# Expectancy

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To appear in:

A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (Vol. 2). New York: Guilford.

Acknowledgements:

We appreciate the comments on an earlier draft provided by Jennifer Beer, Jim Olson, and Larry Sanna. Elena Chen and Florian Fessel provided helpful clerical and library assistance. We gratefully acknowledge the support of National Institute of Mental Health grants R01 MH55578 (awarded to Neal Roese) and R01 MH59774 (awarded to Jeff Sherman).

# Expectancy

*Contemplating the future consequences of present actions has a proud lineage among us primates, and is one of the secrets of what is still, by and large, the stunningly successful story of humans on Earth.*

- Carl Sagan (1997, p. 91)

Nearly every human society has reserved a special place for those denizens claiming the ability to predict the future. Prophets, astrologers, shamans, witch doctors, and scientists are but a few examples of the numerous occupations predicated on foretelling what has yet to occur. Wielding runes, charts, crystal balls, hallucinogens, or mathematics, practitioners of prophecy have achieved widely varying degrees of predictive success. Yet even a little success goes a long way, for enormous is the value of prophecy to any society, or any individual. Prophecy brings power in its purest sense: power to acquire that which is most desirable and avoid that which is most repugnant, power to achieve victory and conquest, power to bypass famine and flood. Regardless of the scope of prediction, the essential value remains invariant: to predict the future is to navigate it more effectively.

Expectancy is a generic term referring to beliefs about the future. From short-term dinner plans for the weekend to long-range forecasts of financial investments, people think about the future and use such thoughts in ongoing judgment, reasoning, decision-making, and behavior. Expectancy is a core construct of psychology, a signature building block of cognition that is at once common among animals yet also uniquely human. It is common in the sense that the brains of all ambulatory organisms have evolved to abstract and record survival-oriented patterns of information (food here, predators there) that may then guide subsequent behavior. Yet

expectancy is also uniquely human in the sense that we alone seem to have the capacity to create detailed imaginings of future possibilities, to erect vivid simulations of environments and situations that have never before existed, and to coordinate ongoing behavior, often involving many people, so as to actualize those possibilities through effort and invention. Expectancy is perhaps a special case of the more general mental time travel capability inherent in episodic memory, which Tulving (e.g., 2002) also has argued to be unique to human cognition.

Expectancies are beliefs about a future state of affairs, subjective estimates of the likelihood of future events ranging from merely possible to virtually certain. This definition is taken from the expectancy chapter that appeared in the first volume of this handbook (Olson, Roese, & Zanna, 1996), and the review that follows is intended to build directly on that earlier chapter. The tone and argument of the present chapter are similar and where conclusions remain the same, we restate them only briefly and refer back to the earlier chapter for elaboration. The present chapter advances beyond the earlier one in three main ways. First, new insights into the tension between rigidity versus revision of mental representation, particularly in the face of disconfirming information, permit a more rigorous portrait of the expectancy construct. Second, the mushrooming literature on stereotyping (which may be defined partly in terms of expectancies for particular social groups) has yielded a variety of insights that must be integrated into a general overview of expectancy. Third and most centrally, this review is organized around a functional perspective rooted to principles of effective behavioral control, coordination, and automaticity. Expectancy is first and foremost an instantiation of those core cognitive mechanisms geared to action and survival.

The chapter is organized around the following sections. We first establish our theoretical framework by explaining the functional basis of expectancies. We then discuss determinants of

expectancies, framed in terms of content-neutral parameters. The consequences of expectancies are then reviewed, structured by the central principle that behavior regulation is the primary function of expectancies, with cognitive and affective consequences operating in support of that primary function.

## I. FUNCTION

The most general and basic function of expectancies is to guide effective behavior. Expectancies constitute information gleaned from past experience, but to be effective, they must be sufficiently lean to be deployed rapidly, particularly when processing resources are taxed. This section focuses first on how expectancies are used to regulate behavior, then on the efficiency of expectancy use.

### *Behavior Regulation*

Expectancies are tools for survival. By anticipating future fortune or misfortune, that is, by constructing a cognitive map that suggests and directs means of acquisition and avoidance, an organism is in a vastly better position subsequently to acquire and avoid successfully (Bandura, 1986; Higgins, 2000; Irwin, 1944; Rotter, 1954; Tolman, 1932). In short, to act effectively in the world is to draw on information gleaned from previous experience. The expectancy is where past and future meet to drive present behavior. This is the essence of the expectancy construct, a psychological mechanism that is first and foremost a tool for guiding behavior and hence, ultimately, a tool for survival.

Several core functions (or motives) have occupied center stage in recent social psychological theory, including needs for accuracy, control, improvement, affiliation, and affect regulation (e.g., Fiske, 2003; Sanna, 2000; Sedikides & Strube, 1997). Perhaps the most basic

function underlying the majority of these conceptions is simply that of behavior control, the regulation of single and sequential actions to ensure survival. Effective management of ongoing behavior subsumes accuracy and control functions and may be put in the service of improvement and affiliation. Affect regulation (e.g., mood maintenance, mood improvement, self-enhancement, etc.) is a distinct function best explored separately, but we argue from the start that it is a secondary function of expectancies, largely subservient to the primary function of behavior control. But human beings do vastly more than merely survive; they plan marriages and careers, they move in and out of communities, and they spend an enormous amount of time attending to details both large and small so as to turn ideas into reality. Expectancy is not just a tool for survival, but a necessity for modern living. For this reason, the functional basis of expectancy is best appreciated not at the level of discrete thoughts but at the level of complex thought systems.

Take the example of a road-trip, say driving from Chicago to Memphis. Such a journey over hundreds of miles requires not just an expectancy ("I'll be there on Sunday"), but a system of expectancies, consisting of at least 4 different kinds of anticipatory cognitions: 1) a *superordinate goal* (i.e., the destination, Memphis, the ultimate end-point that gives coherence to the other expectancy components), 2) *plans* (i.e., a set of subordinate goals specifying particular actions that must be implemented to reach the superordinate goal, such as routine car maintenance, buying gas, and making arrangements for an overnight stay midway), 3) *semantic expectancies* (i.e., derived from semantic memory, these form an interlocking web of implicit background assumptions, ranging for example from traffic laws, the map layout of interstate freeways, and the location of fast-food outlets), and 4) *episodic expectancies* (derived from similar past experiences stored in episodic memory, such as the last road-trip down the I-57

highway or the degree of congestion during the last holiday long weekend). Successful goal completion rests on this interlocking set of multiple expectancies.

Regulatory feedback loops are a defining feature of goals (Austin & Vancouver, 1996), and indeed they pervade an expectancy system simultaneously and at multiple levels. A negative feedback loop is one in which the current state is compared to an ideal or expected state, with discrepancies between the two directly eliciting control changes designed to reduce the discrepancy. Returning to the road-trip example, at the very lowest level, that of the briefest time duration and most subordinate of goals, sits a feedback loop for the mere act of driving. Yet driving is a behavior of tremendous complexity partly obscured by its automaticity. Driving requires continuous online monitoring of visual signals indicating position on the road, proprioceptive feedback revealing motion and acceleration, and symbolic information conveyed by signaling devices like speedometers and signposts. This information is compared to expectancies, in the form of desired position or speed, and deviations between the desired state and the actual state require rapid correction using pedals and steering wheel. Absence of such correction (for example, when sleeping at the wheel) is disastrous. This short-term, low-level feedback loop is but one example; yet the same conceptual operation, widely known as a TOTE unit (Miller, Galanter, & Pribram, 1960), occurs over longer time periods and for larger goals. People compare their current marriages, careers, and other long-running experiences against expectancies taking the form of dreams, ideals, or obligations to others; they note discrepancies; and they engage subsequently in behavior aimed at correcting or reducing those discrepancies (Carver & Scheier, 1998; Higgins, 1987; Markus & Nurius, 1986).

The concept of a negative feedback regulatory loop emphasizes the twin aspects of stability and change with regard to both the incoming current state information and its behavioral

response. Current-state information that is similar to the expected state embodies a situation that is normal and requires no change in behavior; state information that is suddenly dissimilar creates a situation that is abnormal and does require change in behavior. In normal situations, then, expectancies serve to furnish background assumptions, and here their influence is silently implicit. In abnormal situations, however, expectancies become a jarring reminder of how things "ought to have been," defining in precise terms the ways in which the current situation has deviated, and thereby suggesting (or activating) information relevant to behavioral correction (Roese, 2001). Activation of cognitive efforts to better understand what amounts to a failure of prediction is the immediate result, but so too is activation from memory of information semantically related to the newly changed situation, information that creates new expectancies but also suggests new compensatory or corrective behaviors. In a subsequent section, we will return to the enormous body of evidence that details what happens when expectancies are confirmed (normal situation) or disconfirmed (abnormal situation).

Behavior control therefore requires continuous online processing in the form of continuous comparison, or pattern matching, between the current state and the expected state. Very likely in parallel to this comparative process is the conceptually similar online comparison between the current state and recent past state. *Processing fluency* is a construct that captures the moment-by-moment degree of deviation detected in such comparisons, with high fluency characterizing the smooth flow of incoming state information that matches closely either the expected state or past state templates (e.g., Benjamin & Bjork, 1996; Jacoby & Dallas, 1981; Johnston & Hawley, 1994; Whittlesea & Williams, 2001). Processing dysfluency characterizes the detection of a mismatch, and is the functional equivalent of an alarm system (Lieberman, Gaunt, Gilbert, & Trope, 2002). The perception of fluency and dysfluency may be explicit

("Why did she turn right with her left turn signal blinking?") or subtle and implicit (a momentary stutter in the ongoing processing of visual information that may not be consciously experienced, but may trigger resolution processes). Here there is an exciting new connection of cognitive function to structure with the identification of the anterior cingulate as the probable brain site at which this online monitoring of processing fluency occurs (Botvinick et al., 2001; Lieberman et al., 2002). Activity in the anterior cingulate indeed corresponds to rapid shifts in emotion, including pain and anxiety, and also attendant behavioral correction. Crucially, anterior cingulate activity is heightened when expectancies are disconfirmed (Carter et al., 1998). Also implicated in detection of expectation disconfirmation is the orbitofrontal cortex, a region with direct neuronal connections to the anterior cingulate (Berns et al., 2001; Camille et al., 2004; Thorpe, Rolls, & Maddison, 1983). From this vantage point, the key mechanistic underpinning of expectancy confirmation and disconfirmation is, respectively, activation of similar versus dissimilar information from memory and fluent versus dysfluent processing.

We argue that most expectancies are accurate. Those expectancies based on semantic memory (i.e., based on slowly-learned, general world knowledge) are largely accurate, mostly implicit, and utterly essential to effective behavior. Past research on expectancies in particular but also knowledge activation in general, however, has tended to overlook semantic knowledge in favor of those expectancies rooted to episodic memory (i.e., based on rapidly-learned specific instances), which are more often explicit and perhaps more prone to bias. To be sure, expectancies can produce judgmental error, but they do so only rarely against a backdrop of magnificent, silent, and often unappreciated success at overall behavior control.

*Efficiency*

For expectancies to function well, however, they must not only deliver information accurately, but also efficiently. Expectancies that cannot be applied quickly and easily will be of little use in situations requiring swift decisions and nimble action. Indeed, such situations heighten the value of applying expectancies to guide behavior. With insufficient time to comprehend a situation in terms of its unique array of specifics, the ability to bring past experience to bear can be a life-saver. Empirical evidence from multiple domains supports the idea that expectancies are especially likely to be relied upon under trying circumstances. For example, people rely to a greater extent on expectancies relevant to persuasion (e.g., expert opinions are valid) and intergroup behavior (e.g., skinheads are unfriendly) when processing capacity is constrained (for reviews, see Petty & Wegener, 1998; Sherman, Macrae, & Bodenhausen, 2000). More broadly, there is considerable evidence that human judgment and behavior proceeds via *bounded rationality* and that relatively simple rules (a kind of expectancy) are relied upon to provide relatively accurate information in a very efficient way (e.g., Gigerenzer et al., 1999; Kahneman & Tversky, 1973; Simon, 1956). The efficiency with which expectancies may be applied is affected by a number of important properties, and is reflected in the ways that expectancies influence the ongoing encoding of expectancy-relevant information.

*Summary*

Expectancies are mental constructions used to guide and regulate behavior. As such, they are best conceptualized as tools for survival. Expectancies guide behavior with great efficiency, meaning that they provide useful information rapidly and with little demand on processing resources. These main ideas are refined further in the next section.

## II. DETERMINANTS and PARAMETERS

Expectancies vary along several dimensions, or parameters, and the particular envelope of variation along all these parameters for any one expectancy goes a long way toward characterizing its determinants and consequences. Using a parametric approach to categorizing expectancies was a central feature of the earlier chapter (Olson et al., 1996), and it may be contrasted to a typological approach that defines discrete subtypes of expectancies. Miceli and Castelfranchi (2002) used this latter approach, distinguishing between, for example, forecasts (predictions of events believed to be likely), hopes (future events that are thought to be desirable though not necessarily likely), and hope-casts (a predicted future event that is desirable, likely, and which therefore ought to occur). These authors also used mirror-image terms for negatively valenced events (fears and fear-casts). But because of its content-neutral usefulness in encapsulating numerous judgment domains, we retain the parametric approach employed by Olson et al., modifying it slightly to reflect new theoretical insights to have appeared in the intervening years. Five parameters are discussed: likelihood, confidence, abstractness, accessibility, and explicitness.

*Likelihood*

Perhaps the most basic way of describing an expectancy is in terms of likelihood of occurrence. An expectancy describes an event that may or may not occur with some degree of probability, often conveniently expressed using a scale ranging 0% to 100% (or 0 to 1). Thus, some expectancies refer to events believed to be low in likelihood (“Dave’s attempt to quit smoking has about a 10% chance of success”; “This policeman is unlikely to be friendly”), moderate in likelihood (“Boeing has a 50% chance of meeting its quarterly earnings target”; “Bill is neither particularly introverted or extraverted”), or high (“I am 90% certain that I will eat grilled fish on Saturday”; “All professors are absent-minded”). Olson et al. (1996) used the term

*subjective expectancy* to denote such variable likelihood beliefs. The extremity of subjective expectancies critically influences the manner and extent to which those expectancies guide behavior and cognition, and may be confirmed or disconfirmed by experience.

The determinants of expectancy likelihood reflect the more general input sources for all beliefs, namely information derived from past experience, social learning, the popular media, and the like. Mood has been shown to influence likelihood estimates, such that positive and negative moods increase perceived likelihoods of positive and negative events (Johnson & Tversky, 1983), but this effect appears to derive largely from the informational cues inherent in particular affective states (DeSteno, Petty, Wegener, & Rucker, 2000). Importantly, when existing expectancies are confirmed, their subjective likelihood may increase. For example, previous success on a particular task increases expected likelihood of future success (Feather, 1966; Feather & Saville, 1967).

People make inferences and attributions that mediate between the input of information and the output of expectancies. For example, consensus information increases entity attributions (Kelley, 1967), which may be taken to reflect belief in an external, objective reality. In this way, consensus information makes expectancies seem more factual, a process that likely contributes to the conversion of initially subjective expectancies into factual ones ("Everyone agrees so it must be true"). Also, when attributions reflect a belief in stability rather than instability (Weiner, 1985), the resulting expectancy is higher in likelihood ("Chuck failed the exam because of weak ability, which is a stable disposition; I expect Chuck will fail the next exam too"). Importantly, this attribution mechanism underlies the *theory of hopelessness depression*, which suggests that when self-attributions for negative events are stable and global, expectations for the future become chronically bleak, resulting in depressive symptoms (cf. Abela & Seligman, 2000;

Abramson, Metalsky, & Alloy, 1989). These are just a few examples of the many ways that interpretive cognitive mechanisms shape the perceived likelihood of future events.

*Confidence*

Any belief may be held with varying degrees of certainty or confidence. It is important to emphasize that confidence is orthogonal to likelihood. That is, high confidence is not the same thing as a belief in high likelihood of occurrence. Take the flip of a fair coin. The likelihood of the coin landing with heads up is 50%, and knowing that the coin is fair, an observer would expect this likelihood with extremely high certainty. Both low and high probability events may be expected with both high or low confidence ("Jack is very confident that his chances of winning the spelling bee are about 20%;" "Analysts are only somewhat confident of the projected 95% success rate of the new missile system"). Confidence and likelihood are sometimes conflated in studies of expectancy, but we hope future researchers more clearly distinguish between them.

The determinants of expectancy confidence overlap partly with those that influence likelihood. For example, information derived from experience and communication with others can dictate to a large extent the confidence with which the individual expects a particular outcome. Direct personal experience tends to have a greater impact on confidence than indirect experience conveyed by others, as indicated by research on attitudes (Fazio & Zanna, 1981). In either case, increases in experience in a domain increase both the confidence with which expectancies are held and the likelihood that they are abstract. Thus, because abstract expectancies are typically based on a greater sample of experience than episodic expectancies, abstractions are held with greater confidence. Attributions and other interpretive cognitions

influence confidence as well as perceived likelihood. Finally, past confirmation of expectancies also increases confidence (see Olson et al., 1996, for further discussion of these points).

Another determinant of expectancy confidence is the interconnection between the expectancy and other beliefs. The greater the degree of interconnection among semantically related beliefs, the greater the confidence with which such beliefs are held. In research on the *hindsight bias* (Hawkins & Hastie, 1990; Roese, 2004), it has been shown that people have difficulty disregarding the information contained in an outcome in trying to recall their earlier expectancies for that outcome (e.g., after observers learned that the outcome of O. J. Simpson's notorious 1995 murder trial was acquittal, they misrecalled their earlier predictions for acquittal as being higher than they actually were; Bryant & Brockway, 1997). In other words, integration of new information into existing knowledge structures enhances confidence with which particular elements of the knowledge structure are held to be true, and this effect is very nearly the same in both retrospective and prospective judgments (Fischhoff, 1976; Gilovich, Kerr, & Medvec, 1993; Koriat, Lichtenstein, & Fischhoff, 1980). Thus, when people make predictions, they tend to bring to mind attendant information that is consistent with the prediction, which directly fuels overconfidence; manipulations that encourage consideration of alternative future outcomes mitigate that overconfidence (Dougherty, Gettys, & Thomas, 1997; Dunning, Griffin, Milojkovic, & Ross, 1990; Griffin, Dunning, & Ross, 1990; Hirt & Markman, 1995). Like skyscrapers, beliefs structured on interconnected scaffolding stand confidently taller.

This principle of belief interconnection underlies several more specific determinants of both expectancy likelihood and confidence. When people engage in vivid imagination, or *mental simulation,* of particular future event sequences, they subsequently believe the event to be more likely and are more confident of this belief (e.g., Anderson, 1983; Kahneman & Tversky, 1982;

Koehler, 1991). Similar effects occur when people are asked to provide explanations (Ross et al., 1977; Sherman, Skov, Hervitz, & Stock, 1981; Wilson & LaFleur, 1995) as to why a particular event might occur in the future. Further, individual differences have also been explored; for example, people higher in need for closure tend to be more confident about future prospects (Hirt, Kardes, & Markman, 2004; Kruglanski & Webster, 1996).

*Abstractness*

The parameter of abstractness contains enormous implications for the functional basis of expectancies, particularly in terms of efficiency, depth, and temporal-dependence. Abstractness refers to the variation between concrete and specific representations (as instantiated by episodic memory) and abstract generalizations that summarize experience across multiple events, people, and contexts over time (as exemplified by semantic memory).

*Semantic expectancies are efficient*. Semantic expectancies may be used more efficiently than episodic ones. Semantic expectancies are pre-existing knowledge structures that are extracted from ongoing experience, stored in memory, and retrieved when needed. By contrast, episodic expectancies must be formulated on the spot before they can be applied. Although both processes (retrieval vs. formulation) may occur automatically (e.g., Hintzman, 1986; Smith & Zarate, 1992), there nevertheless remains a clear difference in that semantic expectancies deliver accurate, generalizable knowledge relatively more rapidly and with smaller demands on available resources.

The advantage in efficiency of semantic over episodic expectancies is especially evident when individuals encounter novel circumstances (McClelland, McNaughton, & O'Reilly, 1995; Nosofsky, Palmeri, & McKinley, 1994; Sherry & Schacter, 1987). In such cases, ad hoc expectancy generation runs into several problems. First, the levels of temporal, spatial, and

contextual details preserved in episodic memories may inhibit the application of such knowledge to novel situations that do not possess those same features. To quickly extract generalities from multiple concrete episodes in an ad hoc fashion is a challenge (e.g., DeLosh, Busemeyer, & McDaniel, 1997). Second, the predictive validity of such expectancies depends on the number and breadth of experiences upon which they are based: The larger the sample size, the greater the validity (e.g., McClelland et al., 1995). Third, it is simply more efficient to extract and store generalities in an ongoing fashion than it is to re-calculate them every time they are needed by retrieving and summarizing a subset of episodes (Bruner, Goodnow, & Austin, 1956; Hamilton & Mackie, 1990; Klein, Cosmides, Tooby, & Chance, 2002; Nosofsky et al., 1994). Indeed, research demonstrates that the retrieval and application of specific episodes is more easily disrupted than is application of abstract knowledge (e.g., Johnson, Hashtroudi, & Lindsay, 1993; Rothbart, Fulero, Jensen, Howard, & Birrell, 1978; Sherman & Bessenoff, 1999; Tulving, 1983). Thus, extracting and storing abstract features of experience for subsequent use is a more efficient way to turn the past into functionally accurate expectancies than is retrieving and summarizing a large number of relevant episodes in an ad hoc fashion.

*Episodic expectancies provide depth.* It is also important for effective behavior control to retain and develop domain and context specific information that may provide more situationally-accurate expectancies than is possible via abstract knowledge. For example, though from past experience you might expect that dogs in your neighborhood are friendly and harmless, it would be important to know that the Rottweiler named Spike who lives around the corner is aggressive and dangerous. Recent evidence points further to the functional interplay between semantic and episodic knowledge. First, specific episodes may be retained and associated with a relevant semantic expectancy, so that when the latter is activated, so too are specific exceptions to the

general rule embodied in that semantic expectancy (Bartlett, 1932; Graesser, Gordon, & Sawyer, 1979; Klein et al., 2002; Nosofsky et al., 1994). Some have argued that the main evolutionary purpose of episodic memory is to store instances that violate general expectancies about the world (e.g., McClelland et al., 1995; Schank, 1982; Sherry & Schacter, 1987).

Very likely is a developmental sequence through which people construct a full complement of expectancies that maximize their ability to go beyond the specifics of past experiences to predict novel situations, while at the same time maximizing the specificity, applicability, and accuracy of those expectancies. Initially, expectancies are based on particular episodes, but as experience accumulates, individuals extract semantic expectancies that summarize events across stimuli, time, and situations. Sometimes, however, expectancies become overly general and yield inaccuracies. When confronted with these inaccuracies, expectancies are refined, and more subordinate, narrowly-defined expectancies are developed. We learn that not all dogs, roads, or skinheads are the same, and we develop expectancy subcategories. As discussed in detail in a subsequent section, sub-categorization is often a direct result of expectancy disconfirmation. In short, expectancies are initially narrow and specific, then become broader and more general, and finally settle at mid-levels that balance breadth with depth.

*Abstractness is temporally dependent.* Expectancies become more abstract the further into the future the individual looks. Events that are imminent, by contrast, are conceptualized more in terms of concrete details. Under the rubric of *construal level theory* (Trope & Liberman, 2003), recent research shows that in expectancies focusing on the distant future, people use fewer categorical distinctions and are more likely to rely on cognitive simplifications such as the correspondence bias, as compared to expectancies focusing on temporally nearer events.

Abstractness as described within construal level theory can help to explain other kinds of temporal shifts, for example those involving value and motivation.

People place greater value on objects or events that are temporally close than far in the future (Loewenstein, 1987; Loewenstein & Prelec, 1993). Given a choice, people prefer rewards that are available in the short-term over those available in the long, even if getting something sooner means trading off a bit in value, a piece of human nature that any lender, creditor, or loan shark can readily confirm. Several reasons for this temporal-discounting have been suggested, including factors centering on the affective versus cognitive basis of expectancies (i.e., affective expectancies show greater temporal dependence than cognitively-rooted expectancies; e.g., Loewenstein, Weber, Hsee, & Welch, 2001; Metcalfe & Mischel, 1999) and on the magnitude of expected value (i.e., smaller values show greater temporal shifts than larger values; e.g., Chapman, 1996; Thaler, 1981).

Motivation also varies with temporal distance. Using the framework of *regulatory focus theory* (Higgins, 1997), Pennington and Roese (2003) showed that goals emphasizing promotion focus (i.e., those aimed acquisition, accomplishment, and improvement to the status quo) tend to aim further into the future, whereas prevention goals (i.e., those emphasizing caution, security, and preservation of the status quo) target the more immediate future. Moreover, people tend to "brace for the worst" by pondering greater potentials for mishap when events loom temporally close than far (Sanna, 1999; Shepperd et al., 2000). Curiously, it may seem that the temporal dependence of value and motivation are contradictory: a person wants something better in the short term but is motivated to achieve something better in the long-term. This contradiction, however, is illusory and disappears when firm definitions of value and motivation are enforced. People may find a thing more desirable now than later, yet they may nevertheless expect to attain

even more desirable things in the more distant future. This basic principle is well exploited by creditors who offer "pay no interest for a year" deals. Consumers are unwilling to wait to save money for desired products and so pay interest to get the products today, yet are curiously overconfident of their ability to pay off high-interest loans in the more distant future, apparently failing to recognize that neither their income nor spending habits are likely to change that much.

As suggested already, the increasing abstractness with which increasingly distant future events are construed may be the underlying determinant of both shifts in value and motivation. The concrete tangibility, or "bird in the hand" aspect of temporally near events may in and of itself confer value, while the abstract generality of temporally distant events may in and of itself invite broader, more maximal promotion goals aimed at comprehensive improvement of life circumstance. Temporal construal theory points to this integration, and new research in the near (rather than distant) future will likely tackle it more directly.

*Accessibility*

Accessibility reflects the ease with which the expectancy is brought to conscious attention. As with other forms of knowledge, accessibility reflects the likelihood with which knowledge will be applied to subsequent judgment. Expectancies may be highly accessible because of frequency or recency of prior activation from memory (Higgins, 1996). Moreover, the experience of accessibility itself may feed into judgments: Expectancies may be optimistic, for example, not only as a function of the accessibility of positively valenced information, but also as a function of the inference that positive information feels easy to bring to mind (Sanna & Schwarz, 2004).

Whether an expectancy is confirmed or disconfirmed is an important determinant of expectancy accessibility. When an outcome confirms an expectancy, only the merest gist

information regarding the outcome is abstracted and stored in memory, and the expectancy itself remains relatively inaccessible. By contrast, the very occurrence of expectancy disconfirmation makes the expectancy more accessible and instigates sense-making activity aimed at explaining the discrepancy between what is and what was expected. The cascade of cognitive processes stemming from expectancy disconfirmation are considered in detail in a subsequent section, but here we pause to mention two different processes that may result in the *apparent* increase in expectancy accessibility as a function of the experience of surprise. The first process involves, as we have mentioned, the heightened accessibility of a pre-existing expectancy. For example, if after an office co-worker is seen wearing no clothing, the surprise serves to make accessible an implicit semantic expectancy regarding normal business attire. A second process, suggested by *norm theory* (Kahneman & Miller, 1986), is the absence of a pre-existing expectancy. A feeling of surprise may nevertheless result if the outcome evokes the on-line construction of a new standard of comparison (or norm), assembled via the rapid integration of relevant exemplars, which is then contrasted to the outcome in question. Although this sort of *post-computed* judgment process produces effects that mimic the effects of a priori expectancies, relatively little research has explored either deeper processing differences or the different circumstances in which these two processes arise (see McGill, 1993; Medvec, Madey, & Gilovich, 1995, for exceptions).

*Explicitness*

Expectancies also differ in the extent to which they are explicit (able to be consciously reported) versus implicit (unconsciously held). At the most basic level, an expectancy may be little more than an association between a concept and an attribute. Such associations are often held without any conscious awareness of their existence (e.g., Greenwald & Banaji, 1995).

However, many complex expectancies, such as those that regulate driving a car, dining at a restaurant, or conversing with a friend, are also held at an implicit level. Indeed, the vast majority of the expectancies that guide our behavior are likely doing so without our awareness (Bargh & Ferguson, 2000; Nisbett & Wilson, 1977). The expectancy that can be reported explicitly and accurately is the exception, and expectancies likely only become explicit when we either are asked directly by others to articulate them or when we explicitly formulate them in our own minds when striving toward goals.

This is not meant to suggest that people cannot verbalize many expectancies when directly questioned about them. However, these verbalizations may be linked tenuously, at best, to the nature of the underlying patterns of covariation among attributes and concepts represented in memory systems. Though explicitly considered and reported expectancies are surely influenced by underlying patterns of association, they also are influenced by many other factors, including a host of self-promoting and self-presentational concerns that may distort or conceal the accurate expression of expectancy. Sometimes, as in the case of racial stereotypes, people are unwilling to express their true beliefs, even if they are aware of their nature. In many other circumstances, people are simply unable to introspect and identify the expectations that guide their perceptions, judgments, and behavior. The so-called "unwilling and unable" problem is longstanding in research on attitudes (Eagly & Chaiken, 1993), and has, over the years, led to a proliferation of measurement techniques designed to circumvent people's reluctance and inability to respond accurately, from the so-called "bogus pipeline" technique of the 1970s (reviewed in Roese & Jamieson, 1993) to the more recent explosion of indirect measures, of which one was termed (with tongue in cheek) a "bona fide pipeline" (Fazio et al., 1995; see Fazio & Olson, 2003 for review of indirect measures).[1]

One important consequence of the development of indirect measures is that it is now possible to measure and observe the correspondence between implicitly-held and explicitly-reported expectancies. In particular, interesting problems arise when the content of these expectancies are at odds with one another. What does it mean when such a conflict exists? What are the implications for judgment and behavior?

Most frequently, such dissociations have been treated as evidence that people may retain and store both implicit and explicit expectations of the same entity or outcome (e.g., Wilson, Lindsay, & Schooler, 2000). In the stereotyping literature, such dissociations are often described as reflecting the existence of separate implicit versus explicit stereotypes. The idea is that multiple representations of the same object or event exist in memory simultaneously in different memory systems.

An alternative view, and the one we endorse here, is that these dissociations reflect differences in the processes required and permitted by the direct and indirect measurement tasks, rather than differences in underlying representations (e.g., Conrey, Sherman, Gawronski, Hugenberg, & Groom, in press; Fazio & Olson, 2003; Roediger, 1990). That is, responses on different measurement tasks are just that: responses to tasks, rather than direct reflections of underlying representations. There is no isomorphism between task response and underlying representation. In this view, an important distinction between direct and indirect measures is the extent to which they permit conscious intentions and motivations to influence responses. Whereas indirect measures minimize these processes (though they do not eliminate them; e.g., Conrey et al., in press), direct measures do not. Direct, explicit measures demand subjective judgments that are influenced not only by the underlying systems of associations in memory, but also by factors such as people's meta-theories about what they believe, beliefs about what they

would like to believe or should believe, and beliefs about what other people would like them to believe. Thus, in this view, dissociations between direct and indirect measures often reflect "downstream" processes that occur as an underlying, association-based "signal" is transformed into an explicit response, rather than reflecting true differences in the underlying expectancy "signal."

By no means do we intend to suggest that explicitly reported expectancies are meaningless or unimportant. Many important expectancies may be ill-formed or may not exist at all until they are constructed and/or made explicit (e.g., "Where do you think this relationship is going?"; "What kind of wedding should we have?"; "How many children should we have?"). Moreover, regardless of their relation to implicit expectancies, the act of making an expectancy explicit undoubtedly has important consequences (e.g., Making explicit the expectation that a relationship will lead to marriage). For example, explicitly stating an expectancy increases the extent to which that expectancy guides subsequent thought and behavior (e.g., Kiesler, 1971; Rusbult, Martz, & Agnew, 1998). Finally, the overwhelming focus on implicit and explicit beliefs that are socially sensitive, such as those surrounding intergroup attitudes, has likely exaggerated the extent to which implicitly-held and explicitly-reported expectancies are dissociated. Rather little research of this sort has been conducted on other kinds of expectancies, a shortcoming we hope future research is able to address.

Ultimately, the most important question when considering implicit and explicit expectancies is to what extent does each actually predict behavior? So far the tentative answer is: It depends. Obviously, when there is no discrepancy between implicit and explicit expectancies, the two should influence behavior in similar ways. However, when the two are at odds, the key moderator appears to be the manner in which behavior is measured. Just as direct

measures of belief permit greater influence of intent and motivation, so too do direct measures of behavior. Thus, it is not surprising that explicit measures (e.g., of racial attitudes and stereotypes) do a better job predicting explicit behaviors (e.g., verbal responses to White and Black confederates, explicit evaluations of the confederates, racially-relevant jury decisions, judgments of the legitimacy of the Rodney King verdict) than do implicit measures of those beliefs (e.g., Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Fazio et al., 1995). When conscious intent is permitted influence, it similarly influences expressions of belief and related expressions of behavior. Obversely, measures of behavior that minimize the role of conscious intent (e.g., eye-contact and other non-verbal behaviors) are better predicted by indirect measures of belief that also minimize such factors than by explicit measures (e.g., Dovidio et al., 1997; Fazio et al., 1995). Thus, the most valuable measure of expectancy depends on exactly what it is that a researcher wishes to predict from it.

*Summary*

This section reviewed five parameters that may be used to characterize expectancies: Likelihood, confidence, abstractness, accessibility, explicitness. Also discussed were the various influences on these parameters. Together, these parameters capture deeper commonalities in expectancies that differ widely in overt content. The principles by which expectancies guide effective behavior are reviewed in the next section.

## III. BEHAVIORAL CONSEQUENCES

The primary function of expectancies is to guide behavior successfully and effectively. Expectancies do so by informing cognition. In this section we outline how expectancies

facilitate successful behavior, then turn in the subsequent section to the more detailed topic of cognitive consequences.

*Semantic expectancies provide general guides for behavior*. The most basic function of expectancies is that they establish a set of broadly generic roadmaps for ongoing behavior. Semantic expectancies are those that are abstract and typically implicit. Buying food, navigating about town, getting work done, and enjoying leisure activities on the weekend all rest on vast networks of generic knowledge that comprises semantic memory. Novel situations are dealt with effectively by reliance on assumptions drawn from generic schematic knowledge.

*Expectancies for success facilitate success*. Although there are numerous qualifications and caveats, it may generally be concluded that belief in future success facilitates future success (Lewin, Dembo, Festinger, & Sears, 1944; Oettingen & Mayer, 2002; Vroom, 1964). Moreover, commitment to a goal and course of action also facilitate performance (Locke et al., 1981; Mitchell, 1974). Expectancies for success produce effects on behavior by way of increases in confidence (Feather, 1966) and task persistence (e.g., Battle, 1965; Carver, Blaney & Scheier, 1979). In this way, minor setbacks do little to interfere with the broader optimism that keeps the individual on track toward goal completion. There are two main mechanisms by which expectancy effects on performance occur. First, optimism in the sense of expectations of both personal efficacy (ability to succeed) as well as outcome success produce positive affect, which has a general motivating effect that energizes ongoing action (e.g., Bandura & Locke, 2003; Erez & Isen, 2002). Second, elaboration of specific plans fosters implementation intentions that guide ongoing action (e.g., Brandstätter, Lengfelder, & Gollwitzer, 2001; Gollwitzer, 1999; Pham & Taylor, 1999).

These optimism effects perhaps represent the default, but certainly not the only way expectancies influence goal-related behaviors. Drawing again on the regulatory focus theory (Higgins, 1997), the above effects center on promotion motivation, which involves focus on the attainment of desired future outcomes. Keeping one's "eye on the ball," so to speak, facilitates the eagerness that sustains pursuit of desired outcomes. But people may also strive toward prevention goals, which involve preserving the status quo by keeping at bay those outcomes that are not desired. Under this different motivational orientation, vigilance and defensive pessimism (i.e., focusing on undesirable future possibilities) facilitate success at keeping current circumstances from getting worse (Markman & McMullen, 2000; Norem & Cantor, 1986; Norem & Illingsworth, 1993; Showers, 1992).

On average, however, expectancies for personally relevant outcomes tend to be optimistically biased. True, people can be optimistic both about their ability to engineer future success in both promotion and prevention, yet the former is more clearly aligned to the construct of optimism than the latter (Grant & Higgins, 2003). In a subsequent section, we note how optimism produces positive affect and hence may be used strategically for affect regulation. In the present context, it seems that a biased construal of reality that "spins" the future more positively than is objectively warranted might be behaviorally advantageous, as it may facilitate performance through either of the two mechanisms named above. But does such bias have drawbacks?

*Optimistic bias shifts as a function of commitment to a course of action.* As numerous authors have debated, there is a tension between the costs and benefits of bias versus accuracy, for inaccurate forecasts may impede successful action (e.g., Baumeister, 1998; McNulty & Karney, 2004). More generally, blind optimism in the face of obvious setbacks would seem to

preclude efforts at remediation. However, it appears that optimistic bias is contingent upon the stage of progress toward goal completion. That is, before a course of action has been committed to, individuals are relatively unbiased, which is useful in facilitating accuracy-motivated assessment of available options. But once commitment to a course of action has occurred, optimism increases, which may then work to facilitate ongoing performance in the manner described above (Gollwitzer & Kinney, 1989; Taylor & Gollwitzer, 1995).

*Anticipation of setbacks facilitates corrective action.* In the pioneering early years of manned space flight, NASA engineers anticipated and mapped out in detail numerous failure scenarios (engine failure, navigation failure, explosive decompression, etc.), planned responses for each such scenario, then practiced these responses in dress rehearsals called mission simulations. People do pretty much the same thing. They anticipate possible problems and proactively plan solutions (Aspinwall & Taylor, 1997; Sanna, 2000). Research on anticipatory regret has revealed that people routinely take into consideration the consequences of potential future decisions and actions, then decide and act so as to avoid future regret (Zeelenberg, 1999). Much research in this tradition has emphasized the potential for bias: for example, individuals sometimes select objectively worse outcomes so as to bypass the potential for future regret (Zeelenberg et al., 1996) and they tend to mispredict the amount of regret that is actually felt (Crawford et al., 2002; Gilbert et al., 2004). As noted above, a prevention focus (whether defined as a momentary state or chronic individual difference) that evokes vigilant action can be effective particularly under those circumstances in which obstacles are many (Norem & Cantor, 1986; Showers, 1992). At a more basic level, this research collectively underscores the ability of individuals to create detailed simulations of potential future problems for the specific purpose of guiding proactive avoidance behavior. In short, there is functional value to worrying.

*Expectancies can be self-fulfilling*. As the previously noted principles show, expectancies can create their own reality. Such effects may enhance performance and improve the individual's life circumstances, but they may also constitute counterproductive bias. A widely studied example has been variously termed *self-fulfilling prophecy* and *behavioral confirmation*. One of the simplest examples is the self-erasing effect of predictive error (Sherman, 1980). When individuals make explicit predictions for their own future performance, the act of explicit expectancy formation renders consistent information more accessible from memory, making this information more likely to guide subsequent behavior and thus creating a push toward behavioral consistency. With behaviors shifting to confirm prior expectancies, predictive "errors" may become less apparent over time.

The self-fulfilling prophecy centers on the effect of expectancies on interpersonal behavior, particularly when the perceiver's impressions or stereotypes suggest expectancies about a target person with whom the perceiver is interacting. Such expectancies guide the perceiver's behavior during interactions with target individuals, with the resulting expectancy-consistent behavior serving to elicit further expectancy-consistent behavior on the part of the target individual. Early research focused in particular on how the expectancies of teachers might influence the achievement behavior of students (Jussim, 1986; Jussim & Harber, 2005; Rosenthal & Jacobson, 1968), but subsequent research has revealed the generality of such effects, for example in expectancies centering on relationship partners (Downey, Freitas, Michaelis, & Khouri, 1998; McNulty & Karney, 2002), gender stereotypes (Eagly, Wood, & Diekman, 2000; Snyder, Tanke, & Berscheid, 1977), and racial stereotypes (Word, Zanna, & Cooper, 1974). Such effects occur automatically, typically without awareness on the part of either the perceiver (Chen & Bargh, 1997) or the target (Vorauer & Miller, 1997). Yet even so, such effects tend to

be relatively weak, when viewed against the backdrop of the general accuracy of expectancies (Jussim & Harber, 2005).

Self-fulfilling expectancy effects tend to be reduced by heightened accuracy motivation and by explicit awareness of the expectancy (Miller & Turnbull, 1986). A general principle extending to any assimilative priming effect is that such effects diminish when the perceiver becomes aware of the prime (Lombardi, Higgins, & Bargh, 1987; Strack et al., 1993). Moreover, awareness on the part of the target individual, especially when they do not like the implications of the expectancy (as in the case of recognition of being unfairly stereotyped), can create what amounts to contrast effects, in that the target may deliberately behave in a manner that contradicts the expectancy so as to emphasize individuality or autonomy (Brehm, 1966; Neuberg, 1989). Given that these latter effects are motivated, they tend to occur when the expectancy is negative but not when it is positive.

Placebo effects are another example of the self-fulfilling nature of expectancies. A placebo effect occurs when a medical treatment (e.g., a pill) produces a physical impact not by way of any physical effect (e.g., the pill contains no active drug) but rather by way of the perceiver's belief in the efficacy of the treatment (i.e., an expectation of health improvement). In short, people may sometimes be fooled into wellness. Although debate about underlying mechanism continues (e.g., Stewart-Williams & Podd, 2004), the generality of the placebo effect as medical fact and its basis in expectancy is well-established (Ross & Olson, 1981), and was reviewed in detail in the previous version of this chapter (Olson et al., 1996).

*Summary*

This section formed the conceptual heart of this chapter, in that our main argument is that expectancies work principally to guide effective behavior. Expectancies for success facilitate

success, but they are especially likely to fuel behavioral progress once the individual has committed to a course of action. Individuals routinely anticipate future difficulty and proactively avoid it. These examples of expectancies working to create their own reality may also be problematic, as when self-fulfilling prophecies serve to perpetuate inaccurate and unfair prejudices. Through all of the above effects, expectancies exert effects on behavior as mediated by a variety of further cognitive processes, which are utterly critical for continued effectiveness of behavior in light of changing circumstances and learning.

## IV. COGNITIVE CONSEQUENCES

The cognitive consequences of expectancies have dominated past research, particularly with regard to their role in attention, encoding, representation, and memory. At a basic level, expectancies guide processing in a manner that is self-perpetuating. Once useful expectancies have developed, our cognitive system is rather conservative about altering or replacing them. Clearly, it would be dysfunctional to abandon effective knowledge too easily. Yet it would also be dysfunctional if expectancies were so stubborn to the facts as to be unrevisable in the face of contradiction (Piaget, 1952). As several theorists have noted, a cognitive system that is either too flexible or too stable would be at an evolutionary disadvantage (e.g., Johnston & Hawley, 1994; Sherry & Schacter, 1987; Tulving, Markowitsch, Kapur, Habib, & Houle, 1994). Thus, despite the generally conservative nature of expectancies, specialized processes exist to maintain vigilance for inaccuracy, to facilitate the encoding of unexpected events, to enhance the integration of those events into expectancies, and that improve memory for the events.

Expectancies are functional because they help to maximize the ratio of useful information gained for effort expended (e.g., Sherman, 2001; Sherman, Lee, Bessenoff, & Frost, 1998). This

principle accounts for many of the specific ways in which expectancies influence attention, encoding, representation, and memory, particularly when processes resources are constrained. As resource-conserving devices, it is in these difficult conditions that the functional advantages of expectancies are most acute, and that expectancies are most likely to guide information processing. At the highest level of analysis, the cognitive consequences of expectancies are secondary and subservient to the primary function of behavior regulation. Expectancies are retained, discarded, or tweaked specifically to furnish more useful information to guide ongoing behavior. The cognitive processes surrounding expectancies, and in particular reactions to their confirmation or disconfirmation, represent tools for survival.

*Expectancy Confirmation and Disconfirmation*

Cognitive consequences hinge critically on whether incoming information confirms or disconfirms an expectancy. The majority of research on the cognitive consequences of expectancies has focused on differences in how expectancy-consistent versus expectancy-inconsistent information is processed. The experience of expectancy confirmation may be seen as the cognitive equivalent of the seafaring condition of "situation normal," meaning that all is well, no new crew action is required, and the currently operative behavior (speed, direction, degree of readiness) is satisfactory. For goal expectancies, situation normal corresponds to a regulatory loop in which current versus ideal conditions approximate, hence corrective action is presently unnecessary.

By contrast, a disconfirmed expectancy is the equivalent of "all hands on deck," meaning that the current situation represents the potential for danger and thus demands at the very least a) heightened vigilance but perhaps also b) corrective action. Expectancies that are disconfirmed may also represent c) inaccuracy, thus demanding some sort of conceptual repair work so as to

restore or improve accuracy. These three aspects, vigilance, problem-solving, and belief repair, constitute the three primary imperatives of disconfirmed expectancies.

Thus, the functional significance of expectancy-consistent versus expectancy-inconsistent information is quite different. These functional considerations as well as the need for efficient processing largely determine the manner in which expected and unexpected information is attended to, encoded, represented, and remembered. We describe these processes in order of psychological events from initial seeking of and exposure to information, through encoding, representation, and memory.

*Information-seeking*. Expectancies influence the types of information perceivers seek in the environment. Often expectancies are essentially hypotheses about the world, and individuals seek information to test their validity. This occurs primarily for subjective rather than factual expectancies (which tend to be taken for granted). Far from being even-handed, however, diverse research indicates a tendency to seek out information that confirms rather than disconfirms the expectancy (Klayman & Ha, 1987; Lord, Ross, & Lepper, 1979; Skov & Sherman, 1986). Indeed, this bias extends perhaps also to the manner in which scientists test theories (MacCoun, 1998). A more detailed discussion of this pattern appeared in the Olson et al. (1996) chapter.

*Processing fluency*. Exposure to expected or unexpected information influences implicit psychological responses within milliseconds. Several theories have converged on the idea that online processing – attention to and awareness of current experience – involves continuous pattern matching between the incoming sensory stream and semantically related information in memory (e.g., Lieberman et al., 2002; Srull & Wyer, 1989; Whittlesea, 1997). Processing fluency describes the extent to which this pattern matching flows smoothly or is interrupted by

mismatches, i.e., expectancy disconfirmations (e.g., Benjamin & Bjork, 1996; Johnston & Hawley, 1994; Whittlesea & Williams, 2001). The subjective experience of dysfluency (i.e., surprise) may embody mismatches involving perceptual (What should it look like?) or conceptual (What does it mean?) features (Jacoby & Dallas, 1981; Roediger, 1990; Whittlesea & LeBoe, 2003). In sum, recognition of expected stimuli produce subjective feelings of fluency and comfort, whereas unexpected stimuli produce feelings of dysfluency and surprise.

Processing fluency represents the first stage at which the cognitive system registers a confirmed or disconfirmed expectancy. The implicit perception of dysfluency is the starting point for the cascade of cognitive consequences that come next.

*Attention.* Though people may not actively seek out unexpected information, when exposed to it, they will generally attend carefully – more carefully than to expected information. The processing dysfluency that results from expectancy disconfirmation may act as a functional imperative to attend. Research indeed shows that attention is rapidly and automatically directed toward stimuli that is in some way surprising (e.g., Barthalow, Fabiani, Gratton, & Bettencourt, 2001). Interestingly, this principle forms the basis of the enormously successful *violation-of-expectation paradigm*, which has been used to reveal age of onset of particular representational categories in infants (Baillargeon, 2004). Indexed by visual gaze duration, infants who attend longer to an object or event are presumed to have been surprised and hence interested, thus revealing that their brains had in some way represented an expectancy regarding that object or event (Baillargeon, Spelke, & Wasserman, 1985; Wang, Baillargeon, & Brueckner, 2004; Wilcox, Nadel, & Rosser, 1996). This method has revealed that infants as young as 2.5 months of age understand that their physical world consists of objects having continuity (i.e., they exist

continuously in space and time) and solidity (i.e., two objects cannot occupy the same space at the same time) (Baillargeon, 2004; Spelke et al., 1992).

An important moderator of these effects is the availability of processing resources. Under cognitive load, the tendency to attend more carefully to unexpected than expected information is enhanced. Indeed, in these conditions, attention actually shifts away from expected and toward unexpected information in the visual field (Sherman et al., 1998). Differences in the conceptual fluency of expected and unexpected information may contribute to this effect. Because expected information is easily assimilated to existing knowledge and is therefore easily comprehended, little attention is required during encoding. The fit between the information and existing knowledge may be briefly noted, with attention then redirected to more novel and potentially important information in the environment. This attention shift is more likely to occur when capacity is depleted because it is under those conditions that the cognitive system is most pressed for efficiency. Such a process embodies both the stability (via conceptual fluency and pattern matching) and plasticity (by directing attention toward unexpected information) of expectancies.

Individual motivational differences also moderate these effects. People who are motivated to see group stereotypes as malleable (i.e., "incremental theorists") are especially likely to shift attention away from stereotype-consistent and toward –inconsistent information when they were under cognitive load (Plaks, Stroessner, Dweck, & Sherman, 2001). In addition, prejudiced people who also are prevention oriented are more likely to attend to stereotype-violating information (Förster, Higgins, & Strack, 2000; Förster, Higgins, & Werth, 2004).

*Interpretation*. The most readily visible cognitive consequence of expectancies is their influence on how individuals see and understand the world around them. This influence comes

in two forms. First, expectancies may act as heuristics in providing direct input into judgments. Generally speaking, a heuristic is a quick and resource-frugal judgment that is accurate often but not always. The use of expectancies as heuristics has been demonstrated in many domains of psychology. For example, in persuasion research, expectancies about source expertise (experts are to be trusted) often influence persuasion to a greater extent than systematic reasoning about the strengths and weaknesses of given arguments (e.g., Petty & Wegener, 1998). In stereotyping research, stereotypes are often relied upon to make judgments about others to the exclusion of individual behaviors (e.g., Sherman et al., 2000). In both cases, the expectancies are particularly likely to drive judgments when people either are unmotivated to process carefully or are unable to do so (e.g., if they are under cognitive load).

The second way that expectancies influence an individual's understanding of the world is through their influence on interpretation. The idea that people see what they expect to see, or interpret events and objects in a manner that assimilates experience to the expectancy, pervades numerous theoretical constructs in psychology, including notions of coding system, frame, schema, script, and stereotype. Much early research showed how concepts, inferences, or category labels influence subsequent interpretation (Bruner, 1957; Bruner et al., 1956; Darley & Gross, 1983; Hastorf & Cantril, 1954; Higgins, 1996; Kelly, 1955; Vallone, Ross, & Lepper, 1985; Wilson, Lisle, Kraft, & Wetzel, 1989); more recent research has shown similar effects with complex goal-oriented expectancies (Kawada, Oettingen, Gollwitzer, & Bargh, 2004) and in active seeking of self-verifying information (Swann, Stein-Seroussi, & Giesler, 1992). In general, this expectancy-assimilation effect is stronger to the extent that the expectancy is stronger and the stimuli more ambiguous (e.g., Alba & Hasher, 1983; Budescu et al., 2002; Swann & Ely, 1984; Tuckey & Brewer, 2003; Trope, 1986).

*Conceptual versus perceptual encoding*. Information that fits expectancies is more easily understood. One consequence of this comprehension advantage, however, is that people do not attend carefully to expected information (e.g., von Hippel, Jonides, Hilton, & Narayan, 1993). A related consequence is that people do not encode the perceptual details (e.g., physical features) of expected information carefully. Rather, the basic conceptual gist of such information is extracted, but little else. In contrast, though unexpected information is often poorly comprehended, it is attended to carefully, and the physical details are encoded well (Sherman et al., 1998). As with attention, the perceptual encoding advantage for incongruent information is greater when resources are low, again attesting to the flexible efficiency of expectancy use (e.g., Sherman, Conrey, & Groom, 2004). The careful encoding of the details of incongruent information is another means by which the cognitive system preserves plasticity in the face of expectancy confirmation. Retaining these details helps individuals reconstruct the facts surrounding unexpected events at a later time, when new information and greater resources may be available to help make sense of them. Indeed, differences in the conceptual and perceptual encoding of expected and unexpected events have significant influences on the manner in which these stimuli are represented in memory and subsequently remembered. These issues will be address in detail below.

*Coping with Disconfirmation*

Disconfirmed expectancies are at root discrepancies between cognition and reality. They embody failures of prediction and thus constitute inaccuracy within the individual's cognitive model of reality. Such a failure may or may not demand a conceptual fix, but to ascertain which, effort is directed at investigating the nature and source of the failure, and correcting it.

Summarized next are those higher-order consequences of disconfirmed expectancies that are aimed at cognitive repair.

*Disconfirmed expectancies evoke processing that is resource-demanding.* Whereas confirmed expectancies result in relatively automatic processing, disconfirmed expectancies recruit processing that is more effortful (Bargh & Thein, 1985; Stern et al., 1984; Wilson et al., 1989). Initial perceptual processing takes longer for unexpected than expected stimuli (Jentzsch & Sommer, 2002; Matt, Lethold, & Sommer, 1992). Overall, surprise demands deeper and more careful analysis of relevant information, aimed at explaining and understanding the predictive failure. This core principle linking expectancy disconfirmation to systematic processing echoes through several theories, for example those aimed at attitudes (Chaiken, Liberman, & Eagly, 1989) and linguistic interpretation (Burgoon, 1993).

*Disconfirmed expectancies activate sense-making*. Explanation and attribution correspond to an attempt to make sense of an outcome. Because disconfirmed expectancies may constitute danger (as in the case of avalanches, attacking muggers, or outgroup mobs), cognitive effort designed to make sense of them is an essential ingredient for guiding subsequent behavior (e.g., fleeing, fighting, negotiating).

Sense-making involves retrieving information from memory that forms the basis for new explanations (Ahn et al., 1995; Kelley, 1967), which aim to bridge the gap between prior understanding and current experience (Ahn, Novick, & Kim, 2003). Three classes of sense-making activity all reveal evidence of activation by disconfirmed expectancy. *Causal attribution* involves the most basic process of identifying the cause of a particular outcome (John stepped on Susan's feet because he lacks coordination); *counterfactual thinking* involves the more elaboratively narrative articulation of how the outcome might have come about had the key

causal condition(s) been different (John might have been a better dancer with more practice in high school), and *hindsight bias* involves the meta-perception of confidence that the outcome in question was sensible and predictable (I just knew John would step on Susan's feet). Evidence is most voluminous in support of the activation of causal reasoning by expectancy disconfirmation (e.g., Hastie, 1984; Kanazawa, 1992; Wong & Weiner, 1981); similar evidence is nevertheless available for counterfactual thinking (Roese & Olson, 1997; Sanna & Turley, 1996) and hindsight bias (Roese, 2004; Schkade & Kilbourne, 1991).

*Sense-making results in one of 4 inferential products*: *Ignoring* the discrepancy, *Tagging* the discrepancy, *Bridging* the discrepancy, or *Revising* the schema upon which the expectancy is based.

1) *Ignoring.* In this first case, the sense-making activity uncovers few insights, little new information in memory, or is in some way truncated. The result is that no inferential product becomes available, and the discrepancy is essentially ignored. Examples include the cognitive dissonance theory concept of trivialization (e.g., Simon, Greenberg, & Brehm, 1995) and the motivated shallow processing of self-threatening hypothetical behaviors (Sedikides & Green, 2000).

2) *Tagging.* Though sometimes sense-making failures will be ignored, in other cases, they will be tagged for future examination and use. As noted already, even if unexpected information cannot be clearly explained, it may receive considerable attention, and the details of the event may be encoded carefully. This allows people to re-access this information at a later time when comprehension may be more successful. Moreover, unexpected events may be "tagged" onto existing expectancies, so that when expectancies are activated, so too are

individual exceptions to those expectancies (e.g., Klein et al., 2002; McClelland et al., 1995). This helps to constrain the reach of expectancies and maintain their plasticity.

3) *Bridging.* In this third case, the sense-making activity focuses on erecting a conceptual bridge between the expectancy and the disconfirming event, in effect explaining away the discrepancy. Importantly, bridging adds new inferential information while preserving the integrity of the underlying schematic understanding. According to *cognitive dissonance theory* (Festinger, 1957), for example, discrepancies between cognitions may be resolved by adding new cognitions. A particularly common way of bridging discrepancies is by elaborating an exception to a general rule in terms of a subtype category. For example, attributions for disconfirmed interpersonal expectancies tend to focus on external and unstable rather than internal and stable causes (Crocker, Hannah, & Weber, 1983; Feather, 1969; Kulik, 1983). In the context of stereotyping, an explanation for an unexpected group-member behavior may be accomplished by noting a subtype, or new subclass of the stereotype, in which the surprising act is explained in terms of an exception to the general rule embodied in the stereotype (Hewstone, Johnston, & Aird, 1992; Kunda & Oleson, 1995, 1997). These various sense-making efforts conspire to preserve the integrity of the extant expectancy in light of disconfirming evidence, but importantly, they also point to the progressive creation of successively more detailed, multifaceted, and flexible representations of the domain in question. Thus, original expectancies are maintained, but their generality of application is reduced. In short, this bridging principle is an indicator of the deeper, functional process by which schematic knowledge is elaborated in light of ongoing experience, thereby providing successively more effective guides for subsequent behavior. People learn from mistakes.

4) *Revising*: In this fourth case, the discrepancy prompts a reassessment and revision to the original conceptual underpinnings of the expectancy. Unlike bridging, which preserves the integrity of the underlying schema, revising involves changes to the underlying schema at a foundational level. For example, if one goes to McDonald's with the expectation of dining on filet mignon, the magnitude of the error demands a reworking of the essential informational components of the expectancy, along perhaps with expansion of the knowledge base supporting it (e.g., elaboration of the categorical distinction between fast food and fine dining; gathering new insights from restaurant reviews, etc.). This process has been termed "conversion" in some writings (Hewstone et al., 1992; Piaget, 1952; Rothbart, 1981; Weber & Crocker, 1983), but our emphasis includes not only the dramatic shift in schematic valence denoted by conversion, but also the valence-neutral expansion of schematic detail exemplified by the development of expertise (Tanaka & Taylor, 1991), sometimes referred to as "book-keeping" (Rothbart, 1981).

*Discrepancy magnitude and schema complexity determine the inferential products of sense-making.* Theorists have pointed to two main determinants of which type of inferential product tends to emerge from the sense-making activity evoked by a disconfirmed expectancy: the magnitude of the discrepancy between expectancy and outcome, and the degree of complexity or sophistication of the underlying schematic basis of the expectancy. For the first determinant, discrepancy magnitude, small discrepancies will be more likely to be ignored than larger discrepancies. Large discrepancies typically result in subtyping processes, whereby separate, specialized sub-categories are created to account for the discrepant stimuli or events. In contrast, moderate discrepancies tend to result in slow and steady expectancy revision (e.g., Rothbart & Lewis, 1988; Weber & Crocker, 1983).

Schema complexity, or the degree to which knowledge about the relevant domain is developed, also plays a role. With new schemas, as exemplified by low expertise (e.g., a novice squash player trying to grasp the intricacies of the game), initial attempts at reaching a coherent understanding result in an emphasis on confirmatory search and openness to divergent new information. In this case, the emphasis is on developing useful inferential tools rather than with testing the boundaries of those tools. Moreover, it is more difficult to note discrepancies from weak expectancies in the first place. With greater development of the underlying schema, discrepancies between expectancy and experience are more likely to be noticed, and tend to be processed more deeply, resulting in bridging effects (cf. Srull et al., 1985; Tanaka & Taylor, 1991). It is probably also the case that weak expectancies are more likely to involve revision, but as expertise, accuracy, and certainty grow, both disconfirmations as well as revisions become far less likely (Karniol, 2003). Those disconfirmations that do occur involve mainly bridging (sub-typing, in particular).

*Representation*

Differences in the ways that expected and unexpected events are encoded affect the manner in which the information is subsequently represented in memory. Expectancy-congruent information is not attended to carefully and the details are not thoroughly encoded (e.g., Sherman et al., 1998). Rather, the basic conceptual gist meaning is extracted via assimilation to prior expectancies, and little else is retained. Thus, expected events are likely to be retained primarily in abstract, semantic form. In contrast, unexpected events are attended to carefully and the details are more thoroughly encoded. In part, this is simple necessity in that such events cannot be well understood in light of existing knowledge. Accordingly, unexpected events are more likely stored as detailed, context-specific episodes (Sherman, Klein, Laskey, & Wyer, 1998).

*Memory*

Memory for expected versus unexpected stimuli differs in a number of respects. These differences result from the ways in which congruent and incongruent information is attended to, encoded, represented, and retrieved. The differences are moderated by several important variables.

*Recall and recognition*. On measures of both free recall and recognition, memory is superior for unexpected than expected events (e.g., Alba & Hasher, 1983; Stangor & McMillan, 1992). Even when a congruent event can be remembered, its source may not be. For example, stereotypical behaviors are often falsely attributed to people who did not commit them (e.g., Mather, Johnson, & De Leonardis, 1999; Sherman & Bessenoff, 1999).

Such effects center mainly on encoding processes. As noted, incongruent events draw our attention, and because they challenge extant beliefs, individuals expend effort toward explaining them (e.g., *bridging*). This deeper, more elaborate encoding of incongruencies increases their memorability in a number of ways (e.g., Craik & Lockhart, 1972). First, the relatively greater amount of time perceivers spend considering these events in working memory increases their general accessibility (e.g., Higgins, 1996). Second, the attention and detail given to encoding the item-specific features of these events increases the likelihood that the features can be used subsequently as retrieval cues (e.g., Einstein & Hunt, 1980). Third, in trying to make sense of incongruent events, they become associated with other information in memory, creating a wider network of pathways through which they may be retrieved (e.g., Srull & Wyer, 1989). Fourth, the attention to detail and sense-making associated with encoding unexpected events increases the likelihood that they will be stored episodically, with details intact (e.g., Klein et al., 2002; McClelland et al., 1995; Sherman, 2001). In contrast, congruent events

receive relatively little attention and elaboration, and are likely to be represented abstractly, making it difficult to remember them accurately.

*Response bias, search strategies, and familiarity increase true and false memory of expected information.* Estimates of memory for expected events are often inflated by response biases to report congruent events. Thus, on a recognition test, for example, correct recognition of congruent items may be quite high. However, the high incidence of false alarms on these items indicates that performance is driven largely by a bias to respond positively, rather than by accurate memory. Because congruent items (including foils) fit well with general expectancies, perceivers set low thresholds for claiming their verity (e.g., Stangor & McMillan, 1992). These same biases also appear to account, in part, for stereotypic biases in source memory (Spaniol & Bayen, 2002). The implications for eyewitness testimony are significant.

False memories of expectancy-congruent events may also be based on a feeling of processing fluency associated with those events. Because they fit with expectancies, these events may feel familiar even if they did not actually occur. This familiarity may be misinterpreted as being due to prior exposure, rather than to expectancy fit, leading people to falsely judge typical events as likely to have occurred (e.g., Greenwald & Banaji, 1995; Sherman et al., 2004).

Both true and false memory for expected information is also facilitated by retrieval strategies that take advantage of our expectancies. Thus, even though congruent events may be poorly encoded, they may be remembered when people use their expectancies to generate events that may have occurred. Often, when people are asked to remember what happened, they may re-frame the question to themselves as “What is likely to have happened?,” leading to a hypothesis-confirming search for expectancy-congruent information (e.g., Hirt, 1990; Hirt,

Erickson, & McDonald, 1993). This same process may lead to the construction of typical events that did not occur.

*Moderators of memory effects*. One important moderator of all of the effects described above is expectancy strength. As expectancies become clearer, more coherent, or more focused, incongruent events are increasingly surprising, but by the same token congruent events are increasingly taken for granted (e.g., Srull et al., 1985). The associated increased disparity in the extent to which expected and unexpected events are attended to, encoded, and stored episodically affects memory for the events. Thus, the advantage in accurate memory for incongruent events increases with expectancy strength. So, too, do response biases, feelings of familiarity, and expectancy-driven search strategies increase for congruent events (e.g., Sherman & Frost, 2000; Sherman et al., 1998).

A second moderator of memory effects is the level of processing capacity available during encoding. When under cognitive load, people tend to attend more carefully to and encode the details of incongruent than congruent information. Accordingly, the memory advantage for unexpected events is greater when capacity has been restricted during encoding (e.g., Sherman & Frost, 2000). At the same time, diminished capacity increases the extent to which people rely on guessing strategies, feelings of familiarity, and biased search strategies in remembering typical or expected events. The increased reliance on these factors may increase both true and false memories for congruent events.

*Summary*

This section summarized the numerous cognitive consequences of expectancies. We attempted to integrate the general offshoots of expectancies, such as biased hypothesis-testing, the expectancy heuristic, and expectancy-assimilative interpretation effects, with the more

specific offshoots of expectancy confirmation versus disconfirmation, including effects in processing fluency, attention, interpretation, encoding, sense-making, representation, and memory. All these cognitive consequences are aimed at extracting useful information from experience for the specific purpose of guiding subsequent effective action.

## V. AFFECTIVE CONSEQUENCES

Affective responses to expectancies may be viewed as regulatory signals regarding goal progress, with positive affect signaling sufficient and negative affect signaling insufficient progress (as indicated by smaller versus larger discrepancies, respectively, between expected and current status within a regulatory feedback loop). As such, affect constitutes an informational signal intrinsic to behavior regulation (Schwarz, 1990). This section elaborates on this idea, but also touches on optimism as an instance of affect regulation, and on broader affective consequences that have received considerable research attention, including attitudes, aesthetics, humor, and depression.

### *Behavior-Oriented Affective Consequences*

*Negative affect fuels behavior change.* The immediate default response to a disconfirmed expectancy is negative affect (Mandler, 1975; Olson et al., 1996). This primary affective consequence is best understood with regard to its implications for behavior regulation. Specifically, negative affect spurs greater behavioral effort aimed at problem-solving (McDonald & Hirt, 1997; Schwarz, 1990; Taylor, 1991), as mediated by the cognitive consequences reviewed in the previous section. Studies of regret and disappointment have been particularly revealing as indications of how negative affect spurs alterations in behavior (Zeelenberg, 1999). This basic notion also extends through the *investment model* of interpersonal relationships, in

which a relationship that is perceived to fall short of a generic expectation of relationship quality (termed a *comparison level*) results in negative affect (disappointment) which in turn predicts relationship dissolution (Rusbult, Martz, & Agnew, 1998; Thibaut & Kelley, 1959).

*Negative affect is the default response to processing fluency disruption*. On a more basic level, the disruption of processing fluency is experienced as affectively unpleasant (Reber, Winkielman, & Schwarz, 1998; Winkielman & Cacioppo, 2001). It must be emphasized that we are referring to the initial and default affective response to processing dysfluency; this affective response is by no means the only or typical response. As detailed subsequently, inferential processing serves to create secondary affective responses, which may vary widely in valence as a function of the specific form of interpretational attribution (e.g., Whittlesea & Williams, 2001).

*Expectancy disconfirmation shifts evaluation via contrast effect*. Reactions to success and failure hinge not only on the intrinsic quality of the outcome, but also on how the outcome is framed by expectations. A negative outcome creates dissatisfaction when it is expected, but is even more extremely dissatisfying when unexpected. By the same token, a positive outcome may taste sweet if expected, but may be all the sweeter when it takes the perceiver by surprise.

The underlying mechanism for such effects is the perceptual contrast between the expectancy and outcome (Mellers et al., 1997; Roese, 1997). Specifically, an outcome that disconfirms an expectancy can be evaluated in part by comparison to the expected yet unattained outcome, i.e., a counterfactual comparison. The juxtaposition of an alternative that is either better (an upward counterfactual) or worse (a downward counterfactual) renders the evaluation of the factual outcome either more negative or more positive, respectively (Roese, 1994). By this analysis, the evaluative direction between the obtained outcome and its counterfactual alternative matters most in determining affect (Barthalow et al., 2002; Bettencourt et al., 1997;

Feather, 1969; Shepperd & McNulty, 2002). Hence, an unexpected failure evokes more negative affect than an expected failure by virtue of the contrast to an upward counterfactual (i.e., the expected, more positive outcome), and an unexpected success evokes more positive affect than an expected success because of the contrast to a downward counterfactual (i.e., the expected, less positive outcome). New evidence suggests a somewhat different interpretation, that both positive outcomes (that could have been better) and negative outcomes (that could have been worse) may be characterized not so much as contrast-effect shifted unitary affect experience, but rather as an ambivalent experience of simultaneous mixed emotions (Larsen et al., 2004).

That expectancies shape evaluation is a rule of thumb assumed by many, as exemplified by the tactic of "lowering the bar." For example, prior to the 2000 presidential election debates, candidate George W. Bush's handlers tried to "spin" low expectations for his performance, thereby ensuring that nearly any performance by Bush would exceed expectations and thus enhance voter satisfaction via a downward counterfactual comparisons ("He could have performed so much worse …"). Research indeed suggests that individuals sometimes strategically reduce expectancies of success (Shepperd et al., 2000; van Dijk, Zeelenberg, & van der Pligt, 2003). Corporate earnings statements have similarly been shown to be manipulated in such a way that they just barely exceed (but rarely just barely miss) earlier forecasts of performance, thereby ensuring that downward rather than upward counterfactuals are the most salient consequence (Burgstahler & Dichev, 1997).

*Optimism and Affect Regulation*

People are, on average, optimistic: When looking to their own future, they see more positives than negatives (Newby-Clark & Ross, 2003). In pondering future career moves, romantic encounters, financial deals, or vacations with family, people expect events to go well

and dedicate relatively little thought to negative possibilities. Such optimism has been documented against several benchmarks, the most common of which is an interpersonally relative judgment in which individuals predict the likelihood of good and bad events befalling them compared to similar others. This form of judgment has often been called *unrealistic optimism* (Radcliffe & Klein, 2002; Weinstein, 1980; Weinstein & Klein, 1996). Another benchmark is the individual's current circumstance, and here again there is a general tendency to expect future improvement relative to current state; this judgment has been termed *upward temporal comparison* (Heckhausen & Krueger, 1993; McFarland & Alvaro, 2000; Wilson & Ross, 2001). Yet a third benchmark is actual outcomes, and again individuals tend to expect greater riches and rewards than objectively occur at a later time (Mitchell et al., 1997; Wirtz et al., 2003). A variation of this observation has been termed the *planning fallacy*: in judging the future accomplishment of personal or professional goals, projects, or assignments, people expect to complete more and in a briefer period of time than actually turns out to be the case (Buehler, Griffin, & Ross, 1994; Kruger & Evans, 2004; Newby-Clark et al., 2000). Although people are on average optimistic, variation across individuals (e.g., Norem & Cantor, 1986) and cultures certainly exists (e.g., Chang, Asakawa, & Sanna, 2001; Heine & Lehman, 1995), and one recent argument was that variability in optimism constitutes perhaps the most basic of personality factors (Haugen, Ommundsen, & Lund, 2004).

Why are people unrealistically optimistic? Several explanations have been offered, such as those rooted to an egocentric emphasis on self-relevant information (e.g., Karniol, 2003; Kruger & Burrus, 2004). But another explanation running through several prominent theories is that optimistic expectancies produce positive affect, and therefore individuals are motivated to create them. According to this view, people are optimistic simply because it feels good to

imagine a more positive future. Accordingly, people use optimistic expectancies for affect regulation; for example, optimism increases in a compensatory fashion in response to threat (McFarland & Alvaro, 2000). In the *theory of positive illusions* (Armor & Taylor, 1998; Taylor & Brown, 1988), unrealistic optimism was one of several self-aggrandizing cognitions that, so long as they remain moderate rather than extreme distortions of reality, serve to facilitate psychological well-being (Kaiser, Major, & McCoy, 2004; Scheier, Carver, & Bridges, 2001), aid in coping with misfortune (Aspinwall & Taylor, 1997), and even enhance physical health (Peterson & Bossio, 2001), as indexed for example by immune system functioning (Segerstrom, Taylor, Kemeny, & Fahey, 1998; Taylor et al., 2003). Benefits of optimism for productivity, persistence, and life satisfaction have also been observed (e.g., Gilham, 2000; Seligman, 1998). The ultimate negative expectancy is death, and according to *terror management theory* (Greenberg, Solomon, Pyszczynski, 1997), recognition of one's own mortality unleashes a range of processes aimed at keeping this horrific expectancy cloaked in obscurity. The theory suggests that many beliefs and behaviors are aimed at providing distraction from mortality awareness; examples include religion, political ideology, nationalist or other ingroup identification, and even sexual ritual (e.g. Goldenberg et al., 2000). All considered, the range of evidence to support the claim that optimism is motivated, or is sometimes recruited for affect regulation, is substantial. Contemporary theory moreover emphasizes the deep interplay (rather than opposition) between motivated and purely informationally-based mechanisms (e.g., Kruglanski, 1996; Kunda, 1990).

Under the rubric of *affective forecasting*, the concept of *impact bias* has been used to describe people's tendency to exaggerate the emotional impact of future events (Wilson & Gilbert, 2003). In this literature, the focal judgment is magnitude of emotional consequence following a specified event, operationalized in terms of both intensity and duration of affective

experience. Bias is defined in terms of a comparison between predicted and actual emotional experiences (Gilbert et al., 1998; Buehler & McFarland, 2001); for both positive and negative emotions, people expect greater emotional intensity and duration than actually transpires. At first glance, findings on affective forecasting with regard to negative emotions seem to contradict the standard optimism finding: Research on affective forecasting suggests that people exaggerate the emotional impact of negative future events, whereas research on unrealistic optimism indicates that people skew their future view in a positive direction. This contradiction may be explained by recognizing that these two literatures, in tapping separate judgments (emotional impact and event likelihood, respectively) have differentially emphasized two sides of the same regulatory balancing act. When viewed together, impact and likelihood judgments are negatively correlated: The more emotionally consequential the event, the more unlikely individuals deem it to be (Blanton et al., 2001). The most threatening expectancy would be one in which a possible negative event (losing a job, losing a spouse) is deemed both very impactful ("It would really wipe me out") and highly likely. Individuals forced to confront the prospect of a high impact negative event may thus strategically reduce its perceived likelihood ("Sure that would be awful, but it'll never happen to me"). Similarly, if individuals realize that a negative event is likely, they may strategically reduce its perceived impact ("I know it might happen, but it won't be so bad"; Kay, Jimenez, & Jost, 2002). Such a balancing act between judged impact and likelihood is a further instantiation of the principle that individuals regulate expectancies so as to defend against affectively threatening inferences (Jemmott, Ditto, & Croyle, 1986).

To summarize, people are on average optimistic when they look to their own personal future, and this optimism brings about positive affective consequences, which in turn bring a variety of further beneficial consequences for health and performance.

*Broader Affective Consequences*

The previously noted principles center on the immediate emotional offshoots of expectancy confirmation and disconfirmation. In the following examples of attitudes, aesthetics, humor, and depression, the importance of the expectancy construct may be seen across a broader range of psychological effects.

*Attitudes reflect the intersection of expectancy and value*. Attitudes involve evaluations of people, objects, or issues, and a popular means of conceptualizing them involves the varying contributions of information, prior behavior, and affect (Breckler, 1984). The expectancy-value approach to attitudes (and judgment more generally) is that an attitude is the summation of a set of beliefs about the value of particular properties along with the expected likelihood that the attitude object contains those properties (Ajzen & Fishbein, 1980). A positive attitude toward an automobile built by Volkswagen, for example, would be the result of a set of value and expectancy beliefs regarding attributes such as price (low price expected with high certainty), quality (high reliability expected with moderate certainty), and driving experience (solid handling expected with some uncertainty). Although this perspective has proven useful, a recent controversy has centered on whether statistically inappropriate techniques have rendered many past findings ambiguous, and which techniques are best suited for new research (French & Hankins, 2003; Haddock & Zanna, 1998).

*Aesthetic appreciation hinges on moderate expectancy disconfirmation*. Although critics will debate the merits of great versus mediocre art along innumerable dimensions, psychologists have long noted that aesthetic appreciation at its simplest level reflects moderate surprise. That is, new art is appreciated by most individuals when it involves a moderate, neither weak nor extreme, deviation from expectancies. As revealed in early psychophysical studies of taste,

brightness, heat, and form, previous experience creates an adaptation level or habituation point, against which experiential discrepancies are perceived in affective terms (Haber, 1958; Helson, 1964). Later studies of aesthetic judgments of painting, music, and literature confirmed that very small deviations from past experience are perceived as boring; large deviations as unpleasantly bizarre, but moderate deviations as sweetly intriguing (Berlyne, 1974). Reber, Schwarz, and Winkielman (2004) argued processing fluency to be a key mechanism underlying the relation between expectancy and aesthetic appreciation. These authors proposed that the more fluently the perceiver can process an object, the more positive the resulting aesthetic response. Small deviations from expectancy may well be processed fluently, but perhaps so fluently as to barely register as interesting, blending instead into the perceptual background. Large deviations from expectancy, on the other hand, interrupt fluency by stimulating deeper cognitive processing aimed at explaining the discrepancy. Between these two extremes are intermediate deviations that stimulate simpler (and more successful) explanations that rapidly restore fluency to its prior, faster rate. In this regard, it is perhaps not so much greater fluency in an absolute sense that evokes aesthetic appreciation, but rather the contrast effect resulting from a rapid shift from relatively low to high fluency that creates the subjective feeling of aesthetic pleasure (cf. Whittlesea & Williams, 2001).

*Humor derives from resolution of incongruity*. The experience of humor may be taken as a special case of the more general principle guiding aesthetic appreciation covered in the previous section. Humor appears to be the product of a two-step process: a surprise based on some sort of incongruity (e.g., between a particular utterance and the expected word usage; between a “funny walk” versus the typical way of walking), followed very rapidly by an inferential resolution that renders the incongruity non-threatening (Suls, 1983; Wyer & Collins,

1992). As explored in greater detail in the precursor to this chapter (Olson et al., 1996), the greater the initial surprise and the more satisfyingly comprehensive the resolution, the bigger the laughs.

*Depression involves hopelessness expectancies*. Depression is a mental disorder marked by extreme negative affect, demotivation, and behavior deficits. A signature symptom of major depression is global expectancies of future negative events, especially events that are personally important to the individual, and has been specified in detail within the *hopelessness theory of depression* (Abramson, Metalsky, & Alloy, 1989). The correspondence between biased negative expectancies and behavioral dysfunction (e.g., job performance deficits, interference in interpersonal relationships) marked by depression stands in contrast to biased positive expectancies that facilitate the behavior among healthy individuals, thus further underscoring the functionality of expectancies modestly biased toward optimism (Taylor & Brown, 1988).

*Summary*

This section reviewed three main classes of affective consequences of expectancies, with a particular emphasis on consequences of expectancy disconfirmation. First, affective responses to expectancies were considered in terms of their role as regulatory signals regarding goal progress. Second, expectancies for personal events tend to be optimistic, which in turn brings about positive affective consequences. Third, broader affective consequences were also discussed, with a spotlight placed on attitudes, aesthetics, humor, and depression.

## VI. CONCLUSION

To predict the future is to navigate it more effectively. The psychological literature on the construct of expectancy is enormous, yet we argue that the numerous findings uncovered by

this literature are most parsimoniously described with regard to behavior regulation, effective action, and survival. We distinguished between semantic and episodic expectancies, arguing that both facilitate performance but in different ways. Semantic expectancies are summaries of multiple prior experiences; they tend to be relatively abstract, implicit, and efficiently deployed. Most expectancies are of this semantic sort: they provide a wealth of general background knowledge and "common sense" that silently guide construal and behavior with efficient accuracy. Episodic expectancies are derived from memories of particular past instances; they tend to be relatively concrete, explicit, and provide deeper, more specific information.

Whereas semantic expectancies provide implicit and mundane guidelines (a clear morning in July is likely to become a hot day, so dress lightly …), consciously held episodic expectancies may range from small to large plans, from tonight's dinner to next summer's wedding. Episodic expectancies for desired goals may not only guide behavior, but as well facilitate performance, either by energizing motivation via hopeful imagery or by making specific step-by-step behavioral requirements salient. Anticipation of problems and obstacles results in proactive avoidance behavior. Such examples of expectancies creating their own reality are deeply useful to human beings, yet the potential for mishap, as when negative and inaccurate stereotypes fuel self-fulfilling prophecies, spring from the same basic mechanisms.

The usefulness of an expectancy in guiding behavior depends on its accuracy, hence expectancies must be revisable in light of disconfirmation. At the same time, overly capricious sensitivity to non-representative or non-diagnostic disconfirmation would impair rather than facilitate expectancy accuracy. Generally speaking, disconfirmed expectancies demand attention and require cognitive capacity to support efforts at explanation and understanding, the inferential products of which result in one of four consequences, ignoring the discrepancy, tagging the

discrepancy, bridging the discrepancy with new insight, or revising the expectancy on a deeper level. Although we have argued that expectancies tend to be accurate overall, this assertion masks a complicated set of conceptual issues (Judd & Park, 1993; Kruglanski, 1989). These issues were explored in depth in the precursor chapter by Olson et al. (1996); that discussion still stands as an authoritative overview of this difficult subject.

Expectancy is one of the bedrock constructs in the field of psychology. Although numerous areas of psychology utilize the expectancy construct, from developmental to clinical psychology, from animal conditioning to cognitive psychology, this chapter emphasized the voluminous research deriving from social psychology. We have attempted to conceptualize the expectancy construct in terms of its functional basis in effective behavior control, positioning cognitive and affective consequences as secondary to and supportive of this main function. Yet as we write, social psychology is evolving rapidly to embrace new advances in brain imaging technology. With the emerging discipline of social cognitive neuroscience gaining momentum in pinpointing brain structure associated with specific cognitive function, we have constructed our review with an eye to providing a function-oriented roadmap for this new research. Indeed, we have noted one central and highly promising mapping of function to structure in the form of a processing dysfluency detector localized at the anterior cingulate. This is an exciting development, but merely the beginning of what promises to be a sharp expansion of our understanding of the deep relation between brain structure and cognitive function, an expansion we anticipate eagerly.

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Notes

[1] The origin of the term “pipeline” can be traced to the seminal paper by Jones and Sigall (1971), in which they observed that psychologists have long fantasized “about discovering a direct pipeline to the soul (or some nearby location)” (p. 349).