods devote less time to the task and thus come up with less creative responses than those in negative moods.

Additional evidence for malleability in the affect–creativity link comes from studies that vary whether participants are instructed to focus on similarities or differences. In one study of this sort (Murray, Sujan, Hirt, & Sujan, 1990), participants were induced into a happy or sad mood prior to completing a measure of categorization breadth in which they grouped TV shows into meaningful categories. During this task, some participants were instructed to focus on the differences between the TV shows and others were instructed to focus on their similarities. When a focus on differences was accessible, people in positive moods displayed a greater breadth of categorization than those in negative moods—the standard link between affect and creativity. When a focus on similarities was accessible, by contrast, people in positive moods displayed a lesser breadth of categorization than those in negative moods.

Summary

In this section we reviewed evidence showing that the influence of affect on cognition is metacognitive in that affect provides a source of embodied information that people draw on when making inferences about currently accessible thoughts and styles of thinking. Positive affect confers positive value and negative affect confers negative value on accessible thoughts and mental styles, which regulates how people process information and whether they rely on particular thoughts.

As this research shows, and in contrast to the idea that positive and negative affect are tied to particular cognitive outcomes, the impact of affect on cognition is quite variable. Positive affect can encourage one to focus on the forest or the trees, depending on which perceptual focus is most dominant at the moment. Similarly, positive affect does not invariably lead to greater stereotyping and creativity than negative affect; again, this connection depends on what thoughts and

responses happen to be accessible at the moment. It should be noted, however, that as research by Petty (Wegener & Petty, 2001) has shown, affect can have multiple effects on cognition even in the same experiment. Our position is therefore that one way in which affect influences cognition is by validating accessible thoughts, inclinations, and styles of thinking. The flexibility of this process can be seen in the research reviewed in the next section.

AFFECTIVE (IN)COHERENCE: COGNITIVE CONSEQUENCES

This section concerns the cognitive consequences of what is called *affective coherence* and *incoherence.* One way to view evaluative beliefs is as hypotheses about the value of objects in the world, including the self. Principal sources of data for such hypotheses are one's own affective feelings and bodily cues. We speak of affective coherence when such subjective experiences are consistent with evaluative beliefs and of affective incoherence when they are inconsistent with evaluative beliefs.

Epistemic Consequences of Affective Coherence

When subjective experience fails to validate evaluative beliefs about the self, a person is confronted with an epistemic problem. When this happens during cognitive tasks, it may interfere with ongoing cognitive activity, leading to a decrease in performance. This idea was examined in recent research in which momentary affective feelings were made to be either consistent or inconsistent with people's theories about whether they were generally happy or unhappy individuals (Tamir, Robinson, & Clore, 2002). A measure of extraversion–introversion was used as the measure of general beliefs about the self because extraverts reliably report believing themselves to be happier individuals than do introverts. Consistent with hypotheses about the effects of affective incoherence, when induced moods produced feelings that were incompatible with participants' beliefs about themselves as more or as less happy individuals, their performance on a reaction-time task suffered. Thus, happy extraverts who found themselves in a sad mood and unhappy introverts who felt momentarily happy were both relatively slow in making simple choices in comparison to those with feelings and beliefs that were in harmony.

Similar kinds of performance effects have been found in research employing several different forms of affective coherence and incoherence (Centerbar, Schnall, Clore, & Garvin, 2008). In four experiments, happy or sad concepts were primed—in some cases using the sentence unscrambling technique (Srull & Wyer, 1979) and in some cases using subliminal exposure to the same happy or sad words. Of interest was the degree to which various affective experiences would serve as a kind of "evidence" for the validity of happy or sad concepts that had been activated through subtle or unconscious priming.

In one experiment, the experiential "evidence" came from happy or sad feelings due to a musical mood induction. In another, the experiential evidence came from muscular feedback relevant from having participants flex either their obicularis

(smile) or corrugator (frown) muscles. In two other experiments, the evidence came from having participants engage in arm muscle flexion (approach) or extension (avoidance) by pressing up or down on the top or bottom of a desktop.

In each of these experiments, participants were asked at the end to recall as much as they could of a story that they had read earlier in the study. Analyses of their free recall showed the same pattern in each case. When affective feelings and bodily cues were inconsistent with affective ideas that had been primed, participants were able to recall significantly less of the story than those whose activated cognitions were validated by the affective feedback from feelings, expressions, and actions.

Affective Coherence Influences the Value of Accessible Mental Content

As discussed by Centerbar et al. (2008), one way to understand the influence of affective coherence and incoherence is that they elicit feelings of fluency and disfluency, respectively. Evidence consistent with this idea comes from the finding that, as in the case of fluency experiences, experiences of affective coherence are associated with increased feelings of positive affect.

Research on fluency has generally explored its effects on judgment, finding that fluency experiences lead to more positive judgments than disfluency experiences (Oppenheimer, 2008; Reber, Schwarz, & Winkielman, 2004). However, recent research suggests that fluency and disfluency may also serve as cues to the value or validity of accessible mental content, with fluency validating and disfluency invalidating accessible thoughts and responses. Evidence of fluency and disfluency directly changing the judged value or validity of accessible thoughts comes from research examining ease of retrieval effects on persuasion and judgment (Tormala, Falces, Briñol, & Petty, 2007; Tormala, Petty, & Briñol, 2002). In this research, fluency was shown to enhance and disfluency to reduce confidence in accessible thoughts, which then was shown to play a pivotal role in whether such thoughts impacted judgments. This influence of fluency on the subjective value of available mental content has also been shown for primed concepts in impression formation tasks, such as the now classic Donald paradigm (Häfner & Stapel, 2010).

The possibility of a link between affective coherence and incoherence and the use of accessible mental content was recently explored in a series of studies (Huntsinger, 2009; Huntsinger & Graupner, 2010). The idea was that if affective coherence produces feelings of fluency, then it should enhance the subjective value or validity of accessible thoughts. If affective incoherence produces feelings of disfluency, then it should have just the opposite effect on the use of accessible thoughts. Affective coherence and incoherence were again manipulated in different ways in these experiments, including by inducing matches or mismatches in state and trait affect in several studies and by creating matches or mismatches in affective feelings and primed affective concepts in others.

The role of affective coherence in validating accessible thoughts and responses is further shown in research examining its impact on persuasion (Huntsinger & Graupner, 2010). In two studies, affective coherence (vs. incoherence) was induced prior to participants reading persuasive messages advocating

implementation of comprehensive exams for graduating seniors. In addition to the manipulation of affective coherence, these studies also manipulated the strength of the arguments in the persuasive messages (Study 1) and expertise of the source advocating such exams (Study 2). In these studies, affective coherence and incoherence should have been experienced as validation or invalidation, respectively, of available styles of thought and led to differences in how participants processed the messages.

Given people's general inclination to conserve cognitive resources, affective coherence should have validated this tendency and led to superficial or heuristic processing. Affective incoherence, on the other hand, should have invalidated this inclination and led to more careful or systematic processing. Consistent with this idea, affective coherence led participants to be equally persuaded by weak versus strong messages (Study 1) and to be more persuaded by an expert than an inexpert source. Affective incoherence, by contrast, led participants to be persuaded more by strong than weak appeals and to be equally persuaded by expert and nonexpert sources.

In a third study, affective coherence was induced after participants read persuasive appeals containing either strong or weak arguments, but before they reported their attitudes toward comprehensive exams. Thus, similarly to the research by Briñol et al. (2007), rather than validating accessible styles of processing, in this situation affective coherence should have validated or invalidated the specific thoughts that came to mind while reading the persuasive messages. Consistent with this idea, affective coherence led participants to be more persuaded by strong versus weak persuasive appeals, whereas affective incoherence led to the opposite pattern of persuasion. Participants were also asked about their confidence in the thoughts that came to mind reading the persuasive messages. As expected, affective coherence led to greater confidence in such thoughts than did affective incoherence. Mediation analyses revealed that this difference in thought confidence mediated the relation between affective coherence and persuasion discussed before. Accordingly, this research provides direct evidence for the role of affective coherence (vs. incoherence) in shaping the subjective value of accessible mental content, which in turn shapes whether people rely on this content.

Also consistent with the idea that affective coherence influences the perceived value of accessible thoughts, in other studies White participants experiencing affective coherence were more likely than those experiencing incoherence to display stereotypical attitudes toward African Americans and also to show a general preference for arts over math, which is commonly found on the IAT (Huntsinger, 2009, Studies 1 and 2). A similar pattern was found for performance on Payne's weapon-identification task, where affective coherence led to more stereotypical mistakes on this task than affective incoherence (Study 3). In each study, process-dissociation analyses indicated that variation in the expression of implicit attitudes and stereotypes was driven by changes in the automatic use of accessible thoughts, rather than changes in the amount or style of cognitive processing. Affective coherence and affective incoherence were also found to affect the extent to which primed social categories influenced behavior (Study 4) and chronically accessible perceptual styles dominated visual processing (Study 5).

CODA

In this chapter, we took the perspective that affect acts as a guide to cognition—a metacognitive guide, to be precise. We reviewed evidence showing that the influence of affect on cognition is metacognitive in that affect provides a source of embodied information that people draw on when making inferences about currently accessible thoughts and styles of thinking. Positive affect confers positive value and negative affect confers negative value on accessible thoughts and cognitive styles; this regulates how people process information and whether they rely on particular thoughts. As this research shows, and in contrast to the idea that positive and negative affect are tied to particular cognitive outcomes, the impact of affect on cognition is quite variable and depends on the thoughts and responses that happen to be in mind at any given cognitive moment.

The second half of this chapter concerned the cognitive consequences of affective coherence and incoherence. Affective beliefs are hypotheses about the evaluative state of the world or the self that can be validated or invalidated by other coactivated affective cues like those from feelings or bodily states. Affective coherence occurs when affective and bodily cues validate affective concepts, and affective incoherence occurs when such cues invalidate affective concepts.

As our research shows, affect regulates thought by serving as information about the suitability of one's current thoughts or cognitive orientation in a specific task situation. The success of affective reactions in promoting this alignment, however, might be moderated by emotional intelligence or other factors affecting the individual's ability to read his or her own affective reactions accurately, which might in turn be moderated by the intensity of such reactions (for a longer list, see Gohm & Clore, 2000).

In addition, to the extent that such processes involve metacognitive activity, one might expect it to be moderated by variation in motivation and attentional resources. However, that expectation assumes that metacognitive activity necessarily involves controlled rather than automatic processes. But some of the cognitions and inclinations that affective reactions appear to validate are unconscious. Hence, their validation may not involve controlled processing and might not therefore require cognitive resources. For example, some metacognitive validations might be rather nonspecific. Rather than validating one's particular thought, as in a persuasion experiment, affect and fluency experiences might validate one's general cognitive orientation to a task. Feeling positive, fluent, or in the groove, or having an experience of flow might promote a current line of thought more or less automatically.

To be effective, the process would presumably involve a tacit interpretive frame in which feelings of positivity and fluency signify the appropriateness of one's current thoughts, ideas, and cognitive approach. Such metacognitive messages might not then be moderated by factors such as one's need for cognition or the availability of attentional resources. Our reasoning here is simply that because cognitions are not subject to the limitations of conscious, controlled processing, cognitions about cognitions, or metacognitions, might not be subject to such limitations either.

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