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How Emotion Shapes Behavior: Feedback, Anticipation, and Reflection, Rather Than Direct Causation

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Fear causes fleeing and thereby saves lives: this exemplifies a popular and common sense but increasingly untenable view that the direct causation of behavior is the primary function of emotion. Instead, the authors develop a theory of emotion as a feedback system whose influence on behavior is typically indirect. By providing feedback and stimulating retrospective appraisal of actions, conscious emotional states can promote learning and alter guidelines for future behavior. Behavior may also be chosen to pursue (or avoid) anticipated emotional outcomes. Rapid, automatic affective responses, in contrast to the full-blown conscious emotions, may inform cognition and behavioral choice and thereby help guide current behavior. The automatic affective responses may also remind the person of past emotional outcomes and provide useful guides as to what emotional outcomes may be anticipated in the present. To justify replacing the direct causation model with the feedback model, the authors review a large body of empirical findings.

Keywords: *social cognition; automatic/implicit processes; emotion*

Strong emotional reactions are among the most powerful experiences of everyday life. Probably almost

everyone recognizes that feelings of love, anger, guilt, worry, joy, and grief are influential, even defining moments in human life. A life without emotion would seem to many people scarcely worth living, for it would lack much of the richness and variety of human experience. On the other hand, emotions also carry the stereotype of causing people to behave in foolish, illogical, and sometimes destructive ways. But why would people want to have emotions if their main impact is to produce undesirable behaviors that will be regretted later? And, even more to the point, why would evolution have instilled and maintained a strong repertoire of emotional responses in the human psyche, if it mainly caused foolish or otherwise irrational behaviors?

This manuscript is concerned with how emotion is related to behavior, both in terms of ideal function and in terms of actual impact. We assume that most or perhaps

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all psychological processes, and certainly emotion, exist in part to influence behavior. Moreover, this influence would have to be mainly benign and adaptive. If the total net effect of emotion were to cause behaviors that were maladaptive, such as by reducing survival and reproduction, then natural selection would likely have phased emotion out of the human psyche.

The problem, then, is to understand how does emotion exert a causal influence on behavior. The simplest and most parsimonious theory is that emotion directly causes behavior. Fear makes you flee, anger makes you fight, and so forth. This direct causation theory has advantages beyond parsimony, including commonsense appeal. People will explain someone's behavior in terms of "because she was mad" or "because he was afraid," as opposed saying "anger directed her cognitive processing to focus disproportionately on certain possible outcomes, whereupon her behavioral decision process failed to take certain potential risks into account" or "fear temporarily reordered his goal priorities, causing him to abandon one goal in favor of the seemingly urgent albeit irrational goal of escaping the situation."

Given the advantages of parsimony and commonsense appeal, we can only justify developing an alternative, more complicated theory if the direct causation theory is inadequate. Establishing its inadequacy is therefore one thrust of this review. Toward that end, we shall invoke multiple kinds of argument. One is that many emotions do not cause behavior. Another is that ostensible evidence for direct causation of behavior by emotion is often in fact misleading. A third is that when emotion does influence behavior directly, its consequences may be maladaptive or counterproductive, in which case that seems unlikely to be their main function.

Instead of direct causation, we shall promote a view of emotion as a feedback system. Full-blown, conscious emotional experiences operate to stimulate cognitive processing after some outcome or behavior. They facilitate learning lessons and forge new associations between affect and various behavioral responses. Subsequently, these associated affective traces may shape behavior without having to develop into full-fledged conscious emotion. The outcome of the cognitive processing can also serve as valuable input into further behavior even in the same situation that gave rise to the original emotion, if time permits. Ultimately, and crucially, people learn to anticipate emotional outcomes and behave so as to pursue the emotions they prefer.

Thus, this paper rejects the view that the primary function of emotion is to cause behavior directly. We do not deny that emotion can occasionally have such direct effects, but these are likely to be sporadic and sometimes counterproductive. In contrast, we think human conscious emotion operates mainly and best by means

of its influence on cognitive processes, which in turn are input into decision and behavior regulation processes.

Dual Emotional Processes

A perennial obstacle to integrative theories of emotion is that not all emotional phenomena seem to follow the same patterns. It is entirely plausible that the category of emotion and/or affect comprises different kinds of phenomena that follow different causal principles and serve different functions. With cognition, it became necessary to sort many processes into the broad categories of automatic and controlled, and indeed such dual process approaches have been found useful in a steadily expanding set of phenomena (Chaiken & Trope, 1999; Wilson, 2002).

To discuss the possible links between emotion and behavior, we find it necessary to take steps toward a dual process theory of emotional phenomena. That is, people have automatic affective reactions (such as liking and disliking something) that are simple and rapid and may well guide online behavior and quick reactions, even when the full-blown, consciously experienced emotional reaction (complete with physiological arousal) may be too slow and complex to be useful in the same way. If that is correct, then one must search in different places for the relevant functions of the automatic affective reactions and full-blown conscious emotion.

Indeed, a dual process approach to emotion may be useful in resolving some of the most fundamental disagreements that seem to have stymied progress in emotion theory. In particular, the long-standing debate over whether emotion depends on cognition is regarded by both sides as having been resolved in their favor. Theorists who believe cognition is inextricably intertwined in emotion (e.g., Clore, 1994; DeSteno, Petty, Rucker, Wegener, & Braverman, 2004; Robinson & Clore, 2002; Scherer, Schorr, & Johnstone, 2001; C. Smith & Ellsworth, 1985) typically talk about the fully complex, conscious emotional reactions, whereas those who argue that preferences need no inferences (Kunst-Wilson & Zajonc, 1980; Monahan, Murphy, & Zajonc, 2000; Winkielman & Berridge, 2004) emphasize the simple, automatic affective responses. A dual process approach would allow both sides (each of which can point to abundant convincing data) to be correct without contradiction. In other words, maybe conscious emotion is inextricably intertwined with cognition, whereas automatically affective reactions require nothing more than a perception and an association.

For the present, we shall use the terms emotion and mood to refer to what laypersons conventionally understand by emotion. It is a state of conscious feeling, typically characterized by physiological changes such as

arousal. It is experienced as unitary, which is to say as a single state, though it may show up on measures as a blend of several different emotions. (Nonetheless, the fact of blending indicates that the different emotional ingredients are not experienced separately but rather as part of a single state.) It is typically slow to arise and dissipate. It is heavily saturated with cognitions and is normally itself the result of cognitions, especially evaluations. Between the basic set of emotions and the blends, there is a vast assortment of emotions and moods to which people are subject.

In contrast, we shall use the term *affect* to refer to automatic responses. These may be conscious or non-conscious. Typically they are no more than a quick twinge of feeling that something is good or bad, of liking or disliking for something. Winkielman and Trujillo (in press) refer to affect as being a concept that is mainly differentiated on the basis of valence, which is to say positivity versus negativity. This fact is well suited to a very quick and simple response (unlike a complex emotion). Affect does not entail the intense conscious experience that emotion does, though some conscious awareness of liking or disliking may be felt. Automatic affect may not require physiological arousal, although there may be a small or incipient increase. Automatic affective responses arise quite rapidly, possibly within small fractions of a second, and they may dissipate just as quickly. Affect may lack the range and variety of conscious emotion, often consisting of no more than a simple feeling that something is good or bad, to be approached or avoided. It does not rest on elaborate cognitive processing: the feeling of liking or disliking some stimulus may require nothing more than perceiving the stimulus and making one association. Like other automatic processes, affective responses may operate in parallel, and so it would be possible to have several automatic reactions at the same time to the same stimulus, even possibly conflicting ones.

Our usage of these terms is somewhat different from that of Russell (2003), though our ideas are compatible with his and indeed build on them. He uses the term *core affect* to refer to the experiential quality of consciously felt emotion. Core affect is comprised by its valence (positive or negative) and its degree of arousal. By definition, core affect is "consciously experienced" (2003, p. 148). Apart from those two dimensions of variation, core affect does not differentiate between different emotions. In contrast, we are using the term *automatic affect* to refer to phenomena that could be nonconscious and may encode information that differentiates between different emotions. Thus, although the word *affect* is contained in both terms *automatic affect* and *core affect*, the references are to genuinely different phenomena. On the other hand, Russell (2003) uses the

term *blue-ribbon emotions* (e.g., p. 153) to refer to the same phenomena we call conscious emotion and full-fledged emotion. In that respect, our analysis follows his in recognizing the special status of certain fully developed, consciously felt, differentiated emotional states and in recognizing the need to differentiate these important phenomena from other aspects or forms of emotional responding.

A particular difference between our interest and Russell's (2003) is that automatic affect has a cognitive component (hence the differentiation beyond valence). Automatic affective responses may not be full-fledged or blue-ribbon emotions, but they may contain information that is useful enough to alter subsequent cognitions and behavior.

If we assume that both conscious emotion and automatic affect have some relationship to behavior, there is no reason to assume that these relationships are similar, and in fact it seems more plausible that they would operate in quite different ways. Most obviously, the difference in speed makes one much better suited than the other to guide behavior in the heat of the moment. That is, emotion may be rather too slow to guide behavior directly in a fast-changing situation, because time is required for the cognitive processing of the event to lead to physiological changes such as arousal, which in turn may activate motor responses. In contrast, automatic affect will arise almost instantaneously and therefore be available to steer behavior even at a moment's notice.

The difference can be illustrated with the example of fear, which we have found to be a favorite illustration of the notion that emotion directly causes behavior (insofar as fear stimulates flight, thereby promoting survival). Imagine an early human encountering a dangerous predator. For conscious emotion to mediate the flight, a sequence something like this would be necessary. The person must recognize the animal and cognitively appraise the danger. This gives rise to physiological arousal, which spreads through the person's body. The bodily response then triggers a further cognitive process involving the brain, which recognizes the bodily state as fear and on that basis initiates a motor response, and the person flees. This sequence is plausible, but it would take some time (at least seconds, more likely minutes), during which the person is continually exposed to danger. Humans or animals whose responses depended on such a sequence might therefore make relatively easy meals for quick-acting predators.

In contrast, automatic affect would arise in perhaps a tenth of a second, almost as soon as the predator is recognized (N. Smith, Cacioppo, Larsen, & Chartrand, 2003). If survival depends on an immediate response, the affective reaction would be available to inform and guide it (tigers are bad, so run away from rather than

toward them). In this view, the person could be in full flight mode before the conscious emotion of fear is fully formed.

Of what use would fear be at all, if it only arises when the person is already fleeing, or indeed (as some accounts suggest) it is not fully felt until the danger is past and the person has reached safety? One possible use would be to stimulate learning. A wash of fear after a narrow escape could well leave behind the associations that would give rise to more automatic affects in the future. In that example, the retrospective emotion of conscious fear might form associative links to the meadow where the tiger was met, so that the next time the person were tempted to walk that way (perhaps past the tiger's lair), automatic responses would stimulate avoidance tendencies long before the point at which one would actually encounter the tiger again. To be sure, in a prolonged episode, there would be time for fear to build as a conscious emotional state and to influence current behavior. The arousal component of emotion, in particular, might be useful for enhancing performance if the crisis is continuing. This pattern would neatly capitalize on the advantage but avoid the disadvantage of conscious emotion: Insofar as behavior is already underway by the time the emotion blossoms, the emotion would not alter the decision about how to act, but its arousal could improve the person's ability to continue and succeed at that line of action. In other words, the full-blown state of fear, complete with arousal, may arise only after the person is already running away, but it could help the person run faster and longer.

Research from neuroscience suggests that processing of emotional information and the conscious experience of emotion occur in different parts of the brain. Although most of psychologists were trained to believe that the amygdala is the emotion center of the brain (cf. LeDoux, 1996), it seems now that the amygdala is involved instead in altering responses in light of emotional stimuli and does not in fact provide the feeling state of emotion (for a review, see Winkielman, Knutson, Paulus, & Trujillo, in press). The amygdala takes cues from the external environment and adjusts downstream responses, as seen in studies showing that monkeys' amygdalar neurons change at rates that correspond to positive and negative feedback and that this rate of change predicts learning with respect to that stimulus (Paton, Belova, Morrison, & Salzman, 2006). In fact, the neurons in the amygdala respond to subliminal presentations of social information, suggesting that an emotional incident just occurred (increases in the whites of the eyes; Whalen, Rauch, Etcoff, McInerney, Lee, & Jenike, 1998) and is sensitive to gaze information generally (Adams, Gordon, Baird, Ambady, & Kleck, 2003), which suggests a specific interpersonal

function. Therefore, amygdala activity corresponds to affective cues (even those presented outside of awareness; Whalen et al., 1998) and predicts subsequent behavior in an emotional-learning domain (Paton et al., 2006). Notably, however, insult to the amygdala makes no discernible difference in people's conscious experience of emotions (A. Anderson & Phelps, 2002). Rather, activity in the insula, an area that connects to the amygdala, appears to be involved in the creation of emotional experiences. Insular activity corresponds to awareness of threat (Critchley et al., 2000) and supraliminal exposures to emotional stimuli (Morris et al., 1998; Phillips et al., 1998). Particularly notable for social and personality psychology is the finding that the insula becomes active when people are asked to think about emotional memories (Damasio et al., 2000), but if this area is injured, then people do not feel.

A central point of Russell's (2003) analysis was that despite the wide variety of emotions, the operative aspect may often be contained in the simple valence of what he calls core affect, which is to say whether the emotion is good or bad. We are saying that it is mainly the automatic affective responses that directly contribute to causing behavior. To combine these ideas, one could suggest that the automatic affective responses may emphasize the simple good and/or bad dimension, even though they may be further differentiated and contain additional information that might occasionally prove useful. A reason for the dominant influence of the good and/or bad dimension may lie in the organization of the behavior control apparatus into separate approach and avoid systems. Put simply, the quick affective responses mainly indicate either good or bad evaluations, which activate either the approach or avoidance systems. After that, the precise sequence of what to do depends on the complex structure of opportunities and constraints built into the present situation. In this view, neither full-blown emotion nor automatic affect contains a built-in prescription for specific actions. Automatic affects simply activate approach and avoid tendencies, and conscious emotions stimulate reflection and learning. Both then depend on cognitive appraisal to become translated into specific programs for what, exactly, should be done.

Further Definitions and Scope of Problem

As indicated above, we distinguish between two types of emotional phenomena. The full-blown emotion, complete with unmistakable subjective experience and physiological arousal, comprise *conscious emotion*, encompassing also emotion and mood. In contrast, automatic affect refers to much simpler phenomena, which may or may not reach the threshold of conscious

experience and can be characterized by small or no bodily arousal.

The term *behavior* is widely used, but some distinctions are important for clarity. The broadest usages of behavior (promoted by efforts to expand behaviorism so as to encompass all phenomena that psychologists wanted to study) include emotion, as well as cognition and the like. By this view, emotion is behavior, and so any attempt to examine the link between emotion and behavior would be moot if not tautological. We however wish to reserve the term behavior to refer to physical or meaningful action (including speech acts), as distinct from both cognition and emotion.

We also need to distinguish emotional expression as a special case of behavior. We think there is little need to debate the obvious fact that powerfully felt emotions can directly cause people to cry, smile, scream, or make the sorts of facial expressions that Ekman and his group have made famous (e.g., Ekman et al., 1987; also Elfenbein & Ambady, 2002). In contrast, there is much more room to debate whether consciously felt emotions can directly cause people to do a favor for a friend, attack a stranger, make a purchase, compose a song, or start or end a relationship.

We are prepared to accept that emotion can have an indirect influence on behavior by means of its effects on cognition. Our focus is on whether emotion directly causes behavior. We ask, can emotion be a sufficient explanation for some behaviors, without having to invoke conscious executive functioning and altered cognitive processing?

EXPOSITION OF THEORY

This section will lay out the two main theoretical positions about the possible link between emotion and behavior. The first is the simple, parsimonious, and intuitive argument that a major purpose of emotion is to cause behavior directly. The second is the more complex argument depicting emotion as a feedback system. To the extent that the first is inadequate, the second may take its place. The main body of this article will examine empirical findings to assess the two theories.

Direct Initiation: Emotion Causes Behavior

The first theory holds that emotion directly causes behavior. Although we have come to think there are valid reasons for experts to doubt such a view, we believe that this form of thinking is widespread. Russell (2003) characterized the popular view as “everyone knows that fear brings flight and anger brings fight” (p. 161). In everyday conversation, people will attribute

someone’s actions as having been performed “because she was angry,” or sad, or worried, or afraid. Journal reviewers likewise will often propose that some behavioral pattern occurred as a direct result of the emotional state that the procedures created in the participants. The underlying assumption is that emotion is a strong and direct cause of behavior, and so identifying someone’s emotional state explains why the person acted in a certain way.

It is also widely assumed that research evidence supports the view that emotion causes behavior. The influential literature review by Loewenstein, Weber, Hsee, and Welch (2001) asserted that “The idea that emotions exert a direct and powerful influence on behavior receives ample support in the psychological literature on emotions,” (p. 272), though what it cited was neither extensive nor convincing. Yet, apparently none of the authors or reviewers found the assertion questionable or even thought that it was necessary to back it up with evidence.

The common assumption that the main function of emotions is to cause behavior directly can be seen in the writings of many experts, even if most of them soon add qualifications. “Emotions are the labels that we give to our dispositions to act in characteristic ways,” according to Booth and Pennebaker (2000, p. 560). Philosophers such as Ryle (1951) have emphasized the behavioral aspect rather than the inner experience and therefore regarded emotions as dispositions to act in particular ways (Solomon, 1976, 2000). Frijda (1986) emphasized action readiness and later explicated this by saying that emotions are “processes that involve involuntary, nonhabitual action control” (1986, p. 63), a view that rejects a conceptual separation between motivation and emotion in favor of saying that emotion “arouses behavior and drives it forth” (p. 67). Writers such as Frank (1988) have contended that it would be adaptive for emotions to cause behavior directly and indeed inexorably, even dangerous or self-defeating behaviors, because these tendencies will have useful social consequences. For example, if someone is perceived as disposed to deal with anger by seeking revenge at any cost, then others will avoid antagonizing that person. Evolutionary versions of this argument recognize “emotional programs in which the desire to attempt certain actions should be overwhelming, to the point where the actions are experienced as compulsory” (Cosmides & Tooby, 2000, p. 107). Izard and Ackerman (2000) note that “emotion-behavior relations begin to develop early and remain stable over time” (p. 254), noting that as the growing child adds new behaviors to the repertoire for a particular emotion, these new ones complement the earlier ones and remain functionally similar to them.

Several observations lend plausibility to the idea that the purpose of emotion is to cause behavior. First, all psychological processes are presumed to contribute to behavior in some way, and so emotion must also. Direct initiation of behavior would be the simplest way for emotions to influence behavior. Second, many emotions are characterized by heightened bodily arousal, which is generally regarded as mobilizing the body for action. To be sure, arousal may be general and all-purpose, as Schachter and Singer (1962) emphasized, such that roughly the same arousal state characterizes quite different emotions. Still, the fact of arousal suggests that emotions involve increasing the likelihood of active responses. Third, whereas human cognition is relatively advanced and possibly unique among animals, emotional responses may be considerably older, and so emotions may have served to activate responses in many animals that lacked the cognitive capabilities to make behavioral decisions based on reasoning and other forms of information use.

A variation on this view would hold that emotions may have evolved originally for the sake of direct control of behaviors, but this function of emotion has been rendered somewhat obsolete by the further evolution (in human beings at least) of a complex and powerful cognitive system and a sophisticated capacity for self-regulation. Fear might cause rats to flee, but human beings can stop and analyze the situation or can override their fear if necessary (for example, because their military duty requires them to remain at their post). In this view, emotions can still engender behavioral impulses, but these do not necessarily translate into actual behavior. However, this view is already a large step toward our second theory, because it says that, in humans at least, emotion no longer functions mainly as a direct cause of behavior, and so an alternative and more indirect contribution must be argued.

The view that emotions directly cause behavior has been invoked mainly for negative emotions. Pleasant, positive emotions are not seen as directly causing behavior. Fear makes you run away and anger makes you fight, but what does joy make you do? Fredrickson (1998) noted this asymmetry and proposed that positive emotions serve to broaden the cognitive and behavioral repertoire, which signifies adding new alternative possibilities rather than settling on and implementing a single action. In her words, “the specific action tendencies that theorists have previously identified for the positive emotions are not particularly specific” (1998, p. 304). Apparently, it is only bad emotions that are thought to make someone do something specific. Accordingly, our review of empirical findings will attend closely to evidence about bad emotions.

More broadly, the direct causation theory has to contend with several possible objections, which should be

kept in mind as we survey the empirical findings. If emotions arise slowly, they may be too slow to guide behavior effectively in a rapidly emerging situation, though they could possibly be useful with slowly developing or long-lasting situations. If people often feel emotions without acting on them, then the direct causation theory must either shift toward indirect causation (e.g., emotion only suggests possible impulses for acting) or posit an elaborate inhibitory apparatus that often overrides the behavior. If a given emotion does not consistently cause the same specific behaviors, then again the influence of behavior can hardly be considered direct and is perhaps at best a vague impetus to appraise the situation and do whatever seems best. If emotions often cause maladaptive or irrational behaviors, then direct causation of behavior would not likely be the main function of emotion, because evolution would likely have selected in favor of people with less emotion (and hence less maladaptive behavior).

In sum, the theory that emotion directly causes behavior has the virtues of simplicity and intuitive appeal. It suffers however from multiple problems and drawbacks, both conceptual and empirical.

Emotion as Feedback: Behavior Pursues Emotion

Our second theory is that emotion influences behavior as a feedback system. This theory depends heavily on the distinction between automatic affect and full-fledged conscious emotion. The two different types of emotional responses are probably interrelated and coordinated, even though they serve different functions within the system. Conscious emotion commands attention and stimulates analysis, learning, and adaptation, often occurring in the aftermath of behavior and its outcomes (see Figure 1). It may occasionally have a direct effect on behavior (for good or ill), but directly driving behavior is not its main function. Automatic affective responses, in contrast, can provide direct and largely beneficial input into online action control. Automatic affective responses can preserve the lessons and information from previous emotional experiences. The combination of previous emotional outcomes and current affect also contributes to making people start anticipating emotional outcomes—and to choose their actions according to the emotions they expect will ensue (see Figures 2 and 3).

Whereas fear has often been a favorite example of theorists who wish to argue that emotion directly initiates behavior, guilt may be a useful example of the feedback theory. A person performs a behavior that causes distress to a friend. The person therefore feels guilty afterwards. The guilt prompts the person to consider what he or she did wrong and how to avoid similar outcomes

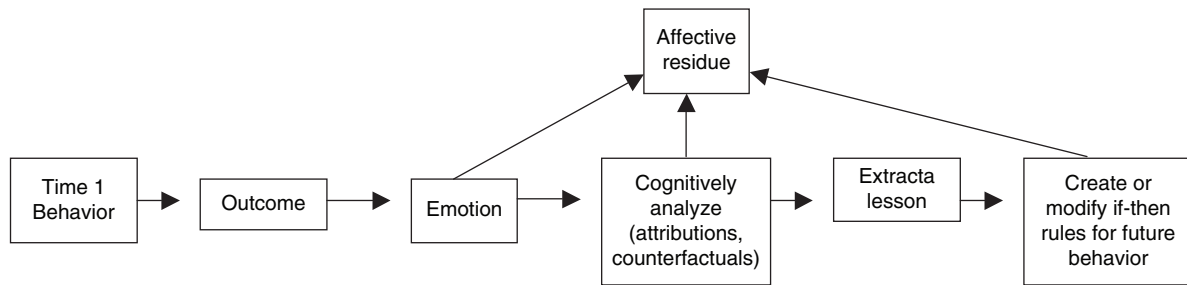


Figure 1 Emotion facilitates learning for future behavior.

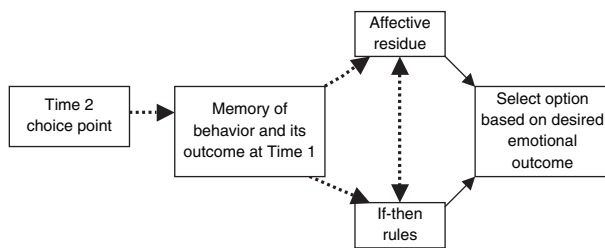


Figure 2 Past emotion influences subsequent behavior.
NOTE: Solid lined arrows indicate causal relationship in which the process creates the effect. Dashed lined arrows indicate associative relationship in which the process activates a set of associations.

in the future. The next time a comparable situation arises, there may be a brief twinge of guilty affect that helps the person choose a course of action that will not bring distress to friends (and more guilt to the self).

Thus, by this account, the behavior resulted (based on regret over its interpersonal impact) in the conscious emotion of guilt. Guilt prompted the person to reflect on what he or she had done, to reevaluate the decision process in light of social norms and obligations, and possibly to extract lessons and conclusions about how a different course of action might have yielded better emotional outcomes (including no more guilt). The lesson was stored in memory along with some affective residue associating guilt with the regretted action. Later, the affective residue became activated in a similar situation and led to a change in subsequent behavior. This change too was based on the view that behavior leads to emotion and that emotion functions essentially as an instructive feedback system. First came the act, then guilt, and the guilt in turn prompted a change in later behavior, which was chosen to avoid further guilt. (And consistent with Russell's [2003] emphasis on core affect, all the guilt had to do in the later situation was signal "bad idea" to make the person avoid the tainted

course of action.) In this way, much behavior is emotion regulating, insofar as it attempts to bring about a desired emotional state later on.

Feedback in action control. An influential theory of action by Gollwitzer (1999) has proposed that people do not necessarily deliberate among behavioral options right when they are confronted with the need to take action. Instead, action is often guided by if-then rules that have been created previously, such as "If there is still daylight when I finish dinner, then I will go for a walk." The set of these if-then contingencies is a crucial bank of programming, and as the person learns to live and operate in the changing, complex social world that humans construct, the set may become extensive. It also may need to be refined and updated fairly often. The updating of this program bank is therefore a vitally important aspect of human functioning. It provides the essential context for the feedback theory of emotion. In that view, the main purpose of emotion is to influence behavior by contributing to the updating process.

How does emotion influence the updating of if-then contingency rules? Emotion provides feedback about recent actions and, by implication, about the adequacy of the current if-then rules on which those actions were based. Positive emotions generally validate the existing rules because those emotions signify that what the person did turned out well, and so the existing rules were presumably effective. Negative emotions signal that one's behavior was not successful, and hence they suggest that the if-then rules need to be revised. The emotional state may stimulate counterfactual thinking and other ruminations about how one could have gotten better results had one followed a different if-then rule. The affective residue provides the push to support future behavior change. The next time one is tempted to act in the same way and follow the old if-then rule, the automatic affective response will be activated, essentially warning the person not to repeat the mistake. The new,

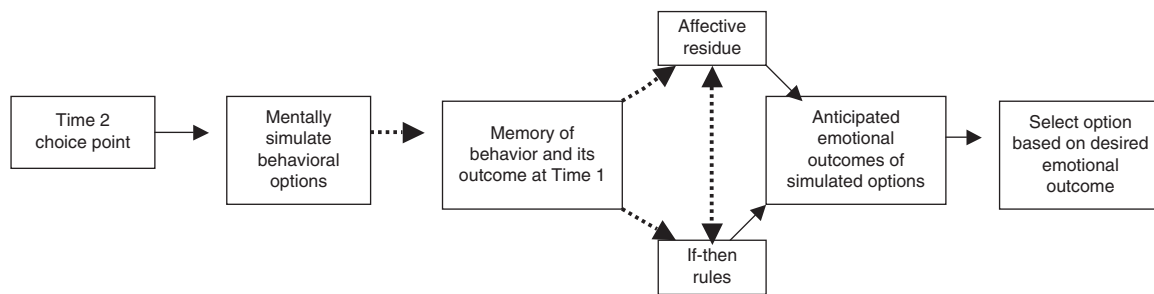


Figure 3 Anticipated emotional outcomes guide subsequent behavior.

NOTE: Solid lined arrows indicate causal relationship in which the process creates the effect. Dashed lined arrows indicate associative relationship in which the process activates a set of associations.

altered if-then rule will be followed instead, and if it does in fact produce better outcomes, then the outcome will be positive emotion that will leave a positive affective residue. Essentially the old if-then rule becomes associated with negative affect and the new, more successful if-then rule gets associated with positive affect, which strengthens the preference to use the new rule.

In broad outline this learning process follows the same principles of animal learning by reinforcement. What is different for humans is the degree of conscious cognition and analysis, to appraise complex social events, extract lessons, and formulate (usually in language) conclusions that can be useful in future situations. Emotion serves as a stimulus to cognitive processing. Were it not for emotions, people would not bother to use their cognitive apparatus as much as they do.

Thus, the main *direct* impact of emotion is to stimulate cognitive processing, not behavior. This may be especially true of negative emotion, though reviewing successes may help repeat them. The output of emotion-stimulated cognitive processing can then guide future behavior, and it can even have input into current responses when there is sufficient time for the sequence to be completed: An action or event leads to a full-fledged conscious emotional reaction, which stimulates cognitive reflection, which in turn produces some conclusion in the form of a (new or revised) prescription for action.

Anticipation of emotional outcomes is an important aspect of the feedback theory. As people learn to anticipate feedback, they may alter their behavior (constructively) to pursue the feedback that they like. Emotion is ideally suited for this because of its hedonic power: Behavioral choices could well be swayed by the anticipation of feeling good or bad thereafter. The affective residue of prior emotional outcomes is likely to contribute to this process. The whisper of automatic affect can foreshadow what the full-blown emotional outcome is likely to be. A twinge of anticipatory guilt may be enough to steer the person away from doing something.

Anticipation of emotional outcomes can also be important when the person is currently already experiencing emotion. In particular, an unpleasant emotion may motivate the person to act in ways that hold the promise of mood repair (i.e., feeling better). In some cases, this could create the false appearance that emotion directly causes behavior, insofar as the emotional state precedes the behavior. We shall review studies designed to distinguish between direct causation and mood repair.

In a sense, then, the anticipation of emotion is more important than the actual emotion, particularly with regard to the duration of each. Emotion provides salient feedback about one's actions, but the function of this feedback is mainly to help the person learn a lesson and leave a strong affective cue that may guide future behavior. When considering how to act, anticipating emotional outcomes can help the person make a better decision, whereas making the decision in the midst of a strong emotional state may cause a suboptimal decision. If anything, the ideal system might be for the person to anticipate emotions as strong (so that they exert a beneficial, guiding effect on decisions) but for actual emotions to wear off rather fast (so they don't impair further decision making). As we shall see, research on affective forecasting suggests that this is precisely the pattern in human emotion (Wilson & Gilbert, 2003).

Acting on the basis of current, intense emotion is generally *not a good idea*—and we deliberately chose that colloquial phrase because it expresses the point that cognition (ideas) rather than emotion should be the proximal influence on behavior. At least, that is how we think the system is designed. To be sure, emotion may occasionally bypass rational analysis to influence behavior directly, sometimes with dire consequences. Still, the fact that the heat of emotion may cause irrational behaviors is not a problem for this view because the benefits of emotion depend on their long-term benefits, and occasional short-term costs might be outweighed.

In the same way, the possible slowness of emotional response (e.g., N. Smith et al., 2003) is not a problem for this view, and indeed it may be quite congenial. If the short-term effects of emotion on behavior are irrational, then it would be ideal for emotion to be slow, because emotion would not disturb or perturb the person's effective responding during the crisis. Then, afterward, emotion could blossom, thereby facilitating learning.

The inability to self-regulate emotional states directly is also relevant. According to the feedback theory, emotion serves as an inner mechanism to reward and punish behaviors. Such a function would be undermined if people could alter their emotional states simply by direct control. Consistent with this line of reasoning, self-regulation theory has long accorded a special place to mood regulation: Whereas people can directly control their behaviors and thoughts, and to some extent their task performances, they cannot directly alter their moods and emotions, and so people tend to require various indirect strategies to change their emotions (e.g., Baumeister, Heatherton, & Tice, 1994; Gross, 1998a; Larsen, 2000; Thayer, Newman, & McClain, 1994).

The resistance of emotion to direct control is, in short, a puzzle to self-regulation researchers. Why did the human self-regulatory capacity evolve so as to be able to exert direct control over actions and thoughts but not emotions? The answer, we think, is that *you cannot control your emotions because the purpose of emotions is to control you*. Emotions are a feedback system for facilitating behavioral learning and control. If they were themselves controllable, they would lose that crucial function. To return to the guilt example, if you could stop feeling guilty simply by act of will, then there would be little need to change your behavior to avoid guilt-producing actions. Guilt would lose its power to steer people to behave in moral or socially desirable ways.

Feedback of any sort is mainly useful to modify behavior (including modifying the if-then rules that guide behavior). Hence, emotion as feedback could be very useful for almost any sort of goal pursuit because it can guide behavior toward the goal, such as by feeling bad after failures in goal pursuit and good after any significant progress. An influential form of this idea has been developed by Carver and Scheier (1990, 1998; also Carver, 2003). In particular, that model emphasized emotions as providing feedback as to how fast one is moving toward a cherished goal. Positive emotions signal progress that is appropriate or better than appropriate, whereas negative emotions signal progress that is slower than expected or desired. Positive emotion can even signal that it is fine to turn away temporarily from this particular goal, insofar as one is ahead of schedule

and hence can work on other goals without jeopardizing long-term success (Carver, 2003). For present purposes, the key point is that as the person learns these emotional contingencies, he or she will adjust goal pursuit so as to avoid bad emotions and increase good emotions—and this will be done by making progress toward important goals. In that sense, pursuing emotional feedback will yield adaptive and constructive outcomes (goal achievement).

The link between emotions and goal pursuit was also proposed by Oatley and Johnson-Laird (1987). They said that emotions arise in the course of goal striving whenever there is a significant change in the likelihood of reaching the goal. Improved chances of success evoke positive emotions, which usually foster further efforts toward the goal. In contrast, changes indicating a lower likelihood of success evoke bad emotions, which can lead to problem solving or even disengagement from the goal (Wrosch, Scheier, Miller, Schulz, & Carver, 2003).

Human cognitive processing increases the complexity of ways that emotions can contribute to learning (e.g., Schwarz & Clore, in press). Emotions may direct attention to relevant aspects of recent experience, so that the cognitive system will dwell on them, explore their implications, and distill whatever lessons are to be learned. Even if the processing is less extensive than that, emotions may dramatize the salient features of the situation and one's own response to it, so that the next time a similar situation arises, the person's response benefits from the prior experience.

According to our analysis, the effects of emotion on cognitive processes might well emphasize thought processes that are designed to help the person learn lessons from recent experiences. Emotions should elicit counterfactual thinking and attributional activity. It should be especially common with novel experiences and unfamiliar actions, as opposed to familiar or habitual forms of action (in which, presumably, the lessons have already mostly been learned). When emotion is blocked, people should be more prone to repeat their mistakes.

Not all emotions are the results of one's own behavior. Obviously people can have emotions in response to external circumstances and other people's actions. These instances of emotion may also facilitate learning in some ways, and indeed vicarious emotion may be helpful or even essential to vicarious or social learning.

In sum, the human emotional apparatus may shape behavior by providing a feedback system that may be useful for sophisticated goal pursuit and learning to behave effectively in complex social and cultural situations. Conscious emotions provide feedback about behavior, stimulate cognitive analysis, and promote revisions of the programming on which people react to events. Conscious emotions can also be anticipated and

so people behave in ways that will pursue desired emotional outcomes. Automatic affective responses preserve these lessons, facilitate acting on the basis of revised if-then rules, and serve as signals of warning or promise about impending emotional outcomes (see Figures 1-3).

REVIEW OF EVIDENCE

We turn now to examine a broad range of evidence that can be brought to bear on the difference between the two theories. To be sure, we did not start out with the two theories competing as equals. Initially we, like presumably most people, assumed that emotion directly causes behavior, and therefore we had not really considered the alternative possibility. We embarked on this review after having repeatedly noticed that emotion often fails to cause behavior and that many emotion findings do not fit well with the assumption of direct causation.

Does Emotion Actually Cause Behavior?

Earlier we quoted various sources as repeating the standard view that emotion exists to cause behavior directly. Research evidence however does not provide much clear support for these claims, in contrast to the far better documented view that emotion influences cognition. A lengthy, influential review of emotion research by Schwarz and Clore (1996) revealed the imbalance. The article was 27 pages long, but only half of one page was devoted to the effects of emotions on behavior. As those authors observed, the asymmetry of their coverage reflected an asymmetry in the literature: "Most of the research has focused on the influence of feelings on cognitive processing. Attention to the impact of feelings on behavior has been more limited" (p. 458). Their updated coverage of the same topic (Schwarz & Clore, *in press*) maintained the same imbalance and was even more explicit about the weakness of links between emotion and behavior: "The immediate effects of emotion . . . are more mental than behavioral" (p. 39).

Furthermore, we noted the issue of specificity as a potential problem area for the theory that emotions directly cause behavior. We have acknowledged that positive emotions have not been shown to predict specific behaviors in multiple situations, and so if specificity is to be found anywhere, it would be with negative emotions. Schwarz and Clore (*in press*) noted it often fails there too: "From knowing only that they are afraid, we cannot predict whether people will sell their stocks, listen to the weather report, or start running" (p. 39). This powerful argument was yet another reason that those authors asserted that it is more profitable to

think of emotion as affecting cognition than affecting behavior.

Aggression is widely perceived as stemming from emotion. Long-standing theories have proposed that frustration is the main cause of aggression, and indeed Dollard, Doob, Miller, Mowrer, and Sears (1939) asserted on the first page of their classic book that "the occurrence of aggressive behavior always presupposes the existence of frustration," and "the existence of frustration always leads to some form of aggression." In the same way, generations of research psychologists have accepted that anger is essential to producing aggression, and most laboratory studies of aggression have included anger manipulations without even bothering to comment on this aspect of their design. Manipulations that supposedly cause aggression do so only in combination with a provocation to anger (e.g., Berkowitz & Geen, 1967; Berkowitz & LePage, 1967). In other words, almost the entire social psychology literature on aggression can be described as a compilation of what variables moderate the basic causal effect of anger and frustration.

Recent evidence has however suggested that the link between aggression and these specific emotional states is not as direct and invariant as previously thought. Berkowitz's (1989) review of the frustration aggression theory concluded beyond any reasonable doubt that frustration is neither necessary nor sufficient to cause aggression. Many frustrated people desist from aggressing, and some aggression occurs in the absence of frustration.

The same point has been made about anger, despite the prevalence of laboratory provocations. Averill (1982) concluded forcefully that not all anger leads to aggression and that some aggression occurs without anger. Anger may in fact lead to higher rates of aggression, but the effect seems to resemble a contributing influence rather than a direct cause. In fact, one could argue that anger evolved to reduce aggression. According to this view, anger can serve as an advance warning of possible aggression, thereby allowing disputants to take steps to try to resolve the conflict in a nonviolent manner. For example, some women with physically violent partners manage to head off incipient rages by initiating sex (DeMaris, 1997). Without anger, conflicts (which are to some extent inevitable in communal life) would erupt into violence more frequently and abruptly.

Romantic love is generally assumed to be associated with sex, and certainly love causes an increase in sexual desire (e.g., Sternberg, 1986). But the links between love and sex are more tenuous than direct causation would imply. The age-old prostitution industry would never have prospered if love were a prerequisite for sex. Conversely, many people are content to enjoy romantic love without sex. For example, lesbians have lower rates

of sex than other types of couples, but there is no indication that this indicates a lesser degree of love (Blumstein & Schwartz, 1983). A survey by Janus and Janus (1993) found that women were more likely than men to endorse a conceptual separation between sex from love, presumably because they are more accepting of love without sex.

Indeed, the view that sex leads to love (thus, emotion coming after the behavior and serving as a kind of feedback that may guide future behavior) is also plausible. Shaver, Hazan, and Bradshaw (1988) proposed that love evolved as a way of conferring an adaptive advantage on offspring. That is, when two people begin to have sexual intercourse, the probability of reproduction rises sharply, and love between those people can serve to bond them together for subsequent years. Keeping the parents together entails that the children will have the benefits of two parents instead of one, and these benefits include a substantial increase in the children's chances of surviving to reach reproductive age themselves.

The idea that fear leads to escape or at least activates a fight or flight response is common and, in fact, this is probably the most widely used illustration of how emotion causes behavior. Even that is hardly universal: The tendency of rabbits and other creatures to freeze when frightened indicates neither fighting nor fleeing. In our own species, soldiers in battle routinely experience fear yet at least manage to overcome any behavioral tendencies to flee, so as to make themselves remain still while under bombardment or in some cases even walk toward the enemy who are shooting at them (e.g., Holmes, 1985). Still, we concede that fear may prompt an urge to escape. We question only how typical it is of other emotion-behavior links.

Furthermore, Robinson (1998) has provided reason to think that fear is an exceptionally poor exemplar for how emotion guides behavior. He proposed that the emotional states of fear and anxiety—but no other emotions—can be stimulated by unconscious cognitive processing. Robinson emphasized that these reactions allow for rapid behavioral reactions, which may be crucial in dangerous situations. Put in our terms, dangerous threats can be appraised with quick cognitive and affective responses that have the animal or person in flight well before any full-blown conscious state of fear has developed.

In everyday life, emotions are experienced quite often without obvious behavioral consequence. At the extreme, people will sit for two hours in a movie theatre and experience a rich assortment of emotional states without once stirring from their chairs. Films (and to a possibly lesser extent books and other media) induce almost the full range of emotions, including fear, excitement, sexual arousal, mirth, joy, sadness, anger, contentment,

and outrage. Instigating these emotions in the viewer is arguably the crucial goal of many films, which presumably explains why movie rental stores sort and designate the films according to which emotions they are likely to induce (comedy, horror, sex, and so forth). Laboratory studies of emotion often use film excerpts to generate the desired emotional states. Yet most films are watched and emotions felt without any apparent behavioral consequence. That is, plenty of actual emotions produce no behaviors.

We have noted that emotional expression is a special case, and emotions may directly cause expressive behaviors. (Films, too, make people laugh and cry.) Emotions may be expressed involuntarily in the face, possibly because different facial poses alter blood flow to the brain (Zajonc, 1985). If anything, the effect of developmental socialization is less a matter of teaching children how to feel or how to show their feelings than to teach them to conceal their facial expressions. Quite possibly, evolution capitalized on these natural tendencies for social reasons: People have learned to read the emotional facial expressions of others, at least in fully expressive mode and when not concealed by habit or design (Ekman, 1973; cf. Russell, 1994).

For the present purpose of assessing how emotion is linked to behavior, the relevant question about expression of emotion is whether observers will read a face as revealing an inner feeling state, a behavioral intention, or an action request. If emotion mainly leads to behavior, then the most useful and hence predominant way of perceiving facial expressions would be to take them as indicating behavioral intentions because they signal what the emotional person is about to do. We have suggested that anger may have that function, insofar as one evolutionary purpose of anger may have been to signal impending aggression so that the conflict can be defused before it gets to that point. Horstmann (2003) undertook to provide a direct test of how people perceived the facial expressions of others. Sure enough, he did find that anger was seen as behavioral intention in many cases (though also as a request for the person seeing the expression to act in some particular way), a fact to which we shall return in the next section. More importantly, though, anger was unique in that regard. The other emotions in his study (including fear, sadness, disgust, happiness, and surprise) were mainly taken as feeling states rather than behavioral intentions. Thus, in general, the social perception of emotion does not link it to direct causation of subsequent behavior. Rather, emotional expressions are mainly seen as indicative of inner feeling states. Emotion is an effect, not a cause, and so Horstmann's results seem most consistent with the view of emotion as a feedback system rather than a system for direct causation of behavior.

Perhaps the biggest question about emotion causing behavior was articulated by Isen (1984, 1987). This problem is specific to negative emotions, but as we noted earlier, the arguments for emotion directly causing behavior have generally emphasized negative emotions. Isen said that when evidence exists that inducing an emotion state leads to a change in behavior, it is generally impossible to know whether the emotion is directly causing behavior—or rather if the person's efforts to change and remedy the emotion are what cause the behavior. People are reluctant to remain in acutely unpleasant states, and so when such states arise, people may immediately start to try to alter them, and the behavioral consequences may thus stem from emotion regulation rather than from the emotion itself. The next section will review some empirical efforts to tease those apart.

Mood Freezing: Exposing Illusory Causation by Emotion

Thus far we have suggested that emotions do not always or invariably cause behaviors. Perhaps this is not saying much. If anger sometimes causes aggression that would certainly qualify as emotion causing behavior and all we would be saying is that there are exceptions. In this section, we go a step farther and suggest that many ostensible demonstrations of emotion-causing behavior are in fact misleading. These findings point instead to the view that behavior pursues emotional outcomes, consistent with the feedback theory.

One well-established finding is that sadness causes helping (Cialdini, Darby, & Vincent, 1973; Cunningham, Steinberg, & Grev, 1980). To be sure, sadness does not have this prosocial effect when attention is focused on the self (Thompson & Hoffman, 1980), but in other circumstances sadness does increase helpfulness, and in that sense these findings seem to fit the view that emotion directly causes behavior. However, Cialdini et al. (1973) proposed that what is really going on is that helping is performed so as to make oneself feel better—thus, behaviors are performed in pursuit of emotional consequences. In that view, emotion is the result, not the cause, of behavior.

A crucial test of this was performed by Manucia, Baumann, and Cialdini (1984), for which they developed the “mood freeze” manipulation. In this study, they gave participants in one condition a placebo and told them (falsely) that the pill would have the side effect of rendering their emotional or mood state immune to change for an hour or so. The mood freeze manipulation logically should make efforts at emotion regulation seem futile, and so any behavior that is essentially performed to alter one's mood should cease. If emotion directly causes behavior, then mood freezing

should have no effect and might even intensify behavioral consequences.

Manucia et al. (1984) replicated the usual finding that people in sad moods help more than those in neutral moods. However, this effect disappeared in the mood-freeze condition: Sad participants were the least helpful in that condition, as compared with being the most helpful in the changeable mood condition.

Thus, sad moods only lead to helping when people believe their moods to be changeable. The implication is that helping is done to produce a change in mood. It is not that sadness automatically or directly triggers a behavioral response of helping. Rather, sadness leads to a wish to feel better, and people will resort to helping as a stratagem to make them feel better. When sad people do not expect to feel better, they do not help. Put another way, the appearance that emotion directly causes behavior (sadness causes helping) was misleading, and the reality is that behavior pursues emotional outcomes (helping is done to counteract sadness).

Subsequent studies have adopted the mood freeze procedure to examine the ostensible links between several other emotions and behavior patterns. Thus, studies have shown that sadness causes an increase in eating, especially perhaps of fattening foods. Tice, Bratslavsky, and Baumeister (2001) induced sadness with a visualization exercise developed by Wenzlaff, Wegner, and Roper (1988) and replicated the usual finding that sad people ate more cookies. However, this effect was eliminated by a mood freeze manipulation that consisted simply of informing participants that eating would not alter their moods. Thus, sadness only leads to increased eating if people anticipate that eating will make them feel better. This fits the feedback theory and contradicts the direct causation theory.

By the same token, mood regulation appears responsible for some of the shifts between immediate and delayed gratification. Tice et al. (2001) replicated the familiar finding that people who were emotionally upset were more prone to take immediate rather than delayed gratification. However, a mood freezing manipulation (using a cover story based on aromatherapy) eliminated that tendency. Thus, it is not that emotional distress directly causes a behavioral shift toward immediate gratification. Rather, the preference for immediate gratification is a strategic move aimed at getting rid of the emotional distress. The same emotional distress does not produce that response when people believe the response will not remedy the bad mood.

Procrastination has also been hypothesized to be caused by bad moods and unpleasant emotional states, such as when working on the task gives people anxiety (Ferrari & Scher, 2000). Tice et al. (2001) showed that this effect is also a mood-repair strategy. In their study,

sad or distraught people were more likely than other people to procrastinate—but only as long as they believed that procrastination might make them feel better. A mood-freezing manipulation eliminated the pattern of procrastination following from bad moods. Moreover, unhappy people procrastinated only when the distractor tasks were fun and appealing and not when the distractor tasks seemed boring or tedious. Thus, again, it was not that emotions directly caused people to avoid working on the assigned task. Rather, alternative tasks attracted people away from the assigned task because the alternatives held the promise of enjoyment and therefore of feeling better. The crucial function of emotion was as anticipated outcome of behavior, not as direct cause of it.

Even the link between anger and aggression may often indicate a mood-repair strategy rather than a venting of aggressive energy or other direct causation of behavior by emotion. Bushman, Baumeister, and Phillips (2001) showed that a mood-freezing pill manipulation eliminated the increase in aggression that was otherwise found among people who were angered by an insult. Moreover, the increase in aggression in response to anger was only found among people who believed that venting anger was a good way to make themselves feel better. In short, anger causes some people to become more aggressive, but this seems to be essentially based on the premise that the aggressive activity will result in mood repair. When that belief is eliminated, anger does not produce elevated aggression.

The studies with mood freeze manipulations are highly relevant to the present argument. They have dealt with several seemingly classic instances of emotions causing behavior, such as sadness causing helping, distress causing overeating and procrastination, and anger causing aggression. Each of the studies has replicated the standard finding that the emotion seems to cause behavior, in the sense that experimentally manipulated emotional states lead to changes in behavior. But—crucially—the mood freeze conditions showed that what appeared to be emotion-causing behavior was in fact based on behavior pursuing emotion. Sadness does not directly cause people to help someone. Instead, sad people help because they believe that helping will bring about improvement in mood. Likewise, anger does not cause aggression; instead, angry aggression is behavior aimed at producing a better emotional state.

Beyond Mood Freezing: Ubiquitous Emotion Regulation?

The previous section reviewed multiple lines of evidence suggesting that what looks like emotion causing behavior is often a matter of behavior pursuing emotion. That

is, when people feel bad, they engage in a variety of behaviors aimed at producing positive change in their emotional states. Isen (1984) noted that it is methodologically very difficult to know whether the apparent consequences of negative emotions are direct results of the emotion or stem instead from the person's efforts to terminate and escape the distress. Our argument here is that the latter may well be far more common than the former. At the extreme, the view that behavior pursuing emotion suggests that human behavior is commonly oriented toward pursuing (anticipated) emotional outcomes, a view that can be dubbed *ubiquitous emotion regulation*. In this section, we note how this view could well explain some other established findings that might seem to suggest emotion directly causing behavior but instead seem more plausibly (or at least equally plausibly) explained on the basis of behavior pursuing emotion.

The assumption that emotional states cause alcohol use is common (e.g., see Hull, 1981). Many observations, whether clinical, experimental, or anecdotal, support the view that bad feelings lead to alcohol consumption (e.g., Conger, 1956; Cooper, Wood, Orcutt, & Albino, 2003). However, it would be misleading to assume that bad moods inherently stimulate an alcohol-specific thirst. Rather, it is equally if not more plausible that unhappy people choose alcohol because they expect it will make them feel better. Thus, the behavior of drinking alcohol is guided by the anticipation of emotional outcomes.

Cognitive dissonance is a well-established pattern by which people revise their attitudes and sometimes their behavior in response to perceived inconsistency (Festinger, 1957; Cooper & Fazio, 1984). Although the evidence in its simplest form suggests that an emotional state, namely the aversive arousal characteristic of dissonance, leads directly to attitude and behavior change, those changes seem more plausibly intended to pursue improvements in emotional state. In fact, the theory assumed from the outset that the purpose of changing attitudes and behaviors was to reduce the discomfort arising from the inconsistency: By reducing the discrepancies and inconsistencies, one could make oneself feel better.

The view of dissonance-reduction processes as behavior pursuing emotion is consistent with some of the major findings. In particular, the view that emotion directly causes behavior is difficult to reconcile with misattribution findings. Zanna and Cooper (1974) showed that counterattitudinal behavior did not lead to attitude change if participants believed (mistakenly) that their arousal state was caused by a pill they had taken. Zanna, Higgins, and Taves (1976) showed that this effect was specific to aversive arousal. In both studies, the same emotional state of dissonance either succeeded or failed to bring about the attitude change as a

function of false beliefs about a supposedly irrelevant side effect of a pill, and so the view that the state itself directly caused the attitude change is at least insufficient to encompass the opposite results. But the view that behavior pursues emotion is fully compatible with those findings. When people believed that their emotional state was caused by the inconsistency, they sought to reduce the inconsistency, which would be the obvious way to alleviate the bad feeling. When they thought it was not caused by the inconsistency (even though it was), they failed to change their attitude. Most plausibly, the deciding factor was whether they believed that revising their opinion would make them feel better.

Findings about aging also seem to support the feedback theory of emotion rather than direct causation. Carstensen, Isaacowitz, and Charles (1999) have proposed that as people grow older, they shift from emphasizing acquiring knowledge toward emphasizing regulating emotion. Carstensen et al.'s broader assumption is that the value of acquiring knowledge is inversely proportional to the time one has left in life, and so as the person begins to recognize that time is growing shorter, he or she will downplay that goal. The competing goal of feeling good is always there (thus emotion regulation is ubiquitous), and it merely becomes relatively dominant as knowledge goals dwindle in importance.

The view that behavior pursues emotion can also resolve the seeming paradox regarding the effects of self-focused attention. As reviewed by Mor and Winquist (2002), the bulk of findings indicate that self-focused attention intensifies depression, anxiety, and other bad moods. On the other hand, self-focused attention often produces positive, desirable effects on behavior, such as increased efforts to perform well or to conform to socially approved standards (Wicklund & Duval, 1971). The most plausible interpretation is that self-focused people seek to improve their performance or behavior to enable themselves to feel better. In support of that view, Steenbarger and Aderman (1979) showed that people responded to failure by becoming self-aware and trying to change for the better—but only when there was some prospect of improvement. When there was no chance to improve, people responded to failure by seeking to escape from and avoid self-awareness. Thus, the overarching goal was apparently to cease feeling bad, either by fixing the problem or by avoiding self-awareness (see also Greenberg & Musham, 1981). That precisely fits the idea of ubiquitous emotion regulation.

The pervasive importance of emotion regulation was attested to in a different way by Lischetzke and Eid (2003). They found that attention to mood had a positive impact on subjective well-being among people who scored high on affect regulation. People who scored low

on affect regulation had the reverse relationship: the more they attended to feelings, the lower their well-being. At one level, these findings speak against the idea of ubiquitous affect regulation, insofar as they indicate that some people do not (or do less than others) use their emotions for affect regulation. At another level, these findings provide valuable support for the feedback theory as the optimal way for emotions to function. They indicate that attending to one's emotional state is only beneficial if one uses the emotions for affect regulation. In other words, people who do not frequently regulate emotion are better off avoiding emotion, so emotion is mainly useful in connection with ubiquitous affect regulation.

The problematic consequences of current emotions (especially bad emotions) help explain the powerfully adaptive value of emotion regulation. Studies with children have repeatedly shown that intense emotions such as sadness, anxiety, and depression or dysphoria tend to foster internalizing problems such as shyness and withdrawal—but not among children who are good at effortful control of emotions (Eisenberg et al., 1996, 1997; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). Likewise, children who are subject to strong emotions such as anger, hostility, and irritation become prone to externalizing behavior problems such as violence and aggression (Gilliom et al., 2002; Keltner, Moffitt, & Stouthamer-Loeber, 1995; Rothbart, Ahadi, & Hershey, 1994; Zahn-Waxler et al., 1994). Emotion regulation generally is linked to quality of social functioning, such that children who regulate their feelings best are also best at getting along with others (Eisenberg, Fabes, Guthrie, & Reiser, 2000). Parallel findings with adults (college students) confirm that good emotion control is central to good social functioning, and in fact adults who score high on measures of emotion control are rated by their peers as more socially sensitive and prosocial (Lopes, Salovey, Cote, & Beers, 2005). They are also more likely than their less emotionally regulated counterparts to be nominated frequently as friends by their peers (Lopes et al., 2005).

Mood regulation may be even more ubiquitous if one abandons the assumption that all mood regulation is aimed at feeling better. Some research finds that people regulate their emotional state toward neutrality to prepare for an interaction with an unacquainted partner. Erber, Wegner, and Therriault (1996) showed that people tried to regulate toward a neutral mood when preparing to work with another participant (but not when preparing to work alone). Happy participants sought out sad materials in the apparent quest for a neutral mood.

Seeking to change bad moods into neutral states is probably the single most common form of affect regulation (e.g., Thayer, 1996). People who feel bad do not

invariably do bad things as a result, and in fact mood-incongruent behavior may often be driven by the attempt to make oneself feel better (Andrade & Cohen, in press-a). For example, bad moods sometimes promote helping (e.g., Cialdini et al., 1973; Cunningham et al., 1980) but not always. As reviewed by Cialdini and Kenrick (1976), many contrary findings emerge from studies with children, who may be too young to have learned that performing helpful and other good deeds is an effective way to make themselves feel better. By the time the child reaches the teen years, he or she seems generally to have made this connection, and so bad moods make teenagers helpful, unlike younger children. In a similar vein, an upsetting failure experience only promotes helping in children if they can see that generosity would bring them credit and repair their tarnished image. Meanwhile, positive moods (but not neutral or bad moods) make people reluctant to help if the task is unpleasant and therefore represents a potential risk to the good mood (Forest, Clark, Mills, & Isen, 1979). In that sense, again, much prosocial behavior turns out to be informed by anticipation of possible mood changes.

Other research supports the notion that whether people give mood-congruent or mood-incongruent responses depends on their beliefs about the power of the stimulus to enhance their mood. Recent work by Andrade (2005) showed that people were more willing to taste a new brand of chocolate when they were in a negative emotional state, if, and only if, they believed that eating chocolate would make them feel better. Participants who did not think of chocolate as mood lifting, as well as those who were in a neutral mood, did not report increased desire to try the new candy. Therefore, layperson beliefs about the emotion-improving potential of specific behaviors moderated the effects of emotional state on engaging in that behavior (see also Andrade & Cohen, in press-a).

The current approach emphasizes the benefits of emotion regulation. In support of this idea, there is evidence that people spontaneously regulate their emotions (Forgas & Ciarrochi, 2002). Immediately after an emotional event, people in both happy and sad moods experience more mood-congruent than mood-incongruent thoughts. With time, however, the content of people's thoughts moves toward the opposite valence. That is, after a few minutes, participants induced to feel sad were having happy thoughts, whereas those put into a happy mood had relatively more sad thoughts. This homeostatic emotion regulation fits nicely with the current analysis: mood-congruent thoughts help people learn the lessons of their previous behavior, but adaptive future behavior requires that emotion regulation take place.

Taken together, the evidence in this section suggests that mood regulation may lurk behind a broad variety

of findings that ostensibly link emotion to behavior. Although such speculations are beyond the scope of this article, one could entertain a view of human behavior as fundamentally and pervasively guided by the quest to regulate one's emotions. A person could certainly do far worse, and arguably not much better, than to go through life making all decisions so as to maximize positive emotions (especially in a long-term perspective) and minimize negative ones.

Emotions and Irrational, Self-Defeating Behavior

A conventional stereotype has held that emotions cause people to perform foolish and even self-destructive acts. According to this view, decision makers should try to minimize or avoid emotion because otherwise they will make poor or nonoptimal decisions. Evidence that real or anticipated emotion leads to self-defeating, irrational behavior is important to consider in any theory about emotion and behavior because such evidence potentially presents a serious problem. If emotion causes self-destructive behavior, then natural selection would have favored people who had the least frequent and least intense emotions. It is implausible that human emotion evolved to cause maladaptive behaviors.

In this section, we consider evidence linking emotion to self-defeating behaviors. Then we consider evidence about how and why emotion has those effects. Then we consider the implications for emotion theory.

Emotional distress causes self-defeat. A review by Baumeister and Scher (1988) noted that emotional distress had been linked to (and probably contributed to) many varieties of self-defeating behavior, including social withdrawal, self-handicapping, failure to comply with medical regimens, choking under pressure, and helplessness. Although the precise causal mechanism remained unclear, it was evident that at least some forms of aversive emotional states led to behaviors that were subsequently regretted. One theory that was not supported was the Freudian hypothesis that unpleasant emotions directly cause people to seek failure or suffering (e.g., that guilt might make people want to be punished). Instead, self-defeating behaviors conformed to the pattern of suboptimal tradeoffs, in which (typically) short-term or definite gains are accompanied by delayed or probable-but-not-definite costs.

Subsequent to that review, evidence has continued to accumulate to show that emotional distress contributes to self-defeating behavior. Eating is one domain of behavior that people often seek to regulate, motivated by social and health benefits. But long-term attempts at dieting are undermined by aversive emotional states, especially self-relevant ones (Heatherton, Herman, &

Polivy, 1991; Heatherton, Striepe, & Wittenberg, 1998). Overweight people report that feeling anxious or depressed is a major impetus causing them to eat excessively (Logue, 1993). Bad moods cause dieters to eat more (Greeno & Wing, 1994), and induced anxiety causes obese persons to increase their food consumption (Slochower & Kaplan, 1980).

As already noted, excessive consumption of alcohol is sometimes increased by emotional distress, usually as an attempt to alleviate the distress, such as when someone goes on a week-long drinking binge to cope with a broken heart. Perhaps unfortunately, the general public perceives alcohol as having the power to reduce anxiety and improve mood (Sayette, 1993; Stockwell, 1985), which makes it likely that people will turn to alcohol when they feel bad. Problem drinkers seeking to quit or control their drinking tend to find that aversive emotional states increase the odds of relapse into heavy drinking (Hull, Young, & Jouriles, 1986; Pickens, Hatsukami, Spicer, & Svikis, 1985).

Cigarette smoking shows patterns of addiction and relapse similar to those of alcohol. People who have tried to quit smoking are more likely to resume smoking if they experience emotional distress (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). In general, smokers increase their smoking when they feel distress (Ashton & Stepney, 1982; Schachter et al., 1977). In such cases when emotional distress leads to more smoking, the smoking does seem to make the smokers feel better (D. G. Gilbert & Spielberger, 1987; Nesbitt, 1973).

Less is known about gambling and compulsive shopping than about other addictions, but there is still some evidence that self-regulation breaks down under emotional distress. That is, people may gamble or purchase more when they feel upset (O'Guinn & Faber, 1987; Peck, 1986). These breakdowns may likewise be linked to perceptions that gambling or shopping will bring about a positive mood change, which therefore appeals to people who feel bad (Dickerson, 1991; Faber, 1992; Rook, 1987).

One classic form of self-regulation and adaptive versus maladaptive choice involves the capacity to delay gratification, such as when a person is tempted to take a small immediate reward instead of waiting for the rationally superior, larger, but delayed award (Mischel, 1997). Multiple studies have shown that current emotional distress shifts choices toward taking the immediate reward (Mischel, Ebbesen, & Zeiss, 1973; Underwood, Moore, & Rosenhan, 1973; Wertheim & Schwartz, 1983). When bad moods are induced, such as by having people recall unhappy memories, people shift toward taking more immediate rewards, whereas people in neutral moods are more successful at delaying gratification so as to get the larger, better reward. The

assumption behind this research is that feeling bad makes the person give priority to making choices that will yield immediate improvements in mood (though we have not found direct evidence as to whether mood repair is actually successful in these situations), and so they make suboptimal decisions. These findings fit the view that immediate emotions are often counterproductive and that current emotional distress causes the person to make choices on the basis of anticipated improvements in mood.

Information loss. How does emotion cause self-defeating behavior? One causal process would involve impairing decision making through loss of information. The emotional state would not directly cause the self-defeating behavior but instead would hamper cognitive processing. In simplistic terms, emotion makes people temporarily stupid, so they make bad choices.

A review by Loewenstein et al. (2001) noted that emotional appraisals of risks differ from purely cognitive appraisals in several vital respects, including a less sophisticated appreciation of probabilities and a heightened sensitivity to vividness and temporal proximity. These authors noted that such emotional appraisals could lead to bad decisions under certain circumstances, such as if vivid and imminent but low-probability dangers are overemphasized. For example, a person might become reluctant to use an airplane after hearing about a plane crash and might therefore use alternative means of transportation, which actually carry higher risks of death as well as other costs such as lost time or increased hassle. Most of the evidence reviewed by Loewenstein et al., suggested that during emotional states, people show a particular pattern of impaired decision making. Specifically, they decide on the basis of outcome magnitudes while tending to ignore or downplay probabilities (other than definite versus merely possible).

The fully rational decision maker presumably computes expected outcome values by multiplying probability by value for each outcome, but the emotional decision maker tends to disregard the probability and focus mainly on value. To the extent that these decisions result in action, therefore, the emotional decision maker will be less than optimal.

Focusing on one aspect of a choice situation can entail ignoring other aspects, and so emotion can degrade a decision process by causing people to fail to use and appreciate potentially useful information. Easterbrook (1959) explained the Yerkes-Dodson inverted-U impact of arousal on performance in terms of screening out progressively more and more situational cues. That is, increasing arousal causes a narrowing of attention. As one moves from low to moderate arousal, performance improves, because task-irrelevant

cues are screened out, thereby eliminating distractors that could hamper effective performance. Eventually, this reaches an optimal point because all the task-irrelevant cues have been screened out. After that point, however, further increases in arousal cause the elimination of task-relevant information, and the loss of potentially needed or helpful information impairs performance (see Chajut & Algom, 2003, for a review).

Information can be lost when the experience of emotion prompts people to adopt a new decision strategy. This effect may be particularly present when people experience regret, an emotion that seems to call for change (cf. Zeelenberg, Van den Bos, Van Dijk, & Pieters, 2002). In one study (Ratner & Herbst, 2005), participants first chose between two stockbrokers, one who was said to have a 43% chance of making a successful investment decision versus a stockbroker who was said to have a 54% chance of making a successful decision. Most participants selected the stockbroker with the better chance of success. After being told that this stockbroker's decision was unsuccessful, as compared with when the decision was successful, most participants then switched to the inferior option. Feelings of regret accounted for the switch. Hence, participants' negative feelings about the outcome of the stockbroker's decision encouraged them to switch to a new stockbroker, despite being told that the new stockbroker will, over the long run, yield worse returns.

Many especially difficult decisions involve tradeoffs, and, as we already indicated, emotional distress can shift people toward making self-defeating choices insofar as they accept long-term costs to get short-term gains. An additional problem with tradeoffs is that people find them aversive to contemplate because there is no perfect option and every option carries some downside. Luce (1998) found that tradeoff decisions generate current and anticipated negative emotions, which cause people to try to escape from the dilemma, often by means of a hasty or simplified decision. This hasty and insufficient consideration of options sometimes leads to suboptimal choices. In a similar vein, Luce, Bettman, and Payne (1997) found that aversive emotional states reduced the processing of information relevant to decisions, suggesting that people in such states were unwilling to acknowledge the tradeoffs that had to be made—and so if one did make a decision under that state, it would be impaired by inadequate appreciation of the attributes and contingencies at stake. Thus, again, emotion causes neglect of valuable information and results in suboptimal choices.

That emotional duress can cause people to neglect information and fail to consider good options was shown in a different way by Keinan (1987). He presented research participants with multiple-choice problems in which the possible answers were presented on a

computer one at a time, allowing researchers to keep track of how long each participant looked at the various choices. Under stress, participants were less likely to look at all the options before making a decision. Thus, unlike control participants, who would typically look at every available option and then choose one, under stress (which generated high anxiety and emotional upset) participants would just search until they found any appealing option and then select it without looking further. The result was poorer performance.

Even anticipated emotion can sometimes have self-defeating effects by means of avoiding information. Some people neglect to get health or medical tests because they wish to avoid the possibility of upsetting results (Biesecker et al., 2000). Getting tested is generally beneficial for health, so refusing tests can be considered self-defeating.

Foolish risk taking. Another related mechanism by which emotional distress leads to self-defeating behavior was identified by Leith and Baumeister (1996). High-arousal negative emotions (but not other states) caused a shift toward favoring high-risk, high-payoff choices, even if these were objectively poor choices. Indeed, people who were upset tended to disregard the probabilities and focus only on the desirability of various possible outcomes. Put another way, emotional distress caused people to fail to base their decisions on all available information, resulting in a tendency to take objectively foolish risks. Taking foolish risks would in turn tend to produce destructive outcomes in many (though not all) cases.

The studies by Leith and Baumeister (1996) made two additional and relevant points. First, the risky choices seemed generally aimed at alleviating the current distress, insofar as the upset person chose the course with the best possible outcome (even if that option carried a 98% chance of a bad outcome instead). Second, it reflected failure to consider all relevant information. One study eliminated the pattern of bad choices stemming from anger by instructing participants to pause for half a minute to list the pros and cons of the various possible options. Thus, when distraught people took foolish risks, it was because they failed to consider the downside.

Distorted expectancies. A third way that emotion can produce irrational behavior is via its effects on expectancies and biased judgment. Seminal work by Johnson and Tversky (1983) showed that emotions color people's perceptions of the likelihood that desirable and undesirable events will happen to them. More recent work has shown that specific emotions can have differential effects on likelihood judgments. DeSteno,

Petty, Wegener, and Rucker (2000) found that angry people estimated the odds of being cheated by a car dealer, for example, as higher than sad people, whereas sad people were more likely than angry ones to expect they would have a dear friend move out of town. These data suggest that emotions bias expectancies. If people acted on the basis of these biased expectancies, behavior could be hampered and suboptimal.

Implications. The evidence presented here shows that many self-defeating behaviors are fostered by emotion, and in particular high-arousal, acute, emotional distress. These findings are consistent with the popular stereotype that emotion breeds irrationality and that decisions made in the heat of emotional distress may often be suboptimal, even downright costly. As to how emotions produce those destructive results, causal processes include a failure to consider all the relevant information and a related tendency to pursue high-risk courses of action (the downside of which was often not properly appreciated until too late).

How do these findings pertain to our two theories about emotion? There is not much support for direct causation. The findings that suggest that emotion causes behavior generally point toward indirect causation (such as when the emotional state causes the person to make a hasty decision without properly considering all the relevant information). Others fit the model of behavior pursuing emotion, such as when people choose or act in ways aimed at bringing immediate relief from aversive feelings. The foolish risk-taking pattern particularly fits that theory because the pattern typically involved choosing high-risk, high-payoff options. Although the downside of risk produces the self-defeating result, the person chose it on the basis of the possibly high payoff, which appealed so strongly because it could make the person feel better.

We noted that self-defeating behavior poses a problem for almost any emotion theory because natural selection will generally favor adaptive patterns (whereas self-defeating behavior is quintessentially maladaptive). Thus theories of emotion must grapple with the problem of maladaptive results, if only to explain why natural selection has not selected against emotion. But the feedback theory can point to sufficient benefits of emotion to outweigh the occasional bad effects. In particular, the evidence suggests that self-defeating behavior only follows from the behavioral pursuit of emotion when it starts from a currently bad emotional state. Those findings may be a special and unusual case of pursuing emotional outcomes. That is, behavior that originates in a neutral state and pursues emotional outcomes may be generally adaptive and beneficial—but when distraught people take desperate

measures to feel better quickly, the results can be costly and harmful.

Emotions and Adaptive, Rational Behavior

Some recent studies have struck a powerful blow to the conventional view that emotions chiefly produce irrational, costly, or destructive behavior. According to these views, emotions can have a very positive effect on helping the person to cope effectively with life.

One of the strongest proponents of this view is Damasio (1994). His research has emphasized people who, by virtue of brain damage or other impairments, fail to have most normal emotional responses. If emotion produces irrationality, as the famous “Mr. Spock” character on the 1960s television show *Star Trek* used to claim, then being free from emotions should enable people to live more successful and rational lives. Contrary to that view, Damasio reported that the loss of emotional responding made these people’s lives prone to failure in both work and social life, as well as other misfortunes.

In a laboratory study, Bechara, Damasio, Tranel, and Damasio (1997) compared responses to a card game of emotionally impaired (by virtue of damage to the prefrontal cortex) and intact individuals. The player could draw from any of several decks of cards. Two of the decks consistently gave the person small rewards (in hypothetical money). The other two offered large rewards but also some very large losses. Most players would begin by sampling each of the decks and then, after encountering a large loss, would avoid the risky deck for a while. The brain-damaged patients were however faster to return to the risky deck after a large loss than the intact patients. Bechara et al. (1997) concluded that the lack of emotional response reduced people’s tendency to learn to avoid the source of harm, leaving them more prone to repeat behaviors that were costly (and ultimately resulting in further costs). This finding fits the view that emotion facilitates learning and thereby promotes adaptive behavior.

To explain how the emotions foster learning, one can invoke the notion that behavior is often made on the basis of pre-existing if-then rules (Gollwitzer, 1999). The first large loss creates an emotional reaction, which results in an if-then resolve for future behavior along the lines of “If I have to make another choice, I should avoid this stack of cards.” Without the emotional reaction, this rule is not created or appears in only a tentative, motivationally weak form, and so the person is more prone to repeat that mistake.

Similar implications emerged from work by Schachter and Latane (1964; also Dienstbier & Munter, 1971) using quite different methods. Participants in this study

were given a chance to cheat on a test that purportedly would have actual effects on their course grade. Some participants had unwittingly been given a tranquilizer that blocked any emotional reactions by thwarting arousal, presumably including the guilt that would otherwise warn them not to cheat. The tranquilized students cheated more extensively than the ones who could feel guilt. Thus, normally, cheating led to guilt, and the anticipation of escalating guilt discouraged cheating—whereas when the emotion was prevented, students merrily went on cheating.

Like guilt, gratitude also invokes an interpersonal debt, and feeling the emotion more strongly may increase the person's inclination to engage in behaviors that will pay the debt later. A series of studies by Bartlett and DeSteno (2006) showed that receiving a favor made people more likely to do a favor when asked by the person to whom they were indebted, and this was mediated by how grateful they felt.

Thus, emotions are adaptive in promoting both self-interested and socially desirable behaviors, and some of these benefits seem to involve profiting from current experience for the future. The next section will extend this into explicit consideration of learning processes.

Emotion and Learning in Daily Life

The preceding section described studies suggesting that emotions may help people learn and profit from their experience. Emotion can have considerable value even after the episode is over because it helps people process information from their recent experiences and thereby learn how to act more optimally in the future. This section explores how emotion helps accomplish that learning.

Counterfactual thinking is clearly one aid to learning because it consists of reflecting on recent events and imagining how they might have turned out differently. Therefore, if emotions are to help people profit from experience, then emotions should facilitate counterfactual thinking. Consistent with this view, Johnson-Laird and Oatley's (2000) review of findings led them to conclude that "sadness elicits counterfactual thinking" (p. 465). From an authoritative review of the literature, Roese (1997) concluded that emotion, specifically negative emotional experience, is the "chief determinant of the mere activation of counterfactual processing" (p. 135). Negative emotions signal that a problem needs rectifying. Often it is too late to do anything about something bad that has already happened, but counterfactual thinking can enable the person to learn a lesson so as to avoid repeating the misfortune in the future (Landman, Vandewater, Stewart, & Malley, 1995; Markman, Gavanski, Sherman, & McMullen, 1993; Roese, 1994; Taylor & Schneider, 1989).

A recent review by Schwarz and Clore (in press) concluded that negative emotions tend to promote detail-oriented processing, whereas positive emotions focus on generalities. This pattern would seem well suited toward learning in the context of daily goal striving. Negative emotions presumably follow bad outcomes such as failures. Changing everything would in most cases be neither pragmatically possible nor necessary—rather, more likely the person should identify the one or two things that were done wrong and rectify those mistakes for next time. Hence, scrutinizing details would be useful for identifying the cause of the problem. In contrast, if the outcome was a success, there is no need to focus on specific details. Rather, preserving the entire sequence is most likely a useful, adaptive lesson for next time.

For example, suppose a family is going on vacation to Paris but is turned back at the airport because the daughter's passport is still in her bureau drawer at home. There is no need to revise every aspect of the preparation process next time—choose another locale, use different suitcases, eat something different for breakfast before leaving, book with a different airline, do not let the same person drive to the airport, do not park in the same lot, do not pack snacks or Sudoku puzzles in the carry-on luggage. After all, different suitcases and a different airline will yield the same bad result if the passport still is lacking. The only thing that needs changing is the procedure for ensuring that all passports make it out of the house and to the airport. Thus, an emotion that promotes consideration of specific details would be most adaptive. Meanwhile, if the trip and vacation all go well, there is no need to scrutinize each aspect, but rather a global approval may be best for building on this success toward future, equally successful vacations.

The power of emotion to drive home lessons was attested by Crawford, McConnell, Lewis, and Sherman (2002). They gave participants ample information for betting on a football game but then exposed participants to advice from an unknown stranger. Most participants took the stranger's advice and then lost, after which they felt regret and elaborated these feelings into self-critical lessons (such as next time, they should rely on the facts rather than the word of some self-appointed expert) that might prevent them from making the same mistake in the future.

Indeed, regret is an important form of emotion based on counterfactual thinking, and it seems a very functional way for people to adjust their behavior. Action or inaction can be regretted. Participants in a study by Zeelenberg et al. (2002) estimated how much regret a soccer coach would feel after a loss, depending on whether he had just changed his team lineup and strategy. If the team had previously been successful, participants

thought the coach would have more regret if he had changed than if he had stuck with the previous (winning) approach (see also Kahneman & Tversky, 1982; Seta, McElroy, & Seta, 2001). Conversely, if the team had been on a losing streak, participants thought he would have more regret if he made no changes than if he had changed. Such patterns of regret seem well designed to produce adaptive responses: stick with successful strategies and change unsuccessful ones.

The value of regret for learning may also explain the widely cited “near miss” effect, which is that people supposedly have more regret after a near miss than after a failure that was not close to success. For example, there is more regret after just missing a plane or train by a few minutes than after missing it by half an hour or more (Kahneman & Tversky, 1982; Medvec, Madey, & Gilovich, 1995). One might logically have predicted the opposite, insofar as one presumably did more things wrong to produce a large failure than a narrow one. But large failures do not hold the promise that one simple change might prevent further such failures. If a woman missed her train by 3 minutes, then she may profitably regret dawdling over her second cup of coffee, so that next time she skips the second cup and makes the train. In contrast, if she missed it by 30 minutes, it is unlikely that any one change could bring success the next time around.

Research and theory on learning from mistakes advanced greatly with the insight that reflecting on mistakes is essential for improved responding. Patterson and Newman (1993) proposed that a lack of reflectivity is why psychopaths, alcoholics, hyperactive children, and extraverts all have problems modulating a dominant (but incorrect) response after negative feedback. In conjunction with the current analysis, this work suggests that emotions have the potential to drive home lessons in part because they prompt cognitive reflection. The more intense the emotional state, the more cognitive reflection is likely to occur (cf. Roese, 1997). Bad emotions may do this more powerfully and effectively than good ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001).

If indeed major outcomes (especially unpleasant or traumatic ones) stimulate thinking so as to make meaning of the event (Heine, Proulx, & Vohs, 2006), then preventing that thinking should lead to worse outcomes. This idea offers one potential interpretation of the program of research by Pennebaker and his colleagues (e.g., Pennebaker, Kiecolt-Glaser, & Glaser, 1988), which has consistently shown that people who speak or write about personally traumatic experiences subsequently experience a variety of health benefits, including improved immune functioning, fewer visits to health care facilities, and better self-reported health.

Pennebaker et al. (1988) has proposed that in many cases people are unable to discuss traumatic events with others or to make sense of them. As a result, they suffer what we might call unresolved emotional distress. Writing helps them process the lessons from these experiences, thereby removing some of the negative aftereffects of trauma.

Thus, the benefits of writing about trauma suggest that an adaptive, healthy response to trauma is for emotion to stimulate thinking about it, which in turn facilitates coping and recovery. Rumination also seems like a way that people may try to deal with residual emotion after some misfortune. Moreover, and in contrast to the work just mentioned, ruminators seem to suffer a variety of negative effects. For instance, rumination while in a depressed mood interferes with problem-solving abilities (Lyubomirsky & Nolen-Hoeksema, 1995). Then again, most of these studies are based on individual differences in ruminating proclivity, and it is entirely plausible that ruminators ruminate precisely because they are unable to make sense of a recent experience to their satisfaction, whereas nonruminators do more effectively figure out what they need to learn and then stop suffering. A recent study showed that to the extent that people’s repetitive thoughts involve plans of how things could be done better in the future, they experience less distress and better adjustment than when repetitive thought takes the form of ruminating over the negative aspects of what had occurred (Segerstrom, Stanton, Alden, & Shortridge, 2003). It seems that whether the repetitive thoughts take the form of “solving” instead of “searching” is key, with the former being related to more adaptive outcomes. Experimental support of this idea comes from Ciarocco (2006), who found that being randomly assigned to perform task-focused rumination after failure actually helped people perform better on a subsequent test. Taken together, these findings suggest that emotion may stimulate rumination about recent or current problems, which can result in adaptive benefits such as problem solving and learning for future occasions.

None of this points to direct causation of behavior by emotion. Instead, it suggests that emotion serves as feedback and prompts cognitive reflection, which can facilitate learning and lead to good behavioral adaptations over the long run.

If emotion provides feedback to facilitate learning, then emotion should be most common when learning is still taking place. One way to operationalize that difference is to compare routine or habitual behaviors (where learning has presumably occurred and mostly ceased) against novel, unfamiliar behaviors (where learning is presumably going forward and desirable). Wood, Quinn, and Kashy (2002) found that people reported more intense emotions when engaged in novel behaviors

than when they performed habitual ones. Moreover, the heightened emotional intensity with novel behaviors was associated with a significant increase in thinking about what one was doing. These findings all fit the view that current emotion supports learning for the future.

Despite the primary importance of learning from one's own experiences, emotion can contribute to learning from externally generated information. Some relevant findings from an extreme case were furnished by Heath, Bell, and Sternberg (2001). Their research was focused on so-called urban legends, which are stories that are widely repeated but have a dubious or questionable basis in fact. In addressing the question of which events (including falsely reported events) become candidates for such wide repetition, Heath et al. (2001) concluded that urban legends are selected mainly on the basis of their emotional power rather than their truth value. Thus, emotion's role is to focus attention on certain information and instigate further cognitive processing of it. Based on the person's motivations, emotional responses highlight what is important and relevant to the individual, thereby driving the cognitive system to dwell on it and elaborate it. Information that fails to generate an emotional response is more likely to be ignored and forgotten.

Emotion Aids Memory

If emotion's role is to highlight important information and facilitate learning for future occasions, then emotion should facilitate memory. This section will briefly review evidence that emotion leads to better memory, especially for material most relevant to what is being learned.

A large body of evidence suggests that emotionally charged events are better remembered than neutral events, a phenomenon generally referred to as the emotional modulation of memory (see McGough, 2000, 2002, for reviews). Both negative (Bohannon, 1988; Brown & Kulik, 1977; Christianson & Loftus, 1987a) and positive (Christianson, 1986) emotions facilitate memory, and the benefits are so robust that the effect is even found among people who normally have memory deficits (i.e., Alzheimer's disease; Kazui, Mori, Hashimoto, et al., 2000). According to the emotional modulation of memory theory, emotion strengthens memory through activation of the basolateral amygdala (BLA) during encoding and consolidation processes that occur in the medial temporal lobe (MTL). Studies using positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) have supported the emotion modulation of memory perspective, showing that increased memory for emotionally charged events is associated with activity in the BLA and MTL (Cahill, Haier, Fallon, et al., 1996; Dolcos, LaBar, & Cabeza,

2004; Hamann, Ely, Grafton, & Kilts, 1999). Thus, emotion influences memory for information that is ready to be encoded and learned, which supports the theory that emotion facilitates learning through facilitating the cognitive processing of information about what caused the emotion.

Emotion enhances long-term as well as short-term memory. Bradley, Greenwald, Petry, and Lang (1992) showed that emotionally arousing images were remembered better than neutral images both immediately and 1 year after participants were presented with the images. Dolcos, LaBar, and Cabeza (2005) replicated this finding and showed that better recall for emotional (vs. neutral) images 1 year later was associated with activation in the amygdala (an emotion center in the brain) and hippocampus. These findings provide additional evidence that emotion facilitates learning through enhanced long-term memory.

Furthermore, and crucially, emotion enhances memory for information that was relevant to the lesson to be learned more than for unrelated information. Christianson and Loftus (1987b, 1991) found that information relevant to a topic from emotional events was remembered better than the topic-relevant information from neutral events. Participants in their studies were presented with a thematic series of slides in which either a neutral (i.e., woman riding a bike) or emotional (i.e., a woman lying on the ground next to her bike bleeding from a head injury) slide was inserted in the middle of the series. The emotion condition led to superior memory for details about the woman (e.g., the color of her coat) and worse memory for extraneous details (e.g., the color of a nearby car), as compared to the neutral control condition.

Recent evidence has shown that patients with damage to the amygdala, and who are therefore emotionally handicapped, did not show enhanced memory for information that is relevant to the topic and were therefore unable to learn the lesson from relevant to the topic (Adolphs, Tranel, & Buchanan, 2005). Being unable to experience the emotion at the neural level impairs people's ability to learn the lesson.

There is some converging evidence in the research literature on mood-congruent memory. The central idea is that current emotional state should facilitate recall of experiences that had the same emotional state (or at least a similar affective tone). We have proposed that an affective residue of a previous emotion may arise when one encounters a situation that is reminiscent of the circumstances that produced the previous emotion. The affect may often be enough to guide current behavior, but if it is not, then an enhanced ability to recall the circumstances that led to the previous emotion would seem likely to facilitate making an effective choice.

(In other words, one can better profit from past experience if one remembers more details about that experience.) Although the research on mood-congruent recall has produced inconsistent results, including failures to replicate (see Bower & Mayer, 1991), there are certainly some supportive findings, which suggest that the phenomenon is probably real but dependent on a host of moderating factors and boundary conditions. A recent review by Parrott and Spackman (2000) concluded that one such factor is that memory for internally generated events (i.e., by the self) is much more prone to create mood-congruent or mood-dependent patterns than memory for externally generated events (Beck & McBee, 1995). In one important demonstration, Eich and Metcalfe (1989) found that mood congruency had a much stronger effect for self-generated than experimenter-generated words. By far the best recall across their four studies occurred when people were in the same mood (induced by listening to happy or sad music) while generating the words as during the later recall test. This pattern fits well with the view that emotion facilitates learning: Current emotion or affect increases accessibility of memories about one's own previous behaviors in a comparable emotional state.

Emotion should facilitate learning more in some people and situations than others. Certain situations evoke more emotion for some people than others, and these differences in emotional reaction should be directly related to the extent to which memory is enhanced. Wessel and Merckelbach (1998) recruited participants who were either spider-phobic or had low fear of spiders and exposed all participants to a bulletin board that contained spiders, babies, and pens. Participants were then given an unexpected memory task in which they had to recall as many items from the bulletin board as they could. Compared to low-fear controls, spider-phobic participants had higher physiological arousal during the presentation of the bulletin board. This increased arousal was beneficial in terms of improving the specificity of memory among spider-phobic participants: They had enhanced memory for spider-related items and impaired memory for items that were not spider related.

Thus, the memory traces are stronger for emotional events than the neutral events, but memory traces are only stronger for information relevant to the situation and the lesson being learned. These patterns support the view that one main purpose of emotion is to facilitate learning and that it does so by focusing the mind on what just happened to cause the emotion.

Moral Reasoning, Moral Emotion, and Moral Choice

All known human societies have moral rules, and people apply these both to their own choices and to

evaluating the behaviors of others. Sets of rules such as the Ten Commandments of the Judeo-Christian religious tradition label some actions as good and others as bad, and specific moral evaluations often depend on making deductive inferences to apply these general principles to specific behaviors and contexts. Moral evaluation can thus be conceptualized as reflecting any or all of the quite different processes we have discussed, specifically formal reasoning from general principles, automatic affective evaluations that something is good or bad, and both anticipated and full-blown conscious emotions such as guilt and shame.

Psychologists have studied moral reasoning extensively, most notably following the work of Kohlberg (1984) and revisionists such as Gilligan (1982). But in recent years, researchers have increasingly disputed the assumption that people use moral reasoning as the primary basis for making their moral decisions. Such disputes raise the question of why people even bother to learn to reason morally. Emler (1998) surveyed a variety of evidence indicating that people do not typically confront a moral dilemma in their own lives by engaging in moral reasoning. Taking the possibly extreme position that moral reasoning is rarely or never used for making choices, Emler proposed that people learn moral reasoning mainly for the sake of arguing with and influencing the behavior of other people. In plain terms, Lucy does not use moral reasoning to make her own choices, but she may become adept at moral reasoning to criticize Jack and to influence him to behave in ways she desires or approves.

An important and influential article by Haidt (2001) proposed that moral reasoning is used primarily to rationalize choices that are in fact made on the basis of intuitions and gut feelings. His studies included confronting participants with hypothetical moral dilemmas of the sort favored in the Kohlbergian tradition, yet he showed that the explanations people gave for their moral rulings were often inadequate and inaccurate, and when participants were challenged, they sometimes could do no better than saying something to the effect of, "I don't know why, I just know it's wrong." His account proposes that automatic moral affect dictates the moral evaluation, and moral reasoning follows along afterward to provide some kind of plausible justification for the judgment.

Haidt's (2001) account can be interpreted as suggesting that moral reasoning is largely hypocritical, in the sense that its purpose is to furnish a false explanation of one's moral judgments simply because others will find the false explanation more acceptable and palatable than the true explanation in terms of gut feelings. But the theory that behavior pursues emotion can encompass his account while regarding the role of

moral reasoning as rather more constructive than simply to deceive one's fellows about one's true motives. In this view, online moral judgments and choices may be dictated primarily by automatic, intuitive reactions, much as Haidt suggests (see also Valdesolo & DeSteno, 2006). But cognitive controls can be used to override the emotional response (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). Moreover, moral reasoning may be useful for reflecting afterward about the event and one's response and thereby, crucially, for stimulating moral learning. Conscious emotion may especially stimulate reflection, such as if a man feels guilty and therefore imagines various counterfactual scenarios to ascertain how he might possibly have avoided the aversive guilt feeling. The upshot of that reflection process may be to alter how he responds to future, similar moral dilemmas.

In other words, the critiques of moral reasoning by Haidt (2001), Emler (1998), and others suggest that moral reasoning is more relevant to explaining how one is supposed to feel and act than to explaining why one felt and acted as one did. But that could be adaptive in the long run even if largely irrelevant in the short run. Learning how one is supposed to respond to moral dilemmas can be useful to avoid condemnation by others. The proximal, driving force for learning these lessons may be the conscious emotion and the wish to avoid feeling guilty again on future, similar occasions. The next time one encounters a similar moral dilemma, one may again respond on the basis of automatic affect rather than moral reasoning, but the moral reasoning one engaged in the last time (after the fact) has changed the automatic response. Thus, moral emotion (like other emotions) may function to help people learn from their mistakes and misdeeds.

Accounts of transgressions obtained by Baumeister, Stillwell, and Heatherton (1995) fit the theory that guilt leads to cognitive processing and changes in behavior. The accounts in which guilt was felt were significantly more likely than the guilt-free accounts to spontaneously mention that the person learned a lesson and changed subsequent behavior.

One function of anger may often be to stimulate such guilt. Fehr and Gächter (2002) examined "altruistic punishment," in which people punish others who take advantage of the group by free riding in a common goods scenario. Punishment was seen as expressing anger, and after being punished, free riders changed their behavior. Most important, they stopped free riding, even with a new group that did not include the person(s) who had punished them. Negative emotionality appeared to be central to both the punisher and the free rider: Punishers were angry, and the free riders perceived this, resulting in positive behavior change.

Automatic Affect and Behavior

Our theory has proposed that automatic affect, unlike full-blown conscious emotion, may be for the purpose of direct input into current behavior. In this section we present some evidence for this sort of influence. We confess to have found far less than expected, perhaps partly because social and personality psychologists have severely reduced their interest in measuring behavior in recent years (see Baumeister & Vohs, 2006).

Showing that emotional stimuli can influence behavior directly and without conscious emotion was the goal of Winkielman, Berridge, and Wilbarger (2005). In their most relevant experiment, they presented participants with happy or angry faces, flashed subliminally. Angry faces caused participants to pour and drink less of a tasty beverage than happy faces, despite the fact that participants did not consciously know what they had seen and that no changes in conscious emotion were reported. The controversial aspect of their work is the postulate of unconscious emotion as a subjective state that is not subjectively apprehended, but their work fits very well with our dual-process model. A nonconscious, automatic, affective response can directly influence behavior effectively, and no full-blown conscious emotion is required. Their results also fit our suggestion that automatic affect may work via activating the approach or avoidance systems.

The link to approach and avoidance systems is also indicated in research by Castelli, Zogmaister, Smith, and Arcuri (2004). Their task required participants to distinguish novel from previously viewed photos of faces, either by an approach-relevant response (moving the arm forward) or an avoidance-relevant response (moving it backward). When the initial group of faces had been presented as those of a positively viewed group, namely child counselors, participants were more efficient when the discrimination task involved the approach response. In contrast, when the faces had been presented as belonging to child molesters, then the avoidance response worked better. Thus, the affective tag associated with the faces altered the efficiency of the behavioral response as a function of whether it was better suited to approach or avoidance.

The feedback theory proposed that these small twinges of affect may be frequent and useful for informing current behavioral choices, whereas full-blown conscious emotions (especially negative ones) might be reserved for the rarer cases when there is some need to reflect and reconsider. We have proposed that guilt, in particular, may be a useful guide to behavior even if strong guilt is rarely felt. There is some evidence to support this notion, though more would be desirable. An experience sampling study by Baumeister, Reis, and

Delespaul (1995) found that people reported minor degrees of guilt rather frequently but severe guilt quite rarely. Extrapolating from their reports, people seem to feel weak twinges of guilt on average about 2 hours per day, whereas strong states of guilt average only a few minutes per week.

Automatic affective responses are also a crucial part of the mechanism behind the findings of Bechara et al. (1997), described earlier, in which brain-damaged patients who lacked normal emotional responses failed to learn to avoid risky decks of cards. Damasio (1994) has proposed that emotional outcomes leave affective residues in the body, which he terms *somatic markers*. Hence, if a person draws a costly card from a certain stack, the next time he or she approaches that stack of cards the somatic marker will be activated, creating a bad feeling that in effect warns the person not to choose from that stack. The possibility of drawing from that same stack again does not need to evoke a full-fledged emotional response, which indeed would probably be too slow to dictate which way the hand moves as it draws a card from one stack or another. Rather, the affective residue resulting from the preceding emotion can arise swiftly, but even that mere trace of affect is enough to help guide the decision process.

We have suggested that automatic affect is useful for pursuing goals. Valuable support for this was provided in a series of studies by Custers and Aarts (2005). Using subliminal presentations of stimuli, they paired neutral tasks with positive or other affective terms, and later they asked participants whether they wanted to perform those activities. Participants more wanted to perform the tasks that had acquired positive affective associations (albeit non-consciously), and this was independent of how they rated their conscious liking for the tasks. Behavioral measures confirmed that participants exerted more effort on tasks that had developed positive and nonconscious affective associations and completed those tasks faster than other tasks. New findings (Aarts, Custers, & Holland, in press) demonstrate that subliminal priming of words that have pre-established positive associations causes similar effect on increasing behavior aimed at goal pursuit (in this case, of the rate and frequency of computer mouse clicks that would bring them closer to the goal of having the chance to win money in a lottery). Participants report having no awareness of the primes nor did they report differential conscious emotional states. Hence, these results indicate that the link to implicit positive affect strengthens the motivation to pursue goals.

One theory suggests an answer to the question of how the psychological system knows that a primed state is one that should have motivational energy put toward its achievement. Custers and Aarts (2005) note that most of the goals that are primed nonconsciously in

psychology studies are desirable and hence probably have positive affect already associated with them (for empirical illustrations see Custers and Aarts, 2005). In the natural environment, repeated pairings of the goal state with positive affect (either incidentally or because of progress toward or obtainment of the goal) establish the affective tags that later become activated when the goal is activated outside of awareness. According to this notion, these cues, then, provide input as to how much effort and time should be spent attempting the goal.

The power of positive, automatic affect for improving goal pursuit and task performance can help explain a variety of other findings regarding the impact of non-conscious stimuli and processes. Shah (2003) showed that priming participants with reminders of significant others increased both their commitment to these goals and to their persistence at relevant tasks. In one experiment, participants who were primed with words related to father worked harder and solved more anagram puzzles when they felt close to their father and felt that their father valued this type of goal achievement, relative to participants who did not have similar feelings about their father. In similar work by Fitzsimons and Bargh (2003), participants who wanted to make their mothers proud responded to a priming method that activated the concept of mother with better performance on verbal task relative to primed participants who did not have the goal of making their mothers proud. In these experiments, participants reported similar emotional states regardless of condition, which rules out changes in overt feeling states as a mechanism for these effects. Significant others are often associated with positive affect because of the positive aspect of the relationship, and because the others approve or support that particular goal—indeed, that approval was a significant moderator of the effects.

Anticipated Emotions Do Influence Behavior

The view of emotion as a feedback system suggests that anticipated emotion may be more important in guiding behavior than actual, felt emotion. Insofar as emotion is feedback, it comes after the relevant behavior and is therefore too late to cause it, but the anticipation of emotional feedback can be very helpful in guiding behavior. Hence the final two sections of our review consider evidence on the effects of anticipated emotion.

That people are swayed by possible, anticipated emotions has been implicit in much of what we have already presented. The mood freezing studies, for example, suggest that people act so as to bring about an anticipated improvement in their mood or emotional state. This section goes a step farther by presenting studies that focus on explicit consideration of future emotions. The next

section will examine research on the consequences (adaptive or otherwise) of choosing and acting on the basis of anticipated emotion.

The importance of anticipated emotion has been recognized by decision researchers, most notably in an influential theory by Mellers, Schwartz, and Ritov (1999). The main thrust of their theory is that human choice is generally guided by anticipated emotion. In choosing between various monetary gambles, people select on the basis of how they think they will feel about winning or losing, rather than simply making a dispassionate calculation of what will maximize their probable financial payoff and choosing on that basis.

Anticipated regret guides decisions about vaccination, indeed both for and against. Vaccination involves taking medicine, sometimes in a painful and inconvenient manner, for a disease one does not have and might never get anyhow. That people get vaccinated at all is thus a testament to the power of anticipated regret: They would be sorry if they failed to get the vaccine and later became seriously ill. On the other hand, vaccines are not entirely risk free, and some people suffer illnesses and even death from them. Ritov and Baron (1990, 1995) showed that when people think about the possibility of illness or death caused by vaccine, they are significantly less likely to seek vaccination for themselves or their children. Even expecting to find out the death rate of a vaccine was enough to put people off choosing vaccination for their children.

Many studies on transgression and altruism indicated that finding oneself to be the (even unwitting) perpetrator of harm causes one to seek to perform good deeds. However, the simple theory that transgression causes good deeds was soon jettisoned in favor of a more complex theory, indicating that transgressors do good deeds designed to make them feel better and avoid future guilt (for review, see Baumeister, Stillman, & Heatherton, 1994). Freedman, Wallington, and Bless (1967) and Silverman (1967) showed that transgression alone does not motivate helping behavior but that transgressors behave in helpful ways to prevent the anticipated feeling of guilt based on others' perceptions. Berscheid and Walster (1967) showed that transgressors preferred to do things for the victim when the benefit to the victim was equivalent to the harm done. The transgressor essentially behaves in a manner that will precisely undo the harm, thereby eliminating guilt. The implication is that people will behave in a prosocial manner only if doing so will reduce the likelihood of experiencing future guilt.

Among the most interesting recent work to compare anticipated versus felt emotions is the research on affective forecasting (for review, see Wilson & Gilbert, 2003). This work has focused explicitly on elucidating

people's expectations about their future emotional states. A major conclusion to emerge from that work is that people's forecasts are overblown, in the sense that people expect that their emotions will be bigger (especially longer lasting) than their actual emotions turn out to be.

In one representative study by Dunn, Wilson, and Gilbert (2003), college students predicted they would be much happier if they were assigned to live in a coveted dorm than to an undesirable dorm, but 1 year later there was no difference in happiness between the students in the coveted dorm and those in the unwanted one. Similar findings were demonstrated when untenured professors were asked about what their emotional lives would be like if they did or did not earn tenure (D. T. Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998). They predicted severe and long-lasting distress if tenure were to be denied, but when it happened in reality they got over the distress relatively rapidly.

The affective forecasting findings seem highly relevant to the feedback theory. Almost invariably, the functional part of any phenomenon will be stronger and larger than its secondary aspects. The feedback theory says that people behave based on anticipated emotional outcomes. That theory would be highly implausible if anticipated emotion were weak and erratic in comparison with actual emotion. To use the tenure example, if assistant professors were to anticipate that failing to get tenure would produce only a mild and temporary feeling of disappointment, they might not be motivated to work hard to achieve tenure. Then, when they failed, they might be overwhelmed by distress. In such a way, a general pattern of underestimating future emotions would impair the feedback system and undermine the behavioral pursuit of emotional outcomes.

In contrast, for the feedback system to work effectively, people should anticipate powerful emotions in connection with their tenure outcome and therefore work hard to achieve success. It is not necessary that people actually feel long-lasting joy or sorrow as a result. According to the feedback theory, when the decision actually comes, people need only have enough emotion to sustain the general credibility of the anticipatory system (and to extract any lessons that can be learned at that time). The findings on affective forecasting indicate precisely this pattern: anticipation of strong and lasting emotions, possibly a strong initial reaction when the event occurs, but a relatively quick dissipation of the actual emotion.

The affective forecasting pattern of exaggerated predictions may sometimes have a strategic basis. Research on defensive pessimism has indicated that some people use exaggerated forecasts of disaster to motivate themselves (see Norem & Cantor, 1986). Whereas optimists

reassure themselves that things will turn out well, defensive pessimists see looming catastrophes, and they cope with that possibility by working extra hard. Currently felt anxiety is generally detrimental to nearly all forms of performance, from test-taking to public speaking to sex, but defensive pessimists typically are quite successful in their work (despite their constant worries), and so their false forecasts of future misery seem adaptive for them.

There is a smattering of other evidence favoring anticipated over currently felt emotion. Research by Gross (e.g., 1998a) has directly compared coping with current versus anticipated emotions, and the anticipatory coping is more effective. More precisely, that research has compared reappraisal strategies, which involve dealing with anticipated emotions, and suppression strategies, which consist of trying to get rid of a bad emotion after it has already arisen. The general pattern of findings from that work has indicated that reappraisal strategies are much more effective and adaptive, including having more optimal effects on coping, memory, and physiological reactions, than suppression strategies (Gross, 1998b; Richards & Gross, 2000). In other words, it is better to cope based on anticipated emotions than currently felt ones.

Anticipated and current feelings were compared directly by Richard, van der Pligt, and de Vries (1996). They randomly assigned participants to consider either their current feelings about engaging in unsafe sex or how they would expect to feel after engaging in it. The anticipated feelings led to a significant reduction in risky sexual behaviors across the next several months, whereas the current feelings had no effect.

Furthermore, the superior importance of anticipated emotion could help explain the seemingly contradictory findings (reported earlier) about whether emotionality in general is adaptive or maladaptive. Some emotional states clearly produce irrational and self-defeating behavior, yet people who lack emotions seem to fare poorly in life. But the latter lack both felt and anticipated emotions, and it could be the inability to anticipate emotions that impairs people's functioning.

Another line of research has shown that anticipated emotions can influence the choice of whether to enter situations. Marketing research by Andrade and Cohen (in press-b) explored the paradoxical phenomenon of horror movie attendance, in which seemingly rational consumers pay money to see a film that is designed to evoke fear and disgust. Their data indicated that aficionados anticipate temporary fright but overall positive emotions from attending horror films, whereas people who anticipate that a film will mainly bring negative affect tend to loathe and avoid such films. In a similar vein but different context, Vogel, Wester, Wei, and Boysen (2005) showed that the anticipated outcome of

discussing one's emotional problems with a counselor were more predictive of behavior (getting help) than were current emotions about talking to a counselor.

Thus, the anticipation of emotion guides behavior. The emotion system operates, perhaps, by exaggerating how strong the emotional outcomes will be to engage and sway the decision-making system.

Anticipated Emotions Promote Safe Choices

The preceding section showed that people sometimes base their choices and actions on the emotional outcomes they anticipate. But for the feedback theory of emotion to be plausible, it is necessary to show that the effects of anticipated emotion on behavior are generally beneficial. Otherwise, evolution would presumably have selected against people with such emotion systems.

To anticipate the evidence, our reading of the literature is that it points to two overlapping conclusions. First, there is a fair amount of evidence that anticipated emotion does lead to adaptive, beneficial, socially and personally desirable behaviors, especially insofar as these take the form of choosing a safe, readily defensible option. Second, anticipated emotion often leads to caution, including a bias in favor of the status quo when the status quo is at least minimally acceptable. The latter conclusion may sometimes go against the former: That is, caution may lead to suboptimal decisions, such as when fear of possible regret causes someone to avoid a slightly risky act that could have produced a very positive result. However, we think that playing it safe and sticking with an acceptable status quo would have been generally an adaptive strategy, and the blunt instrument of natural selection might well have favored a general play-it-safe strategy even if it does not yield the best possible outcome in all cases.

Anticipated regret. We have already seen that anticipated regret can alter some decisions. Here, the question is whether anticipated regret causes people to make better and/or safer decisions. Decision makers evaluate their outcomes relative to what might have been if they had chosen differently (Roese & Olson, 1995). Decision theorists refer to the emotions associated with these comparisons as anticipated regret and anticipated rejoicing (Bell, 1982; Loomes & Sugden, 1982), and many studies have demonstrated their effects on choice. As an example, Tetlock and Boettger (1994) demonstrated how social pressure to be accountable can amplify anticipated regret, thereby inducing decision makers to be especially averse to imposing losses or costs on anyone who may be affected by their choices. Janis and Mann (1977) proposed from their early review of the literature that anticipated regret changes

decision-making processes toward greater vigilance and information gathering, ultimately leading to better decisions (i.e., decisions with a higher chance of a good outcome). Greater information gathering may be an especially noteworthy effect of anticipated emotion, given the contrast with currently felt emotion—which, as noted earlier, often narrows the focus and reduces the gathering of information, with sometimes costly consequences (Easterbrooke, 1959).

In an early demonstration of how anticipated regret can alter decisions, Simonson (1992) showed that asking shoppers to think about possible regret over their choice of VCR caused them to shift toward favoring the so-called safer choice, which is to say the one they could justify better, regardless of whether it actually was better. The more easily justified options included a guaranteed discount price, as opposed to a possibly even lower price in the future, and a well-known, high-quality brand (Sony) as opposed to a cheaper item with an unknown brand.

Research from the health arena also supports the idea that anticipated regret changes people's decision making toward safer, healthier options. One study found that what differentiated women who came in for a second breast cancer screening and those who failed to show up was the regret they would feel if it was later known that they had breast cancer and could have caught it earlier (Lechner, de Vries, & Offermans, 1997).

Anticipated regret can also influence sexual decisions and again it leads to safer and healthier choices. Richard, de Vries, and van der Pligt (1998) reported that students who were higher in anticipated regret formed stronger behavioral intentions to take precautionary measures in a casual sex situation. Furthermore, these self-reported intentions and anticipated regrets were a significant predictor of actual precautionary measures over the next month.

Anticipated stress. When people believe that they may experience negative emotions in the future because of some stressful event, they engage in proactive coping—changing their behavior to minimize the negative emotions they may feel (Aspinwall & Taylor, 1997). Proactive coping takes multiple forms, including trying to prevent the aversive event from occurring and trying to minimize its eventual impact. Either way, it indicates that behavior changes in a generally constructive manner based on anticipated emotions.

Goal pursuit. Evidence for the beneficial value of anticipated emotions on goal pursuit was provided by Bagozzi, Baumgartner, and Pieters (1998). They studied dieting and exercising behavior. Anticipating emotional

reactions to reaching versus not reaching their goals helped motivate people to try harder to pursue the goals, and those motivations and efforts in turn facilitated actually reaching the goal. In a similar fashion, expected happiness is thought to be a potent determinant of useful behavior. Bandura (1989) claimed that people set loftier goals when they expect positive outcomes and they persist at reaching their goals more in the face of setbacks. People who experience setbacks are, according to Markus and Nurius (1986), more likely to strive if they continue to believe that the future will bring happiness. In that way, expected happiness can motivate people to continue pursuing their goals thereby perhaps facilitating success.

Anticipated guilt. Guilt can exert a strong effect on behavior even if people rarely feel guilty, simply because people learn what will make them feel guilty and then change their behavior so as to avoid guilt (Baumeister et al., 1994). Thus, by anticipating guilt and changing behavior to prevent that feeling, people can bring their behavior into line with valued, socially desirable patterns.

Experimental evidence of the positive power of anticipated guilt was provided by Lindsey (2005). She manipulated the anticipation of guilt in connection with a campaign for bone marrow donors by, among other things, including a story about a child who died waiting for a bone marrow donation and saying “And just think about how bad you might feel if you decided not to help when it is so easy” (p. 461). Path analyses confirmed that the manipulations led to anticipated guilt, which in turn led to increased behavioral intent to donate, and which in turn resulted in actual bone marrow donations.

Staying put. The evidence presented thus far indicates that people often make safe, beneficial decisions based on anticipated emotion. We turn now to a slightly different (although probably related) pattern that can sometimes produce suboptimal outcomes. That is, when people anticipate negative emotional outcomes from taking action, they may choose not to act and hence to leave things as they are. As long as the status quo is tolerable, then staying with it should be considered a safe choice. In that sense, anticipated emotion still promotes safe choices, even if it sometimes causes people to miss out on opportunities for even better outcomes.

One theoretical basis for making this prediction emerges from studies of regret by Gilovich and Medvec (1995). When people are asked to list their regrets looking back over long periods of time, they tend to report more regret over inaction than over action (i.e., over omissions than commissions). Prospective studies of anticipated regret, however, do not show that imbalance. For example, the “first instinct fallacy” studied by

Kruger, Wirtz, and Miller (2005) indicates that students are often reluctant to change an answer after they have written it down, even though evidence indicates that changing is somewhat more likely to yield a correct final answer. The deterrent is however that people believe they would feel most regret if they had had the right answer and then changed it to a wrong one, whereas having been wrong all along would produce less regret. Thus, in anticipation, they focus on avoiding errors of commission.

To integrate these findings and resolve the apparent contradiction, we suggest that anticipated regret generally favors the status quo (such as in sticking with the answer you already wrote down), and so behavior in general is biased to avoid errors of commission. If one plausibly assumes that opportunities for both kinds of errors are roughly equally distributed throughout life, and anticipating regret mainly prevents errors of commission, then errors of omission will end up being more common. That would explain why only the retrospective studies find more regrets over errors of omission. Put another way, people recall more errors of omission because there actually were more errors of omission—and that is because the anticipation of regret makes people mainly avoid the opposite kind of error (commission).

A review by C. Anderson (2003) titled “The Psychology of Doing Nothing” concluded that a great deal of inaction stems from anticipated or feared emotional outcomes. People delay decisions, favor the status quo over possible alternatives, and bypass risky opportunities because they are deterred from action by the anticipation that they might feel bad if they acted differently. Thus, anticipated negative emotion (even as a possibility) prompts people to stick with the relatively safe and known circumstances of the current status quo.

In an influential early demonstration of the status quo bias, Kahneman and Tversky (1982) asked students to imagine two investors who both lost a substantial (and identical) amount of money, one by actively buying a stock, the other by passively holding on to a stock he already owned. Nearly all (92%) of the participants said they thought the active buyer would experience more regret than the passive holder. The implication is that holding on to the status quo is seen as less likely to be regretted than changing it, even when outcomes are equally bad. This study likewise confirms our suggestion that anticipated regret emphasizes errors of commission.

Likewise, after hearing a story about a hypothetical person who either switched to a new option or stayed with the same option, participants forecast that the person would feel more regret if he or she would have switched (as opposed to staying put), thereby indicating that people view the status quo as a safe option under most circumstances (Simonson, 1992; see also Luce, 1998).

Recent work on the endowment effect points to the centrality of expected emotions in producing the large and reliable discrepancies between buyers and sellers. Sellers, who have been endowed with an object, anticipate negative feelings of loss when they contemplate selling, and therefore a higher asking price is needed to compensate for the possibility of later regret (Fishbach & Zhang, 2005). When the researchers coaxed participants to think about errors of omission and when participants were put into a happy mood before naming a willingness to sell price, the difference between buyers’ and sellers’ valuation of the product was eliminated. Thus, apparently, people boost the price at which they would sell a valued item they have as a way of mitigating the chance that they will later feel regret over parting with it.

A clever study with lottery tickets showed that anticipated regret supports a status quo bias even beyond the endowment effect. Bar-Hillel and Neter (1996) offered participants to trade their lottery ticket for a new ticket with an equal chance of winning. To overcome the endowment effect, they offered participants a small cash incentive to make the trade. Making the trade would thus seem an unqualified gain: one keeps one’s same chance of winning the lottery plus receives some guaranteed money. The only reason to refuse this advantageous trade was the anticipation of possible regret one might feel if one traded away the winning ticket. Apparently, however, this was a serious concern, and less than half the participants were willing to trade. Remarkably, a control procedure involving trading identical pens (with the same cash inducement) yielded a much higher rate (90%) of making the trade. But trading pens does not invoke the possibility of future regret, unlike trading lottery tickets.

Thus, anticipated regret can cause people to refuse to make even advantageous, rational exchanges. Still, as we said, a general strategy of staying with a tolerable option is probably a prudent and safe approach.

GENERAL DISCUSSION

The assumption that the purpose of full-blown, conscious emotion is to cause behavior directly appears to be widespread and indeed deeply embedded in psychological theorizing. Yet it appears to be far less true than many researchers (ourselves included) have assumed. This manuscript sought to develop an alternative theory. We have proposed a distinction between full-blown, conscious emotion and automatic affect. Instead of direct causation of behavior, the role of full-blown emotion seems mainly to act as input into the cognitive control of behavior. Full-blown emotions constitute

feedback that facilitates cognition and learning rather than directly guiding behavior. Behavior does however pursue emotion, such as when people act on the basis of anticipated emotions rather than current ones. Automatic affects, often in the form of quick and simple twinges of liking and disliking, may express and revive the lessons from past emotional experiences and help guide behavior directly, especially by helping people choose among competing plans or goals. Automatic twinges of affect also help one anticipate possible emotional outcomes. We now summarize the evidence and conclusions regarding our main points.

Emotion is Not for Directly Causing Behavior

The direct causation theory has long had the virtue of simplicity. To apply it to any observed behavior, one need only infer a prior or current emotional state and posit that the emotional state contained or generated the impulse to act in a certain way. It could only be falsified by observing that the same emotion failed to generate the same behavior on other occasions, and that is a null result, which the logic of scientific experimentation dismisses as inconclusive (and not publishable). No one would notice how frequently and widely the direct causation theory was failing to fit the facts, especially as long as each new generation of emotion theorists could remind itself that fear causes fleeing.

Sometimes emotion may lead directly to behavior, but we think there is ample reason to think that this is not the main or proper function of conscious emotion. Many emotional states do not lead directly to behavior. When emotion does cause behavior directly, the results are often less than optimal, sometimes even irrational and self-defeating. Decisions made during emotional states tend to neglect important information, including probabilistic information. Given these drawbacks, evolution would likely have phased emotion out of the human psyche if direct causation of behavior were its main function (because people would be better off without emotion). Another problem is that emotion is often slow to arise, possibly too slow to help with quickly developing situations and therefore too slow to be useful for directly initiating behavior. Sometimes the emotion does not seem to emerge fully until the crisis has passed.

Another problem, specificity, is underappreciated but presents a formidable challenge to the direct causation theory. Emotions are too general to initiate specific behaviors. Instead, broad activation of approach or avoidance tendencies seems more plausible than highly specific action tendencies.

Much evidence that purports to show emotion influencing behavior is misleading, as the mood-freezing studies showed. Instead of emotion causing behavior,

the behavior is aimed at bringing about a change in one's emotional state—so the behavior is pursuing emotion as the desired outcome. The emotional state of sadness does not intrinsically contain anything about eating cheesecake, but rather the sad person eats cheesecake when it is available in the hope of changing emotional state (i.e., cheering up). Even such supposedly classic patterns as anger causing aggression turn out to indicate that the person expects the behavior to produce mood repair. Thus, even when the data seem to show emotion causes behavior, the underlying reality is often that behavior pursues emotional outcomes.

Conscious Emotion as Feedback

Emotion has a clear evaluative function, and so it expresses how a recent event or outcome is related to the person's motivations and values. People only have emotions about things that matter to them.

The view that emotion serves as feedback avoids the problems we have identified with the direct causation theory. The lack of behavioral specificity is not a problem because the behavior has already occurred. The slowness of conscious emotion is also not a problem because the emotion is not for dealing with the event as it happens as much as for stimulating reflection on it afterward. The fact that emotions impair calculation of probabilities is also not a problem because, again, the event has already occurred.

Consciousness Promotes Learning

One common purpose of feedback in general is to facilitate learning, and learning is crucial to the feedback theory of emotion. Evidence indicates that conscious emotion is helpful for learning. People have more emotions when performing new activities than habitual or familiar ones, and that fact suggests that emotion is more relevant for learning new things than for performing familiar acts.

People who lack normal emotional responses do not learn things as well as those who have normal emotions. The accumulated evidence shows that emotion stimulates cognition much more reliably than it stimulates specific behaviors. Negative emotions, in particular, promote counterfactual thinking, and such thinking seems ideal for helping people reflect on what they have just done so as to figure out (learn) how to behave in a more rational, practical, or moral fashion on future occasions.

The contribution to learning is attested by the benefits of emotion for memory. Emotion makes people more likely to learn a lesson from an event and improves their memory for information relevant to that lesson. Emotion stimulates reflection on prior events, and that

reflection can help with coping and improve health. There is some evidence that people are more likely to change their behavior, and change it toward the better, when they have emotional feedback about prior behavior.

Automatizing Evaluation

One function of consciousness that has long been noted, however, is that many responses start out being learned or acquired consciously and then become automatized, which means they can be executed automatically and without conscious help, and indeed that is how skills are acquired in general (e.g., Baumeister, 1984; Lieberman, Gaunt, Gilbert, & Trope, 2002). Our theory suggests that there may be an emotional version of this same automatization process. Conscious emotion leaves an affective residue associated with the memory of the situation and behavior that produced the emotion, and when a similar opportunity arises in the future, the affect can be automatically activated (“lying is bad”) so as to guide behavior.

The simple valence of affect, being either positive or negative, maps well onto the approach and avoidance systems that can dictate how to respond to a particular situation. That solves the specificity problem we noted earlier for the direct causation theory: The emotion does not contain specific information about how to act, but rather the particular situation evokes positive (approach) or negative (avoid) reactions based on prior experiences in similar situations.

Some evidence confirms that automatic affect does guide behavior, even when people are not fully conscious of their affective inputs. The affective residue corresponds to what Damasio (1994) has called a somatic marker: stored evaluative information stemming from past outcomes and potentially helpful for guiding future behavior. Additional evidence shows that nonconscious affect can facilitate goal pursuit.

Anticipating Emotion

Assuming that emotional feedback does facilitate learning, a person will gradually learn to anticipate what acts will bring which emotions. Once those expectations are formed, the person then is likely to start selecting actions based on the anticipated emotional outcomes—because people are strongly motivated to avoid emotional upset and/or to seek out positive emotions. The result may be a tendency toward what we called *ubiquitous emotion regulation*, which, though possibly overstated, means that pursuing emotional outcomes is a factor in most behavioral choices.

Ample evidence shows that people make choices and change their behavior on the basis of anticipated emotions, such as to avoid guilt or regret. Furthermore, anticipated

emotion sometimes guides behavior better than currently felt emotion. Adjusting behavior on the basis of anticipated emotion appears to be quite adaptive: It produces safe, healthy, and justifiable choices. It also tends to foster preserving the status quo when the status quo is good.

Research on affective forecasting has provided some of the most vigorous comparisons of currently felt versus anticipated emotions, and the general finding is that the anticipated emotion is often stronger than the actually felt emotion. This fact suggests that the anticipated emotion may be more important than felt emotion. For example, that is why guilt can be a powerful guide to behavior even for someone who rarely feels guilty, simply because that person anticipates the potential guilt and therefore takes steps to prevent it.

Implications for Behavior Control

Our review suggested that anticipating emotional outcomes may have a positive, beneficial influence on decision making and action control. Although it would be a simplistic overstatement to assert broadly that anticipated emotion promotes good decisions whereas felt emotion promotes bad decisions, that formula is not entirely wrong either. The feedback theory could work without assigning a place to anticipated emotion, but it would then be just a reinforcement theory. Anticipated emotion (possibly assisted by automatic affective signals) is probably an essential part of the system. One recommendation from this review is that researchers shift some of their emphasis from studying current emotional state to studying anticipated emotional outcomes. To some extent, that shift has begun (witness the mood-freezing, affective forecasting, and anticipated regret work), but more experiments are warranted. Crucially, even the effects of current emotional state may often depend on anticipated emotion, such as when acute emotional distress motivates someone to act in ways that promise relief.

In the sections on self-defeating (irrational) and adaptive (beneficial) behaviors, some apparent paradoxes and contradictions emerged. Current emotional state sometimes contributes to self-defeating behavior and thus the direct causation of behavior by emotion is often maladaptive. Put more bluntly, it is often destructive or costly to act on the basis of current, intense emotion. We suggested that those findings speak against the view that the evolved purpose of emotion is to cause behavior directly because natural selection would favor adaptive behaviors. In contrast, emotionality per se seems to be adaptive, insofar as people who lack emotional responses suffer multiple problems. One resolution to this apparent paradox is to invoke anticipated emotion rather than currently felt emotion. Anticipatory emotion,

favored by the feedback theory, is useful and adaptive, even if behaviors performed under the influence of current emotional distress are sometimes ill-advised and maladaptive.

The only problem with that resolution is that on closer inspection, many of the self-defeating behaviors performed in the heat of emotion turned out to be aimed at securing mood repair (just as in the mood-freezing studies). This was yet another sign that the feedback theory is more accurate than the direct causation theory—but it exposes the feedback theory to the criticism of promoting maladaptive responses. In plainer terms, many self-defeating behaviors seem to be based on anticipated emotion. How can this be resolved?

The different time spans are crucial to take into account. The most plausible integration, in our view, requires a distinction between pursuing emotional feedback from a neutral state and pursuing it from a state of acute distress. The latter may yield much worse results than the former. In both cases behavior is pursuing emotion rather than emotion directly causing behavior. But the urgent desire to escape from current, acute emotional distress can encourage people to take foolish risks and ignore distal costs, with harmful and destructive results. Acute emotional misery may produce a short-term focus, so as to feel better *now*. In contrast, making decisions in a relatively dispassionate, neutral state so as to maximize long-term positive emotional outcomes seems more likely to yield desirable results.

Put another way, consider one of the standard recipes for self-defeating behavior, namely short-term gain linked to greater but delayed harm (e.g., Baumeister & Scher, 1988). Although the person in a neutral or positive state might occasionally be swayed to embrace that sort of costly bargain, in general there is no pressing need for it. To the extent that the person can appraise the long-term outcomes, he or she likely would avoid falling into that trap. In contrast, a person who feels acutely bad would be strongly tempted by the prospect of feeling better right away and hence may be more willing to discount or disregard the potential for long-range problems. In that way, current emotional distress could tilt the decision-making apparatus toward the self-defeating course of action.

The broadest and most speculative implications of the present review pertain to the conscious control of action generally. The naïve assumption that conscious processes directly cause behavior has come under increasing attack in recent years, as evidence accumulates that automatic responses are the direct causes of behavior (e.g., Bargh, 1997; Wegner, 2002) and that consciousness is often too slow to initiate behavioral responses (Libet, 1985). One way to salvage a role for consciousness in guiding behavior is to propose that it has mainly indirect effects. In that way, current behavior is executed automatically by consulting if-then programs

for how to respond to circumstances, but consciousness can reflect on recent actions and alter those if-then programs (e.g., Gollwitzer, 1999; also Baumeister, 2005). That is, consciousness may be less effective at directly initiating behavior than in reprogramming the self for future occasions. The feedback theory does not depend on such assumptions but would fit well with them. Conscious emotion stimulates counterfactual thinking and reflection about recent behavior, helps distill lessons, and leaves automatic traces that will remind the person of the lesson the next time a similar circumstance arises.

Limitations and Directions for Future Work

This article was intended to open rather than close a debate. We have presented the feedback theory as a viable alternative rather than a proven fact, and we think the direct causation theory should be converted from a standard assumption to a questionable hypothesis. Further work is needed to test many of our points. Does anticipated emotion generally influence decisions, and in a positive manner? When (if ever) does emotion directly cause behavior and not by means of pursuing a change in emotional state or by the indirect route of shaping cognition, which in turn shapes behavior? Does automatic affect really function differently than conscious emotion? We have presented a fair amount of evidence, but given the breadth of the theory, far more would be desirable before the issues could be considered as settled.

We have been sharply critical of the assumption that emotion directly causes behavior. Emotion may however directly shape cognition, and cognition may have fairly direct impact on behavior. (To be clear, there is room for debate as to whether cognition directly causes behavior or there is an intervening step, in which case cognition would function as a kind of advisor to the executive that actually controls behavior.) As Schwarz and Clore (1996) pointed out, the direct influence of emotion on cognitive processes is far better established than the direct influence of emotion on behavior. In our view, this fits well with the feedback theory, in which the effects of conscious emotion are geared toward retrospective analysis and learning. Emotion shapes behavior by way of cognition. If there are exceptions, when emotion directly causes behavior but bypasses cognition, these outcomes may be maladaptive. Human beings function well when emotion directly stimulates cognition and not-so-well when emotion directly stimulates behavior. Insofar as that generalization is correct, then the proper function of emotion is to influence cognition.

Interpersonal processes represent a large gap in our theory and a beckoning opportunity for future theory and research. We have focused on how one person's emotions are related to his or her own actions. Although we think the feedback theory is a plausible

account of how that may work, it does not exhaust the functions of emotion. One person's emotions may influence another's actions; people may act in the hopes of eliciting or changing each other's emotions; and people may anticipate how others will feel. The fact that emotions seem naturally to seek expression, such as in facial expressions, suggests that they have a deeply rooted communicative function. Furthermore, people may deliberately act emotionally so as to induce emotion in another person (e.g., anger or disappointment may evoke guilt or remorse) in the hope that the other will learn a lesson and not repeat some unlikable behavior.

We have also glossed over most distinctions between specific emotions, and it is possible that some of them function in special ways. In particular, anger may focus attention on external factors such as other people, and so the lessons one learns, if one learns at all from anger, may pertain more to other people (e.g., whether to trust a transaction partner after being duped; see Vohs, Baumeister, & Chin, in press) than to the self. Still, if anger makes one learn not to trust particular others or rely on them or play cards with them, then the net effect could be quite similar to self-oriented emotions.

Concluding Remarks

One seeming paradox of human emotion is that it activates the body with arousal and other effects as if preparing it for action, yet the emotional stimulus is often something that is over and done. The feedback theory can make sense of this (as with several other apparent problems) by suggesting that the emotion system does much of its best work after the fact. Living in a human cultural society is far more complex than living in almost any other known social system, and so humans have more lessons to learn, and more complicated ones, than other creatures. A flexible, reactive feedback system would be useful for adapting to life under those circumstances, especially if it steered people to use their advanced cognitive apparatus for figuring out how to negotiate their way through the unique, remarkable opportunities and pitfalls of these intricate social and cultural systems. For all its drawbacks, human emotion seems well designed to provide such a feedback system.

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