

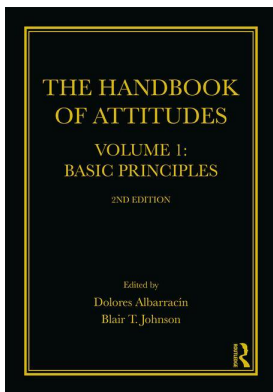
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Access details: *subscription number*

Publisher: *Routledge*

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## **The Handbook of Attitudes Volume 1: Basic Principles**

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### **Some Determinants and Consequences of Beliefs**

Publication details

<https://test.routledgehandbooks.com/doi/10.4324/9781315178103-8>

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**Published online on: 04 Sep 2018**

**How to cite :-** Robert S. Wyer. 04 Sep 2018, *Some Determinants and Consequences of Beliefs from: The Handbook of Attitudes, Volume 1: Basic Principles* Routledge

Accessed on: 23 Sep 2023

<https://test.routledgehandbooks.com/doi/10.4324/9781315178103-8>

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## 8

# SOME DETERMINANTS AND CONSEQUENCES OF BELIEFS

## Cognitive, Social, and Motivational

*Robert S. Wyer, Jr.*

Beliefs are often the cognitive bases of attitudes. Although attitudes can sometimes be based on positive or negative feelings alone (Schwarz & Clore, 1996; Strack, Martin, & Stepper, 1988), they are more often based on estimates of the likelihood that the stimulus has certain desirable or undesirable attributes or that a behavior will have desirable or undesirable consequences (Fishbein, 1963; Fishbein & Ajzen, 1975). Beliefs about the consequences of a behavior can influence perceptions of its desirability and decisions to engage in it (Ajzen & Fishbein, 2005; Ajzen, Fishbein, Lohmann, & Albarracín, this volume). Thus, the fact that beliefs are intimately connected to attitudes and behavior is incontrovertible.

Many of the issues associated with belief formation and change were reviewed in an earlier edition of this *Handbook* (Wyer & Albarracín, 2005). In that chapter, considerable attention was given to the way that belief-relevant knowledge was organized in memory and the processes that govern its later retrieval and use (cf. McGuire, 1960, 1964, 1981; McGuire & McGuire, 1988, 1991). Rather than repeating the earlier discussion, I will focus more directly on the way that general knowledge combines with new information to influence the formation of beliefs and the cognitive, social, and motivational factors that determine the magnitude of this influence.

### General Considerations

#### *Definition and Measurement*

Beliefs are typically conceptualized as subjective estimates of the likelihood or subjective probability. Thus, they might refer to the likelihood that an object has a particular attribute, that an event has occurred or will occur in the future, or that a statement is true. To this extent, beliefs are distinguished from attitudes, which are expressions of the positive or negative feelings that are elicited by a stimulus.

This distinction is not universally recognized, however (McGuire, 1969). For example, tripartite conceptions of attitudes (e.g., Katz & Stotland, 1959) assume that attitudes have three components: an affective reaction to the object, beliefs that the object has favorable and/or unfavorable attributes, and overt behavior. Thus, beliefs are part of the *definition* of attitudes. A clearer distinction between attitudes and beliefs was proposed by Fishbein (1963; see also Peak, 1955; Rosenberg, 1960). According to this conceptualization, an attitude is based on both evaluations of the individual features of the attitude object and beliefs that the object actually possesses these features. To this extent, however, beliefs and attitudes are inextricably related.

More recently, Zanna and Rempel (1988; see also Olson & Zanna, 1993) conceptualized an attitude as “the categorization of a stimulus along an evaluative dimension” (Zanna & Rempel, 1988, p. 319). From this perspective, an attitude toward a stimulus would be conceptualized in terms of the likelihood that the object belongs to an evaluative category. To this extent, attitudes and beliefs, like other categorizations, are only distinguishable in terms of the criteria on which they are based. That is, the extremity of one’s judgment of an object along a bipolar scale might reflect the strength of one’s belief that the object belongs to one of the categories that define the scale endpoints, and this might be true regardless of the attribute being judged. For example, people who estimate someone’s honesty along a scale defined by the endpoints “very dishonest” and “very honest” might first decide which of the two bipolar categories the target is more likely to exemplify and then rate the target more or less close to this endpoint (i.e., more or less extremely) depending on their belief that this category is applicable. However, a similar process could underlie judgments along an evaluative scale that is defined by the endpoints “very bad” and “very good.”

In a similar vein, Wyer (1973) found that the evaluation of an object along a category scale could be conceptualized as a subjective expected value of a distribution of beliefs that the object belongs to each of the scale categories and that the uncertainty associated with the judgment was a function of the dispersion of these beliefs. These considerations suggest that although an attitude might be defined as a subjective affective reaction to a stimulus, the assessment of this attitude is a reflection of the belief that this reaction exemplifies a given scale category. In other words, the criteria for forming an attitude toward a stimulus might differ substantially from the process of forming a belief but the processes of *reporting* them along a category scale may be similar. A detailed discussion of the measurement of attitudes is provided by Krosnick, Judd, and Wittenbrink (2005; this volume).

As a result of these ambiguities, the effects of situational and individual difference variables on attitudes and their effects on beliefs are often difficult to distinguish on the basis of judgment data alone. In this chapter, I will maintain the conceptual distinction between attitudes and beliefs proposed at the beginning of this section. However, the ambiguities noted above should be kept in mind when evaluating research that bears on these constructs.

### ***Basic Principles***

Research on the determinants and effects of beliefs covers a wide range of phenomena. However, the assumptions underlying much of this research can be captured by several general principles similar to those proposed by Kardes and Wyer (2013) in a review of information processing research more generally.

#### ***Principle 1. Cognitive Efficiency***

People are typically unlikely to engage in any more processing than is necessary to attain the objective they are pursuing at the time. This disposition is manifested in three ways:

- (a) People are likely to base their judgments of a stimulus on only a small proportion of the information they receive that happens to capture their attention (Taylor & Fiske, 1978).
- (b) People who make a judgment or decision are likely to retrieve and use only a subset of the previously acquired belief-relevant knowledge they have stored in memory that comes easily and quickly to mind.
- (c) When several alternative procedures could potentially be used to compute a judgment or arrive at a decision, people are likely to use the one that comes to mind most quickly and can arrive at a judgment most quickly and easily.

### *Principle 2. Mental Representations*

People who receive information about a stimulus form a mental representation of it on the basis of this information. Several metaphorical descriptions of these mental representations have been proposed (Barsalou, 1999; Barsalou et al., 2003; Carlston, 1994; Carlston & Smith, 1996; McGuire & McGuire, 1991; Smith & de Coster, 1998, 1999; Wyer & Carlston, 1979; Wyer & Srull, 1989; Wyer, 2004). The nature of these representations can vary:

- a. Representations can consist of single concept or a configuration of interrelated features. They can be coded semantically, visually, or in other sense modalities. They can refer to a single object or a group, to a specific event or a sequence of events, to a goal or to a cognitive or motor procedure for attaining it, or to an implicit theory (see Principle 6).
- b. The features of a representation could either be unorganized or organized either spatially (e.g., a human face) or temporally (a sequence of causally related events). Moreover, they could refer to either a specific stimulus (Barack Obama, last night's dinner at Biaggi's) or a general one (U.S. Presidents, eating at a restaurant).
- c. A representation could include not only features that are specified in the information presented about its referent but also unmentioned features that are inferred in the course of constructing it.

Regardless of their content and structure, a representation once formed is stored in memory and is later retrieved as a single unit of knowledge.

### *Principle 3. Knowledge Accessibility*

Judgments are typically based on the subset of knowledge that comes to mind most quickly and easily at the time the judgment is made. (For alternative conceptualizations of the processes underlying knowledge accessibility, see Higgins, Bargh, & Lombardi, 1985; Srull & Wyer, 1979; Wyer & Carlston, 1979; Wyer & Srull, 1989; Wyer, 2004.)

- a. This subset of information, in turn, is a positive function of both the recency with which the knowledge has been acquired and used and the frequency with which it has been used. (Higgins, 1996; Förster & Liberman, 2007; Wyer, 2004, 2008).
- b. Concepts and knowledge that have been used frequently over a period of time become *chronically* accessible and consequently can be applied independently of situational factors that might influence their applicability (Bargh, Bond, Lombardi, & Tota, 1986).

### *Principle 4. Awareness*

People are often unaware of the factors that influence the knowledge they use as a basis for judgment and of the reason they employ a particular procedure in making a judgment or decision.

### *Principle 5. Persistence*

Once a mental representation of a stimulus has been formed on the basis of new information, or a judgment has been made of the stimulus, this representation or judgment is stored in memory and can potentially be retrieved and used independently of the information on which it was originally based (Carlston, 1980; Kardes, 1986; Srull & Wyer, 1980).

*Principle 6. Implicit Theories*

People acquire implicit theories about themselves and the world in which they live and they use these theories to construe the implications of new information they receive. These theories can include scripts (prototypic event sequences; see Schank & Abelson, 1977,1995), stereotypes and generalizations about people, objects or events (implicational molecules; Wyer, 2007). The invocation of these theories can lead individuals to infer attributes of an experience that were not observed while ignoring other attributes that might actually be relevant. (For further discussion of implicit theories, see Gawronski, this volume.)

*Proposition 7. Communication Norms*

Individuals spontaneously apply normative principles of communication in interpreting a message (Grice, 1975; see also Higgins, 1981; Schwarz, 1994, 1996). For example, they expect communications to be informative (to convey information that the recipient does not already have), to convey the truth as the communicator sees it, and to be relevant to the topic at hand. They apply these principles both in conveying information to others and in interpreting the implications of communications they receive. If the literal meaning of a message appears to violate these principles, they attempt to construe its intended meaning in a way that is more consistent with them.

*Proposition 8. Subjective Reactions*

The subjective reactions that people happen to be experiencing at the time they encounter a stimulus can be used as a basis for judging the stimulus and construing its implications. These reactions can include not only affect (Schwarz & Clore, 1983, 1996) but also other feelings (feelings of difficulty, assertiveness, certainty, etc.); see Schwarz (2004).

*Principle 9. Ease of Processing*

The more easily people can construe the implications of new information and/or previously acquired knowledge for a judgment, the more strongly they will believe that their judgment is correct. Correspondingly, the easier it is to retrieve information from memory, the more likely people are to believe that its implications are true.

Each of these principles has received substantial empirically support in social psychological research (for reviews, see Wyer, 2004; Wyer, Shen, & Xu, 2013; Wyer, Xu, & Shen, 2012; Wyer & Srull, 1989). The research to be reported is often based on one or more of these principles. In the remainder of this chapter, I first consider the cognitive processes that govern the formation of beliefs that are based on both new information and previously acquired knowledge. I then consider both social and motivational factors that influence belief formation and change.

**Cognitive Processes of Belief Formation**

Beliefs can be computed on the basis of new information that about a stimulus, previously acquired knowledge that is retrieved from memory, or both. Although the processes of forming beliefs from different sources of information have much in common, several distinctions are important. A fundamental distinction is between beliefs that are based on direct experience and those that are based on previously acquired knowledge or information that is provided by others. Beliefs that are acquired through direct experience with their referents are stronger and difficult to change. (It is hard to convince a person who has tasted salty food that the food is actually sweet or to persuade a person

who has witnessed a policeman kick and beat an unarmed minority group member that the policeman was acting out of self-defense.) Information that people acquire indirectly through persuasive communications or word of mouth is more likely to be treated with skepticism and may lead to less extreme beliefs even if it comes from a highly credible source.

However, the distinction between beliefs that are based on direct information and beliefs that are based on previously acquired knowledge is somewhat misleading. For one thing, even events that are directly observed are typically interpreted in terms of previously acquired concepts and knowledge that happen to be accessible in memory at the time. Thus, for example, people who see a man running in front of a group of other men might infer that the first man is either leading the others or is running away from the others. Which interpretation is made, and its implications for the protagonists, could depend on what concepts and knowledge come to mind at the time of the observation (Principle 1).

More generally, the knowledge that people acquire could influence the beliefs they form in three ways. First, it could bear directly on the event or proposition to be evaluated. For example, the belief that Donald Trump opposes efforts to reduce global warming might be based on a statement that he made to this effect. Second, the knowledge might consist of information that bears indirectly on the validity of the proposition (e.g., information that Mr. Trump appointed the chief executive officer of Exxon as Secretary of State). Third, the knowledge could consist of general concepts that affect the interpretation of new information that bears on the proposition being evaluated.

The way in which these different processes come into play in belief formation and change can depend on the type of belief being formed. For example, the belief about a specific person or event could be altered by new information that bears on the interpretation of the event or a construal of its implications. In contrast, beliefs in an abstract principle (e.g., “honesty is the best policy”) are more difficult to change as the terms in which the principle is defined are subject to interpretation. Consequently, any given piece of information can often be dismissed as irrelevant or as an exception to the general rule. A more provocative question arises concerning the maintenance of superstitious beliefs that have no basis in reality and yet are not easily refuted. We consider these beliefs presently. The remainder of the present section elaborates the ways in which previously acquired knowledge comes into play in belief formation and change

### ***Direct Effects of Previously Acquired Knowledge on Beliefs***

The fact that previously acquired knowledge has a direct effect on belief to which it pertains seems self-evident. However, the impact of this knowledge may depend on the conditions in which the knowledge is acquired. As noted earlier, knowledge may be considered less credible when it has been acquired through word of mouth than when it is acquired through direct experience with its referent.

Additional considerations arise. When new information is received, for example, its influence is likely to depend on the credibility of its source. However, the knowledge one acquires becomes dissociated from its source over time (Tulving, 1983). Thus, we generally have little memory of when and how we acquire much of our knowledge about the world in which we live. When the context in which information is received is peripheral to the information itself, it is likely to be forgotten, leading the information to become part of general knowledge that is recalled and used as a basis for judgment independently of this context.

The impact of this phenomenon is exemplified by the “sleeping effect” (Gruder et al., 1978; Pratkanis et al., 1988; Kumkale & Albarracín, 2004). That is, a communication from an incredible source has little effect on beliefs immediately after it is received. However, its effect increases over time once the source of the information is forgotten. Other studies have similar implications. In a study by Hasher, Goldstein and Toppin (1977), American participants were asked to report their

beliefs about events and situations with which they were quite unfamiliar (e.g., “Dar es Salaam is the capital of Tanzania”). Several days later, they completed a second questionnaire containing some of the same items along with others they had not seen before. Participants reported stronger beliefs that the repeated statements were true in the second session than they had at first. Participants apparently retrieved the repeated statements from memory independently of the context in which they had seen them before and attributed the statements’ familiarity to their general world knowledge, thus increasing their belief in the statements’ validity. Jacoby, Kelley, Brown, and Jasechko (1989) reported a similar phenomenon. That is, participants judged fictitious names to be more likely to denote well-known persons if they had encountered the names in a similar questionnaire the day before.

### *Media Influences on Beliefs*

The recall and use of information out of the context in which it was acquired has implications for the impact of television on perceptions of social reality. An extensive program of research by L. J. Shrum (Shrum & Lee, 2012) provides evidence that individuals who watch television excessively overestimate the incidence of persons and situations in the real world that are overly represented on television; the numbers of doctors, lawyers, and policeman (Shrum, 1999, 2001); the prevalence of violence (Shrum, Wyer, & O’Guinn, 1998); and indications of an affluent lifestyle (Shrum, 2001). Moreover, when media-related information is stored in memory as part of general knowledge, it can have an adverse effect on individuals’ personal values and increase materialism (Shrum, Burroughs, & Rindfleisch, 2005).

This research has further implications. To the extent that people consider phenomena that occur frequently in daily life to be commonplace, they are more likely to accept their implications as normal and inevitable. Thus, for example, exposure to acts of aggression could increase perceptions that these acts are common and inevitable in daily life and to accept them. The effects of television violence on children’s beliefs have been extensively investigated (Anderson & Bushman, 2002).

Because features that are frequently overrepresented in the media are likely to become chronically accessible in memory (Principle 3), their effects are likely to persist over a long period of time. A provocative, albeit depressing, example of these effects was reported by Zillmann and Bryant (1982). They found that exposing naïve college students to massive doses of sadomasochistic pornography over a period of several weeks increased their tolerance of rape. Moreover, these effects persisted for at least several months.

It is important to bear in mind, however, that the effects of the media on beliefs in the acceptability of violence and rape do not necessarily mean that it induces people to engage in this behavior. People who observe sexual violence do not necessarily become rapists. Nevertheless, they may come to believe that rape is a normal occurrence and, therefore, might be more tolerant of its occurrence than they would otherwise be.

### *Effects of Accessible Self-Knowledge on Judgments*

The impact of watching television on beliefs exemplifies the effects of frequency of exposure on the accessibility of knowledge. The *recency* of activating knowledge can have similar effects (Principle 3). Salancik and Conway (1974) provided evidence of this phenomenon. Participants were asked to report their agreement with a set of items concerning their religious behavior. In one condition, the items pertaining to religious behavior contained the word “occasionally” (e.g., “I occasionally pray”) and nonreligious items contained the word “frequently” (e.g., “I frequently have premarital sex”). In another condition, the inserted words were reversed (“I frequently pray,” “I occasionally have premarital sex,” etc.). After completing the questionnaire, participants reported their religiousness.



Responding to items containing “occasionally” is likely to stimulate participants to sample positive instances of the behavior whereas responding to items containing “frequently” is likely to stimulate them to identify negative instances. If they later base their estimates of their religiousness on the sample of instances that were made accessible as a result of completing the questionnaire, they should believe themselves to be more religious in the first condition than in the second. This was in fact the case.

A second study by Salancik (1974) had similar implications. Students in a class near the end of a semester were given an open-ended questionnaire in which they were asked to report the reasons for their classroom behavior either following the stem “in order to” (e.g., “I raise my hand in class in order to . . .”) or following the stem “because I” (“I raise my hand in class because I.”). They then completed a standardized course evaluation questionnaire and their evaluations were later correlated with final course grades. Responding to behavioral items in the first condition presumably activated a disposition to focus outward and thus to use extrinsic criteria as a basis for responding (e.g., “in order to let the instructor know who I am”) but responding in the second condition disposed them to focus inward and to use intrinsic bases for judgment (e.g., “because I want to learn”). Salancik assumed that these criteria, having been made accessible, would dispose students to use extrinsic or intrinsic criteria in reporting the course evaluations. Consistent with this assumption, the correlation between students’ course evaluations and their final course grades was substantial in the first case but was close to zero in the second.

### *Anchoring Effects*

Salancik’s studies exemplify the effects of prior cognitive activity on the accessibility of knowledge that, once accessible, influences beliefs to which the knowledge is relevant. A quite different series of studies with similar implications was conducted by Mussweiler and Strack (1999, 2000) in research on anchoring effects. Tversky and Kahneman (1974) reported that, when individuals judge a stimulus along a scale, they typically focus on one of the scale endpoints. Then, if the endpoint value is implausible, they mentally progress down (or up) the scale from this endpoint until they arrive at a value that seems plausible and use this value as a basis for their judgment. However, because a range of values along the scale are typically plausible, persons are likely to stop at a higher value if they progress downward from the high scale endpoint than if they progress upward from the low endpoint and consequently make a higher judgment in the former condition than in the latter.

However, Mussweiler and Strack (1999) proposed a quite different process. They suggest that, when individuals encounter a stimulus with a very high value, they may consider this value to be implausible. In the course of considering it, however, they are likely to think about the features of stimuli with plausibly high values, making these features accessible in memory. Therefore, if they are asked to judge the typical value of a stimulus of the sort they are considering, they may base their judgment of the stimulus on these features and assign a higher value to it than they might otherwise. For example, if they are asked whether Mahatma Gandhi was greater than 100 years old when he died, they may reject this possibility but, in doing so, may activate features of an elderly person. Consequently, if they are later asked to estimate his actual age at the time of death, they may make a higher estimate than they otherwise would. Analogously, if they are first asked whether Gandhi was greater or less than 20 years old when he died, they may judge his actual age at the time of death to be less than they otherwise would.

Aval and Wyer (2011) applied this conceptualization in judgments of the price of commercial products. In doing so, they found that making comparative judgments of the price of a product that was typically based on hedonic (affect-related) criteria (e.g., a sweater) activated affect-based criteria for judgment that were applicable to not only this type of product but other types as well. Consequently, the accessibility of these concepts in memory affected the price that people believed



they would pay for products in general. In contrast, making comparative judgments of the price of a high-tech product (e.g., a CD player) activated features that were specific to this type of product. Therefore, it affected the price that people believed they would pay for this type of product alone and had no effect on the price they would pay for other types.

The paradigm used in the aforementioned studies was somewhat artificial. However, similar effects have been identified outside the laboratory. Nunes and Boatright (2004), for example, found that exposing persons to either expensive or inexpensive sweaters in a beachfront stall affected the price they were willing to pay for CDs that were on sale at a neighboring booth.

### *Effects of Prior Judgments on Subsequent Ones*

The preceding studies provide evidence that the recency of activating previously acquired knowledge can increase the likelihood of using it in a different, unrelated context. Similar considerations suggest that, if people have formed a mental representation on the basis of information they have received and store this representation in memory, they are likely to retrieve it for use in making later judgments independently of the conditions that led to its construction (Principle 5). Two series of studies provide evidence of this possibility.

First, in a study by Carlston (1980), participants received descriptions of a target person that exemplified either (a) kindness and dishonesty (e. g., giving someone an answer during an exam) or (b) unkindness and honesty (e. g., telling his girlfriend that he thought her new hair style was ugly). After receiving this information, they judged the target with respect to one of these traits. Then, several days later, they judged the target with respect to the other trait. Participants based their second judgment on evaluative implications of their first judgment independently of the original information they received. (Thus, participants who received kind, dishonest behaviors judged the target as honest if they had initially judged his kindness but judged him as unkind if they had originally judged his honesty.)

In a quite different study (Ross, Lepper, Strack, & Steinmetz, 1977), participants were given a clinical case study of a person and asked either to explain why the person after leaving therapy might either have committed suicide or to explain why he might have donated a substantial sum or money to the Peace Corps. Finally, they were given a list of alternative outcomes and asked to indicate their belief that each had occurred. Participants based their prediction on the basis of the mental representation they had constructed in the course of generating an explanation. Thus, they predicted that the outcome they had explained was more likely to have occurred than outcomes that they had not explained. In a quite different domain, Sherman, Skov, Hervitz, and Stock (1981) found that participants who were asked to explain either why they might succeed or why they might fail on an anagrams task predict the outcome they explained to be more likely to occur than the alternative outcome. Moreover, their actual performance of the task was consistent with their predictions.

### *Effects of Retrieval Difficulty on the Impact of Prior Knowledge*

People's belief in a proposition is likely to depend on their perception of the credibility of the criteria they bring to bear on it. Individuals who find it difficult to retrieve and construe the implications of belief-relevant knowledge may be less confident that their assessment of these implications is valid and may report less strong beliefs in the proposition than they otherwise would.

In most of the studies described thus far, participants based their beliefs on the basis of a small number of information that was accessible in memory and was easy to apply. Some types of judgments, however, require a more extensive search of memory for judgment-relevant knowledge, and when this knowledge is difficult to identify, its implications may be questioned.

Norbert Schwarz and his colleagues provide intriguing evidence of this possibility and its applicability in a wide range of situations. In an initial study (Schwarz, Bless, Strack et al., 1991), participants were asked to report either 6 or 12 instances in which they were assertive. It is fairly easy to recall 6 instances but difficult to recall 12. Thus, although participants actually recalled more assertive behaviors in the latter case, they found it difficult to do and inferred from this difficulty that they actually did *not* have the attribute. Thus, they believed they were less assertive in this case than when they had recalled only 6.

Since the time of this initial demonstration, numerous examples of the phenomenon have been reported in a wide variety of areas (Schwarz, 2004). For example, people evaluate their personal computer less favorably if they are asked to recall many positive features of it than if they are asked to generate only a few (Menon & Raghuram, 2003). A series of studies by Sanna and Schwarz (2003) on the “hindsight bias” are particularly noteworthy. That is, people who learn that an event has occurred are more likely to believe that they would have predicted its occurrence than is actually the case (Fischhoff, 1975, 1982). This is presumably because people can easily generate a reason why the event occurred that they would actually not have considered without knowing its occurrence. If this is so, however, perceptions that it is difficult to generate reasons should decrease or even reverse the effect. To evaluate this possibility, Sanna and Schwarz told persons to generate either a large number or a small number of reasons why a target event had occurred. As expected, participants were less likely to believe they would have predicted the event when they had generated a large number of reasons for its occurrence than when they had generated a small number.

A similar procedure was used to understand the underpinnings of post-decision regret. Regret is presumably the result of the belief that one could have avoided a negative outcome by behaving differently. Sanna and Schwarz (2003; Sanna, Schwarz, & Small, 2003; Sanna, Schwarz, & Stocker, 2002) showed that asking participants to generate a large number of ways in which they could have avoided a negative outcome led them to perceive that the outcome was unavoidable and consequently decreased the regret they expressed as a result of its occurrence.

Other factors can influence beliefs through their mediating impact on ease of processing, however. For example, people believe that statements are less likely to be true when they are presented in colors that make them hard to distinguish from their background than when they are easier to read (Reber & Schwarz, 1999). However, perceptions of difficulty can influence attitudes independently of beliefs. Winkielman and Cacioppo (2001), for example, found that the ease or difficulty of processing information about a stimulus can elicit positive or negative affect and that these feelings can generalize to the stimulus to which the information pertains. Thus, figure-ground contrast (Reber & Schwarz, 2001); color (Reber, Winkielman, & Schwarz, 1998); and font (Shen, Jiang, & Adaval, 2010) can influence people’s affective reactions to a stimulus independently of the beliefs that are formed about it.

### *Superstitious Beliefs*

The effects identified by Schwarz and others provide examples of the conditions in which previously acquired knowledge that objectively confirms the validity of a belief can actually have a negative impact if the knowledge is difficult to retrieve from memory. There are quite different conditions in which knowledge and information that bears directly on a general proposition has little influence on beliefs in the proposition’s validity or the behavior it implies. These conditions arise in the case of superstitions, which persist despite numerous instances in which their validity is disconfirmed. Superstitious beliefs and the behavior associated with them vary over a wide range, including knocking on wood, not walking under a ladder, and engaging in ritualistic behavior. Thus, athletes often wear the same jocks or jersey throughout the duration of a winning streak, and many people carry good luck charms as insurance against misfortune. By the same token, a failure to take precautions

against a negative event is often believed to increase the likelihood that it will occur. For example, people believe that not carrying an umbrella may increase the likelihood of rain (Risen & Gilovich, 2008); that failing to carry medical insurance will increase their chances of becoming ill; and that discussing a negative event will bring it about.

A particularly intriguing aspect of superstitious beliefs is that they persist despite any evidence for their validity and often in the face of substantial evidence against them. Risen (2016) provides an exceptionally provocative review and analysis of the cognitive and motivational bases for this persistence that takes into account both heuristic and deliberative processes. She analyzes numerous instances in which individuals engage in behavior to avoid an undesirable event despite knowledge their action could not possibly have this effect. For example, they may wear a good luck charm while taking a test or being interviewed for a job. As Risen (2016; see also Risen & Gilovich, 2008) suggests, these actions might often be manifestations of applying the availability heuristic (Tversky & Kahneman, 1973). That is, the process of contemplating of not wearing a good luck charm may lead people to elaborate the negative consequences of this behavior, making the possibility of these consequences more vivid. Alternatively, they may be stimulated to construct a mental simulation of the consequences, making it easier to imagine and increasing beliefs its occurrence for this reason (Ross, Lepper, Strack, & Steinmetz, 1977). A similar process might underlie “magical thinking,” for example, the belief that simply mentioning the possibility of a negative event will increase its likelihood of occurrence.

There are several reasons why superstitious beliefs persist. For one thing, positive and neutral events are more likely to occur than negative ones. Thus, superstitious behaviors that are performed in order to avoid a negative event or lead to a positive one may fortuitously be reinforced even though the same outcome would have occurred in the absence of the behavior. Another reason is pragmatic. That is, even though the likelihood that a behavior will help to avoid a negative outcome is remote, the negative consequences of not engaging in the behavior are so great that people decide to engage in it “just in case.” Pascal’s bet is a well-known example. That is, although the likelihood that a Christian god exists is extremely low, the consequences of not conforming to Christian rituals if there *is* a god are too terrible to contemplate. Engaging in prayer and other ritualistic behavior might be partly a result of such pragmatic considerations.

Although superstitious beliefs are largely irrational, they may actually have a positive impact on motivation and behavior. Damisch, Stoberock, and Mussweiler (2010) found that participants who carried a good luck charm while engaging in an achievement activity increased their confidence that they would perform, and as a result, they actually performed better than participants who had been physically separated from their lucky charm while performing the task. As the authors point out, it was unclear from their studies whether having a lucky charm close to them increased confidence and performance or being separated from the lucky charm decreased it. Be that as it may, the fact that the superstitious beliefs affect actual performance is provocative.

### ***Indirect Effects of Knowledge Accessibility on Beliefs***

The preceding discussion provides examples of the effect of activating a subset of knowledge on beliefs to which it is directly relevant. In many cases, however, people estimate the likelihood of a situation occurring when no direct information about it is available. For example, they might consider the occurrence of an event in the future, or of a past event whose occurrence cannot possibly be verified. In such cases, people must use indirect means of estimating the likelihood of the event’s occurrence. This can often require reasoning, based on knowledge of the contextual factors that are likely to surround the event and are likely to facilitate or inhibit it. In some cases, this reasoning may conform to formal rules of syllogistic reasoning. In other cases, the inferences may involve reasoning that is not strictly logical.

*Syllogistic Processes in Belief Formation*

When people have no direct knowledge of the validity of a proposition, they may infer its validity on the basis of their beliefs in other propositions that have implications for it. For example, suppose people are asked to estimate the likelihood that global warming will increase by 5 degrees within the next 10 years. They might base their estimate on their belief that industries will continue to pollute the atmosphere and that, if this is so, global warming will increase. However, they might also take into account the possibility that industries will *not* continue to pollute and the implications of this possibility for the likelihood of global warming. People's overall belief that the global temperature will increase 5 degrees may be influenced by their beliefs in each of these possibilities.

Note that the aforementioned beliefs the premises of two syllogisms of the form "A; if A, then C" and "not A; if not A, C," each of which implies a conclusion "C." A formal model, based on McGuire's (1960) probabilistic theory of belief formation and change, captures these syllogistic inference processes (Wyer & Goldberg, 1970; Wyer & Hartwick, 1984). This model has the form:

$$P(C) = P(A)P(C/A) + P(\sim A)P(C/\sim A), \quad [1]$$

where  $P(C)$  and  $P(A)$  are beliefs that two propositions,  $C$  and  $A$ , are true and  $P(C/A)$  and  $P(C/\sim A)$  are beliefs that  $C$  is true if  $A$  is and is not true, respectively. If these beliefs are assessed along a scale of likelihood from 0 (not at all) to 10 (definitely) and divided by 10 to convert them to units of subjective probability, this equation provides a surprisingly accurate a quantitative description of the relation among these beliefs. (The standard error of the difference between predicted and obtained estimates of  $P(C)$  is typically less than half a scale unit without the use of curve-fitting parameters; Wyer, 1970, 1975.) Thus, it can be used to assess the "Socratic effect" (McGuire, 1960), that is, an increase in the consistency of beliefs over time once the beliefs are made salient (Rosen & Wyer, 1972).

Note that if the components of Equation 1 were true probabilities, the equation would be consistent with the laws of mathematical probability theory. However, other relations among beliefs do not conform to these laws (Wyer, 1976). As Henninger and Wyer (1976) concluded, the equation is more likely to describe a conditional inference process. That is, persons estimate the likelihood that a proposition  $C$  is true by (a) first identifying a relevant "informational" proposition ( $A$ ) that and happens to be easily accessible in memory, then (b) estimating their conditional beliefs that  $C$  is true if  $A$  is and is not true and finally (c) subjectively averaging these conditionals, weighting each by their beliefs that  $A$  is and is not true, respectively.

The close quantitative fit of Equation 1 allows it to be an effective diagnostic tool in understanding the basis for people's beliefs in a proposition when more than one criterion can potentially be applied. For example, suppose two propositions,  $A_1$  and  $A_2$ , could potentially be used as a basis for reporting beliefs in a target proposition  $C$ , the relative accuracy of the equation in describing the relations among the beliefs associated with each proposition could provide an indication of which proposition is actually applied (Wyer & Hartwick, 1980, 1984).

*Nonlogical Inference Processes*

McGuire's (1960, 1981) conceptualization assumes that people apply principles of syllogistic reasoning in drawing inferences on the basis of information. However, nonlogical inference processes can underlie beliefs well. For example, a proposition of the form "If  $X$ , then  $Y$ " should logically imply that "if not- $Y$ , then not  $X$ ." In fact, however, individuals who are given this information are more inclined to infer that "if  $Y$ , then  $X$ " rather than to infer the logically equivalent relationship (Wyer, 1977; see also Wason, 1966). Put another way, people are likely to treat conditional relationships as if they were biconditionals.

The disposition to treat conditionals as biconditionals can account for a number of judgmental heuristics of the sort identified by Tversky and Kahneman (1973, 1974). For example, people may have learned that, if instances of a category occur frequently, they are easy to recall. Based on this knowledge, they may infer that if instances are easy to recall, they have occurred frequently. Thus, in Tversky and Kahneman's (1973) classic example of the "availability heuristic," persons incorrectly infer that there are more English words that begin with "k" than words that have "k" as the third letter because the former words come more easily to mind.

The "representativeness heuristic" provides a second example. People often believe that members of a particular social category typically possess a circumscribed set of attributes. Consequently, they may infer that if people have this set of adjectives, they are likely to be members of the category. Thus, as Tversky and Kahneman (1974) found, American college students who are told that a person is short, has dark hair and reads poetry are likely to believe that the person is more likely to be a Chinese studies professor than an engineering professor despite the fact that engineering professors greatly outnumber Chinese studies professors at most American universities.

Other examples can be easily generated. For example, people who believe that high-quality commercial products are expensive are likely to infer that an expensive product is of high quality. If people have learned that the details of temporally remote events are difficult to remember, they may infer that an event is difficult to recall in detail, it is temporally remote (Brown, Rips, & Shevell, 1985). If people believe that an event occurred a long time ago, they can remember many things that occurred in the interim; consequently, they can remember many things that occurred since a particular event, they may estimate that the event occurred less recently (Ahn, Liu, & Soman, 2009; Dong & Wyer, 2014). Or, because people know that things that are likely to occur are easy to imagine, they may infer that if they can easily imagine an event, it is likely to occur (Ross, Lepper, Strack, & Steinmetz, 1977; Sherman, Skov, Hervitz, & Stock, 1981).

### ***Effects of Previously Acquired Knowledge on Comprehension***

Beliefs are obviously not formed on the basis of previously acquired knowledge alone. Many beliefs are based on new information about their referent that is presented in the situation at hand. An interpretation of this information and a construal of its implications are based on previously formed concepts and knowledge about the type of objects and events to which the information refers. Consequently, the interpretation depends on what concepts and knowledge happen to come to mind easily at the time.

Research that confirms the impact of knowledge accessibility on the interpretation of information has been reviewed in detail elsewhere (Förster & Liberman, 2007; Higgins, 1996; Wyer, 2008; Wyer & Srull, 1989). In many instances, the concepts and knowledge that are applied come to mind for reasons that is unrelated to the information being interpreted. For example, if people receive information that a person goes skydiving and wants to cross the Atlantic in a sailboat, they might interpret the behavior as either "adventurous" or "reckless," depending on which of these concepts happens to have been employed in an unrelated task they performed earlier (Higgins, Rholes, Jones, 1977). These effects can occur even when participants are not consciously aware of the conditions that gave rise to their activation (Bargh & Pietromonaco, 1982).

When information consists of several interrelated features, more complex representations of knowledge may be activated and used as a basis for interpreting it. Thus, for example, the description of a person's dinner at Biaggi's might be interpreted in terms of a more prototypic "restaurant script" that specifies the sequence of events that typically occur (Graesser, 1981; Graesser, Gordon, & Sawyer, 1979). (For an elaboration of the processes that underlie the use of prototypic event schema in interpreting situation-specific occurrences, see Trafimow & Wyer, 1993.) Bransford and his colleagues (Bransford, Barclay, & Franks, 1972; Bransford & Johnson, 1972; Bransford & Stein,

1984) provide compelling examples of statements that appear uninterpretable (e.g., “the haystack was important because the cloth would rip”) can be interpreted meaningfully by providing a single word (e.g., “parachute”) that activates a large body of knowledge to be brought to bear on them and permit them to be understood.

Of particular relevance to the issues of concern in this chapter are the implications of Principle 2e. That is, when a previously formed representation is activated for use in interpreting information, unmentioned features that are contained in the representation may be added to the new representation that is formed. Consequently, when the latter representation is retrieved and used as a basis for judgment, these features may be later recalled as having actually been mentioned in the information that was presented and can affect beliefs that are based on the representation. A classic example is reported by Loftus and Palmer (1974a,b). After seeing a picture of an automobile accident, participants were asked how fast the car was going when it either “hit the tree” or “smashed into the tree.” Participants reported that the car was going faster in the second case than in the first. Moreover, they were later more likely to report seeing glass at the scene of the accident in the second case. Participants apparently reconstructed their mental representation of the accident in response to the question they were asked, adding features that were consistent with the question and later recalling the features as actually having been mentioned.

The role of previously acquired knowledge representations on beliefs may be particularly evident in reconstructing the past. Detailed episodic memories of a specific experience fade over time and thus are more likely to be reconstructed on the basis of more general knowledge about the type of experience in question. In other research, Loftus and her colleagues demonstrated these effects on eyewitness testimony (Loftus, 1975; Davis & Loftus, 2007) and memory for sexual abuse in childhood (Loftus, 2000, 2005; Davis & Loftus, 2004). In the latter case, persons are likely to have only a vague memory of interactions with their parents when a child. Consequently, leading questions and suggestions can lead them to intrude features of these interactions that are consistent with a prototypic representation of child abuse that they have heard or read about and to use this reconstruction as a basis for beliefs they report later.

These examples have a more general implication. That is, inferences that are made in order to reconcile the co-occurrence of different events can become part of the representation of the sequence of events as a whole and later be “remembered” as actually having occurred. In a study by Spiro (1977), participants read a story about an engaged couple who got into a heated argument because the woman wanted children and the man did not. After reading the story, the experimenter incidentally mentioned that the couple actually got married and were happily together. Upon receiving this incidental information, participants spontaneously made inferences about unmentioned events that would allow it to be reconciled with the information they had read. Consequently, they recalled these inferences 1 month later as actually having been part of this information. (For example, they reported that the woman found she couldn’t have children or that the man changed his mind.) A study by Sedikides and Anderson (1992) reported analogous findings in a quite different domain.

### ***Interference Effects of Mental Representations***

The preceding studies provide examples of situations in which the construction of a new mental representation overrides the impact of the original information on which it was based, leading to intrusions or distortions of the information’s implications. When a mental representation is formed on the basis of new information, it is likely to be recalled and used as a basis for judgment independently of this information (Carlston, 1980; see Postulate 6 in this chapter). Therefore, if the new representation is used as a basis for recalling the original information, the information may be remembered inaccurately. Studies of face recognition by Schooler (e.g., Schooler & Engstler-Schooler, 1990) provide evidence of this interference. That is, people who had written a description



of a face were less accurate in identifying the face than people who had not engaged in the writing task. Moreover, the process of generating written descriptions appears to induce a more general encoding strategy that decreases the accuracy of recognizing other faces as well (Dodson, Johnson, & Schooler, 1997).

Similar conclusions in a quite different paradigm were drawn by Adaval and Wyer (2004). Individuals who had watched a movie later wrote down their impressions of the actor or described what went on. As in Schooler's research, participants were inaccurate in recognizing details of the movie if they were relevant to their writing task. That is, the things the protagonists said were relevant to participants' impressions of them, but things they did were not. Therefore, participants who had written about their impressions were less accurate in identifying things the protagonists said but were accurate in recalling things they did. However, both things the protagonists said and things they did were relevant to a description of what went on. Consequently, persons who had described what went on were inaccurate in identifying both types of items.

### ***Implicational Molecules and Implicit Theories***

A substantial part of the knowledge we acquire consists of general beliefs about ourselves and the world in which we live. For example, we learn that glass will typically break when it is dropped on the floor, not brushing one's teeth leads to tooth decay, people with similar values like one another, and things that occur frequently are easy to remember. These generalizations are typically used as rules of thumb both to explain events that have occurred in the past and to predict their occurrence in the future. As Wyer and Carlston (1979); Wyer, 2004) note, these generalization, which function as *implicit theories*, can sometimes be decomposed into sets of interrelated propositions, or *implicational molecules*. These molecules theoretically influence beliefs according to a "completion principle"; that is, if all but one proposition in a molecule are instantiated in terms of a specific situation one encounters, an instantiation of the remaining proposition is spontaneously inferred. Thus, if we have the molecule [X is glass; X will break when dropped on the floor], we not only might predict that if a glass dish will break if it is dropped on the floor but also might infer that an object that broke when it was dropped had been made out of glass. Or, a decomposition of the generalization that things that occur frequently are easy to recall, [X occurs frequently; X is easy to recall], might be used to infer that, if instances of an event come to mind easily, they probably occur frequently, as implied by the availability heuristic (Tversky & Kahneman, 1974). Thus, implicational molecules provide an alternative account of the disposition to treat conditional beliefs as biconditionals, as suggested in an earlier section of this chapter. Moreover, cognitive balance principles (Heider, 1958) and principles of social attribution (e.g., Jones & Davis, 1965) can be conceptualized as applications of implicational molecules (Wyer & Carlston, 1979; Wyer, 2004).

Although many implicit theories cannot be so easily reduced to implicational molecules, they may function similarly. Schank and Abelson (1995) postulate the existence of "story skeletons," or prototypic sequences of events, that people apply in understanding experiences they encounter. These skeletons are common in understanding and empathizing with anecdotal descriptions of others' experiences (e. g., being jilted by a boyfriend), explaining why they occurred, and giving advice about how to respond to them. The application of these stories in comprehending social experiences may be more the rule than the exception. Schank and Abelson (1995) asserted that almost all meaningful social knowledge was composed of stories that we use in comprehension and communication and provide a basis for inferences and explanations. They may also be used as a basis for reconstructive memory, as Loftus' (1975, 2000) research suggests.

Implicit theories can have a substantial influence on the beliefs that are formed on the basis of information about oneself and others. These effects are striking exemplified in the extensive work by Carol Dweck (1991) and her colleagues (Dweck, Hong, & Chiu, 1993; Dweck, Chiu, &



Hong, 1995). They note that some people acquire *incremental* theories about themselves and others, perceiving that people's traits and abilities are malleable and able to be changed through learning, whereas others acquire *entity* theories that imply that traits and abilities are fixed and unchangeable. The application of these theories in comprehending one's own and others' behavior can have profound effects on the interpretations of behavior and beliefs about its consequences. Entity theorists, for example, attribute poor performance on a task to an inherent lack of ability and are likely to quit, whereas incremental theorists are more inclined to attribute it to lack of effort and persevere. On the other hand, entity theorists are likely to attribute immoral or dishonest behavior to inherent characteristics of the offender and believe he should be punished and prevented from participating in society, whereas incremental theorists are more inclined to believe that offenders can be rehabilitated (Chiu, Dweck, Tong, & Fu, 1997).

One manifestation of entity theories is the belief in essentialism, that is, the notion that characteristics of race, gender, and other currently groups that are victims of social inequality are biologically determined and thus unable to be modified though social change (Kray, Howland, Russell, & Jackman, 2017; Medin & Ortony, 1989; Morton et al., 2009). These theories can provide the basis for social stereotypes and for justifying discriminatory behavior. Kray et al. (2017), for example, found that adopting an essentialist view of gender increased males' justification of gender inequality.

Implicit theories can influence not only perceptions of the present but reconstructions of the past (Ross, 1989). In one study, for example, women were asked to keep a daily diary of their emotions over the period of a month. After completing it, they were asked to recall the emotions they experienced during the time of their menstrual cycle. The emotions they reported were less strongly correlated with the actual emotions they had experienced than with their implicit theory of how they feel during the time of their cycle, reported before their diary was completed. In a second study (Conway & Ross, 1984), individuals who had participated in a study skills program were asked to recall their preprogram ability. Their responses were typically consistent with their implicit theory that the program was effective, independently of its actual effectiveness. Thus, participants whose ability had actually not been influenced by participating in the program recalled their preprogram ability to be less than they had actually estimated it at the time.

## **The Content and Structure of Belief-Relevant Knowledge**

The preceding sections focus on the role of previously acquired knowledge on the construction of beliefs. However, they generally did not consider the type of mental representations that have these effects and the processes that underlie their influence. This section focuses more specifically on both the content and structure of these representations and the processes that underlie their use.

Although the content and structure of knowledge representations can vary in many ways, three dimensions are of particular relevance to the concerns of this chapter. First, as Principle 2 indicates, the mental representations that underlie responses to information can be coded in different sense modalities. However, the primary modalities are verbal (semantic) and visual. Second, information can be represented either categorically (e.g., as a list of unrelated features that exemplify a concept of its referent) or as a temporally and thematically related sequence of events. Third, information can be represented either abstractly, referring to people or events in general (e.g., U.S. Presidents, a baseball game) or to specific ones (Barack Obama, the final game of the 2017 World Series). The effects of these factors can be interactive, as the following discussion indicates.

### ***Visual Versus Verbal Information Processing***

The influence of visual imagery in information processing is well established (Bower, 1972; Kosslyn, 1976, 1980; Lakoff & Johnson, 1980). Mandler and Pagan Canovas (2014) provide a detailed

conceptualization of the formation of “image schemas,” or analogical representations of spatial relationships and movement. Many characteristics of visual images are similar to those of pictures. However, they omit details that would be necessary in a picture of the stimulus to which they refer while adding other features that were not specified in a verbal description. Thus, an image that is stimulated by the statement, “the boy kicked the ball” is unlikely to contain the boy’s clothing or hair color but might contain a more detailed representation of the type of ball he has kicked. Although visual imagery clearly exerts an important influence on the representation of information, its impact on belief formation is less straightforward than it might appear.

Beliefs can be based on either verbal information, visual information, or both. Verbal descriptions of events that are temporally and situationally constrained are spontaneously elicit visual images in the course of comprehending them, forming a mental simulation (situation model) of the events (Wyer & Radvansky, 1999; Wyer, 2004; for more general discussions of situation models and their effects, see Johnson-Laird, 1983, 1989; Radvansky & Zacks, 1991). In contrast, visual depictions of events do not require the assignment of verbal labels in order to comprehend them. Consequently, this recoding may not be performed unless it is necessary in order to attain a goal to which it is relevant.

A study by Wyer, Adaval, and Colcombe (2002) confirms this asymmetry. Participants received information about a sequence of temporally related events. In one condition, the events were conveyed in a series of pictures, and in a second condition, they were described verbally. Later, participants were asked to verify the events on the basis of descriptions that were in either the same modality or a different one. When the events had initially been conveyed in pictures, participants took longer to verify them on the basis of verbal descriptions than on the basis of pictures. This indicated that the pictures of the events had not been coded verbally initially, and so the verbal descriptions presented later had to be recoded in order to verify them. When participants had initially received verbal descriptions of the events, however, they spontaneously encoded them visually as well as verbally. Consequently, they later were able to verify the events quickly regardless of whether the test stimuli were pictures or verbal descriptions.

Other studies provide compelling evidence that verbally described events are spontaneously coded visually in the course of comprehending them (Black, Turner, & Bower, 1979; Garnham, 1981; Glenberg, Meyer, & Lindem, 1987) In Glenberg et al.’s (1987) study, for example, participants read a story about a man who engaged in a sequence of activities. The story began with the statement either that “John put on his sweatshirt and went jogging” or “John took off his sweatshirt and went jogging.” Later, participants were given a recognition memory test for items that were mentioned in the story. Although “sweatshirt” was never again mentioned after the opening sentence, participants apparently formed a visual image of John either wearing a sweatshirt or not, and this image persisted throughout the sequence the events that occurred. Consequently, “sweatshirt” was more salient at the time of recognition in the first condition than it was in the second condition and was able to be verified more quickly.

### *Effects of Visual Imagery on Beliefs*

When people form visual images from verbal information, the vividness of these images can increase the extremity of judgments based on them. This could be true even if the vividness of the image per se is irrelevant to the judgment being made. Furthermore, vivid images are more likely to persist over time. In a study by Reyes, Thompson, and Bower (1980), participants read the summary of a court case in which a man after leaving a party was accused of drunken driving. Prosecution evidence included a statement that the man at the party had bumped into a table and either (a) knocked something onto the floor or (b) knocked a dish of guacamole dip onto the hostess’s white shag rug. Defense testimony included a statement that, upon leaving the party, the man had been able either (a) to jump out of the way of a car or (b) to jump out of the way of a shiny red Volkswagen. When

participants made judgments immediately after reading the transcript, they were equally likely to believe the man was guilty or innocent. After a delay of several days, however, they were more likely to favor the verdict whose evidence had elicited a vivid visual image.

Other characteristics of verbal information can influence the vividness of the visual images that are formed and the strength of the beliefs that are based on these images. According to construal level theory (Trope & Liberman, 2010), values along different dimensions of psychological distance (temporal, physical, social and probabilistic) are related. That is, an event is likely to be judged as less likely to occur (i.e., as psychologically more distant) if it is temporally or physically distant than if it is close. For example, people may believe they are more likely to receive a prize if they imagine themselves being physically close to it than if they imagine themselves being distant from it (Yan, 2014).

This difference has further implications. Images, like pictures, are constructed from a given perspective, and the perspective from which they form the image of an event can affect their perceptions of their distance from it. For example, the statement, “a terrorist came into the restaurant and shot three customers” elicits an image of the event from the perspective of someone in the restaurant. In contrast, “a terrorist went into the restaurant and shot three customers” elicits an image from the perspective of someone outside. As Jiang and Wyer (2009) found, people report experiencing more extreme emotional reactions to statements of the first type than to statements of the second type. Thus, according to construal level theory, they are likely to believe that the event is more likely to have occurred in the former case.

The positive impact of visual imagery in advertisements for unfamiliar products demonstrated by Dahl, Chattopadhyay and Gorn (1999). These images can sometimes be formed spontaneously. For example, if consumers are confronted with a purchase decision, imagining themselves using the product in anticipation of the decision can increase their likelihood of choosing it (Shiv & Huber, 2000). When constructing an image is difficult or requires cognitive effort, however, this effect is not evident (see also McGill & Anand, 1989). In fact, it can have a negative, boomerang effect. In a series of studies by Petrova and Cialdini (2005), participants were explicitly encouraged to imagine themselves experiencing a vacation trip. If they had high chronic imaging ability, constructing these images increased their willingness to purchase the vacation package. If they had low imagery ability, however, or if the images elicited by the ad were vague, encouraging them to construct visual images had a *negative* impact on their purchase intentions.

Other research also provides evidence of individual differences in the extent to which people intentionally form visual images on the basis of information they receive (Childers, Houston, & Heckler, 1985) and in the vividness of the images they construct (Pham, Meyvis, & Zhou, 2001). Thus, the different emotional reactions observed by Jiang and Wyer (2009) occurred only among participants who reported a tendency to construct visual images when they comprehended information. More general cultural differences in responses to visual information have been identified by Tavassoli and Lee (2003).

### *The Role of Imagery in Narrative Comprehension*

When the information that people receive describes several unrelated events, they may encode the implications of each event separately. When the events are temporally and thematically related, however, people may construct a narrative-based representation of the sequence of events as a whole (e.g., an episode model; see Wyer & Radvansky, 1999). The effectiveness of narrative-based representations of knowledge was identified by Pennington and Hastie (1986, 1988, 1992). Jurors in a simulated murder trial were more persuaded by testimony that was conveyed in “story order” (e.g., when evidence concerning events leading up to the crime were presented first, followed by evidence surrounding the incident itself and evidence concerning its aftermath) than when it was organized according to the witnesses who presented it.

Visual imagery can play a role in these effects. A series of studies by Adaval (Adaval, Isbell, & Wyer, 2007; Adaval & Wyer, 1998) showed that the effects of visual images elicited by pictures can depend on which type of representation is formed. In one study, for example (Adaval et al., 2007), participants received information about the career of a political candidate. In some conditions, the information was conveyed in a temporally ordered narrative, and in other conditions, it was conveyed in an ostensibly unordered list. Furthermore, a picture of the candidate was either presented or not. When the verbal information was temporally ordered, the visual image elicited by the picture provided cognitive “glue” that increased perceptions of the story’s cohesiveness and increased its effectiveness. When the information was conveyed in a list, however, participants construed the implications of each piece independently and integrated their separate implications a more mechanistically. In this case, the picture interfered with this integration process and decreased the impact of the information.

A quite different study by Wyer et al. (1991) provided further evidence that visual images can influence the implications of verbal information. Participants first viewed a videotape of a political candidate giving a nonpolitical testimonial for a local dignitary. The candidate’s appearance and general demeanor was varied over conditions. Then, either immediately after seeing the speech or a day later, they listened to a radio program sponsored by the League of Women Voters in which the candidate’s views on a number of social issues were summarized. The views conveyed either a generally liberal ideology or a conservative one. After receiving this information evaluated the candidate, participants reported their positions on the issues and described their personal political orientation.

The candidate’s appearance had a general impact on judgments, confirming findings reported by Englis (1994). (For more general evidence that people’s physical appearance can have an impact on perceptions of credibility, see Brownlow, 1992.) However, it also influenced responses to the verbal information, and this was true regardless of its evaluative implications. When the candidate’s speech was not salient at the time participants evaluated the candidate, they based their evaluations on their agreement with the candidate’s issue positions independently of the ideology that the positions conveyed. When the speech was salient, however, participants based their evaluation on the similarity between the ideology conveyed by the candidate’s issue stands and their own ideology, independently of their agreement with specific issues.

### *Effects of Processing Difficulty*

As Adaval et al.’s studies indicate, the processing of pictures and the images they elicit do not always have a positive impact on judgments to which they pertain (see also Petrova & Cialdini, 2005). When people are motivated to form a coherent narrative-based representation of a sequence of events and the image elicited by the information is difficult to integrate, the disposition to form visual images can increase the perception of the incompatibility the events and decrease the effect of the information. A series of studies by Jiang and his colleagues (Jiang, Steinhart, & Wyer, 2009; Jiang, Adaval, Steinhart, & Wyer, 2014) confirmed this possibility. In a typical study, participants received pictures of a hotel that conveyed views from either inside the hotel or outside. The pictures were ordered so that, in some cases, pictures that were taken from the same perspective were presented together, but in other cases, pictures taken from different perspectives were together. Participants with instructions to imagine themselves visiting the hotel found it more difficult to do in the latter case and evaluated the hotel less favorably.

There are qualifications on this conclusion. For example, participants with a set to acquire information about the hotel perceived that more information was presented when pictures that were taken from different perspectives were presented together and evaluated the hotel *more* favorably in this condition. Moreover, when participants were simply told to form an impression of the hotel without being explicitly instructed to imagine themselves visiting it, the effects depended on

whether participants were spontaneously disposed to form visual images and did not occur when persons were inclined to process information verbally (Jiang et al., 2009).

Further considerations arise when the implications of a sequence of events is implausible. In this case, visual images constructed on the basis of the information can increase the salience of their implausibility and decrease the effectiveness of the information on judgments to which it pertains. Participants in a study by Hung and Wyer (2008) received an advertisement for a product that described (a) a problem that people might have, (b) a product that would potentially solve the problem, and (c) the solution. However, the modalities in which the problem and solution were conveyed were manipulated independently. In an ad for a hair restorative, for example, the problem was conveyed by either a picture of a man showing hair loss or by the statement, "hair loss is a serious problem for men," and the solution was conveyed by either a picture of a man with a full head of hair or the statement, "hair loss is much less apparent." When one element of the ad was pictured and the other was conveyed verbally, individuals interpreted the verbal information in a manner that was consistent with the picture, and so the ad had a positive impact on judgments. When both elements were pictured, however, participants were aware of the ad's implausibility and counter-argued its implications, decreasing its effectiveness relative to conditions in which one element was conveyed verbally.

### ***Categorical Representations of Information: The Effect of Stereotypes***

When information describes a temporal sequence of events, visual imagery can play an important role in the representation that is formed of it. In many cases, however, the information about a referent is categorical, consisting of a set of items that are unrelated except for their common association with the person or object to which they refer. The construction of these representations and the processes that underlie their formation was proposed by Srull and Wyer (1989). A particularly important type of categorical representation on which beliefs are frequently based is a *stereotype*, consisting of a central concept and a set of trait and behaviors that are associated with it. For example, a stereotype of a lawyer might include "talkative," "articulate," "dishonest," "prepares briefs," "questions witnesses," etc.

A general conceptualization of the conditions in which people use stereotypes was proposed by Fiske and Pavelchak (1986; see also Fiske & Neuberg, 1990). That is, when individuals receive information about a person who ostensibly belongs to a social category, they first make a global appraisal of the similarity of the person's features with those that define the category and, if there is a sufficient match, base their judgment on their beliefs about the category as a whole. If, however, the target does not exemplify the typical category member, recipients performed a piecemeal analysis of his or her individual features and based their judgments on the results of this analysis instead.

The question becomes what constitutes a sufficient match. Lambert and Wyer (1990) noted that individuals differ in not only the attributes they believe to characterize the average member of a category but also the variability of category members with respect to these attributes. For example, most individuals are likely to believe that priests are moral on average, but some people may believe that priests vary considerably in morality whereas others may believe that priests are fairly homogeneous in this regard. This difference has implications for the extent to which a particular priest's behavior is considered to be atypical.

To examine these implications, participants whose perceptions of the homogeneity of priests had been predetermined were told that a particular priest had embezzled money and were asked to judge his morality. Participants who believed that priests' morality varied over a wide range perceived the target to fall within this range. Therefore, they based their judgments of the target on their perception of the average priest, rating him as more moral than control participants did. When participants considered priests to be homogeneous with respect to morality, however, they

perceived the target's morality to be outside the range of priests in general. These participants used their perceptions of priests in general as a standard of comparison, judging the target to be less moral than control participants did.

Lambert and Wyer's (1990) findings are consistent with Fiske and Pavelchak's (1986) assumption that the extent to which people's use of a stereotype depends on their perception of its applicability. However, other factors can come into play. For one thing, individuals may be more likely to use categorical criteria as a basis for judgment if (a) these criteria are accessible in memory and (b) alternative criteria are difficult to apply. Studies by Bodenhausen and his colleagues confirm these contingencies. In one study (Bodenhausen & Wyer, 1985), participants read the case file of a person who had committed assault in a bar. In one condition, the evidence in the case file was incriminating, and in another condition, it was exonerating. When the name of the defendant was nondescript, participants based their belief that he was guilty on the case file information. When the defendant was described as Jose Ramirez from Albuquerque, New Mexico, however, they based their beliefs on their stereotype of Hispanics as aggressive, and the case file information had little effect.

Assessing a person's guilt is a relatively complex task, and so a stereotype is particularly likely to be used as a heuristic basis for these judgments. If a judgment does not require much cognitive effort, however, people may not invoke a stereotype. Bodenhausen and Lichtenstein (1987) confirmed this possibility but showed that the critical factor was not the difficulty of the judgment that people actually made of a person but rather, the complexity of the judgment they *expected* to make of the person at the time they received information about him. Participants received a case file similar to that employed by Bodenhausen and Wyer and were told to read it for the purpose of either (a) deciding the defendant's guilt (a complex judgment) or (b) estimating his aggressiveness (a simple judgment that could be inferred directly from his behavior). After reading the information, however, they judged both the defendant's guilt and his aggressiveness. Participants apparently formed different representations of the defendant at the time they received information about him, depending on the judgment they expected to make, and used this representation as a basis for *both* of the judgments they reported later. Thus, participants who expected to judge the defendant's guilt believed him to be both guilty and aggressive when a stereotype had been activated. However, participants who expected to judge his guilt believed him to be both less aggressive and less guilty, regardless of whether a stereotype had been activated or not.

### *Stereotype Suppression*

The use of a stereotype to judge a single category member is often considered to be undesirable and people may consciously avoid doing so. However, the conscious suppression of a stereotype can backfire, increasing its effects when people are no longer monitoring the behavior. Wegner and Erber (1992) found that conscious attempts to avoid thinking about an object increase the object's accessibility in memory. Based on this evidence, Macrae, Bodenhausen, Milne, and Jetten (1994) gave participants a picture of a skinhead and asked them to write a description of him but, in doing so, to avoid thinking about the person's category membership. Compared to control subjects who were not given these instructions, these participants (a) responded more quickly to stereotype-related words in a subsequent lexical decision task, (b) evaluated a different member of the stereotyped category more negatively, and (c) avoided seating close to a member of the category when waiting for another experiment.

The question is how to accomplish the avoidance of a stereotype. Perhaps the best way of stimulating individuals to avoid the use of one categorical criterion is to induce them to use a *different* criterion, thereby decreasing the accessibility of the first one (Macrae, Bodenhausen, & Milne, 1995). Thus, for example, disposing persons to think of an Asian woman as an Asian can decrease the disposition to stereotype her as female.



## The Role of Procedural Knowledge on Belief Formation and Change

The beliefs that people form on the basis of new information they receive can depend on not only the implications of the information itself but also the cognitive procedures that they use in construing its implications. Several of the procedures used to construe these implications were noted earlier in the context of discussing visual information processing, the construction of narrative-based versus list-based representations of information, and the use of global versus piecemeal criteria bases for judgments. The use of these procedures, however, is largely determined by the type and form of the information presented and the relative difficulty of applying them.

When more than one strategy could be used in arriving at a judgment or decision, the procedure selected is likely to depend on the likelihood that it comes to mind at the time a judgment is made. These strategies could vary along many dimensions. For example, people might either focus on global features of a stimulus or engage in a detailed analysis of its individual features; they could elaborate the implications of information or counterargue its validity; they might compare choice alternatives on the basis of their relative superiority along specific dimensions or make an overall evaluation of each alternative separately. The selection of a strategy could depend in part on the type of information to be processed and the ease of applying it in the situation at hand. However, it could also depend on the relative accessibility of the procedure in memory at the time.

### *The Role of Behavioral Mindsets*

The selection of these alternative procedures is therefore governed by Principle 2. On one hand, procedures that have been used frequently in the past may become chronically accessible in memory and applied automatically, without awareness, under conditions in which they are applicable. On the other hand, behaviors that have been employed in the course of attaining a goal in one situation can activate behavior-related concepts that, once accessible in memory, influence the strategy that is applied in a later, unrelated situation in the pursuit of a different goal to which the strategy is applicable. The latter process, which characterizes the effect of a behavioral *mindset* (Wyer & Xu, 2010; Wyer, Xu, & Shen, 2012) or, in some cases, a behavioral *production*, could be applied without awareness of the conditions that gave rise to its activation. Numerous examples of the impact of mindsets on beliefs and behavior have been documented, only a few of which are provided below.

### *Types of Mindsets*

#### DELIBERATIVE AND IMPLEMENTAL MINDSETS

The best-known examples of a mindset are provided by Gollwitzer (1990) and his colleagues (Freitas, Gollwitzer, & Trope, 2004; Gollwitzer & Bayer, 1999; Gollwitzer, Heckhausen, & Steller, 1990). They distinguish between a *deliberative* mindset, which involves a consideration of alternative decision strategies, and an *implemental* mindset, which involves the implementation of a strategy that has already been selected. If these mindsets are activated in one situation, they can influence behavior in other situations as well. Thus, inducing a deliberative mindset, which involves the contemplation of alternative courses of action, can increase uncertainty about the decisions made in a later, unrelated situation. In contrast, an implemental mindset, which involves the single-minded engagement in an activity without considering alternative possibilities, can increase confidence in later decisions; increase the extremity of beliefs in attitude-relevant issues (Henderson, de Liver, & Gollwitzer, 2008); increase perceptions that one is invulnerable to risk (auto accidents, divorce, etc.) (Taylor & Gollwitzer, 1995); and bias self-perceptions toward positive attributes without thinking about negative ones (Bayer & Gollwitzer, 2005).



A related phenomenon is the shopping momentum effect identified by Dhar, Huber, and Khan (2007). They found that inducing persons to make a purchase of a product at one point in time activated an implemental mindset that decreased their consideration of alternative courses of action and consequently increased their likelihood of making another purchase later.

#### WHICH-TO-CHOOSE MINDSETS

The shopping momentum effect governs decisions of whether to buy a single product or not. When a decision involves multiple alternatives, participants must decide which product to buy as well as whether to buy anything at all. A mindset could influence decisions in these conditions as well. Moreover, the effect of the mindset might generalize over content domains. In a series of studies by Xu and Wyer (2007, 2008), people first compared animals with respect to a physical attribute (e.g., “which is larger, an elephant or a zebra?”). Then, they were given two choice alternatives and asked to decide whether to choose one, the other, or neither. In the absence of a mindset, participants apparently evaluated each alternative separately and decided not to choose anything if neither alternative was above a minimum threshold of acceptability. However, making comparative judgments activated a “which-to-choose” mindset that led participants to compare the alternatives and to choose the one that was relatively more superior regardless of whether it met the standard they would normally consider acceptable. Thus, it increased their likelihood of choosing which of two products to purchase and which of two dating partners to select rather than choosing neither. Moreover, it increased the likelihood of buying a snack that was on sale after the experiment.

#### UNCERTAINTY AVOIDANCE

In a study by Muthukrishnan, Wathieu, and Xu (2009), participants were first asked to make a series of gambles. In one condition, the payoff associated with each choice alternative was clear. In a second condition, the payoff resulting from choosing one of the options was uncertain, leading participants to avoid choosing it and inducing an “uncertainty avoidance” mindset. In a later task, participants were asked to choose between a product with inferior attributes from a well-known company and a product with superior attributes from an unknown company. Participants with an uncertainty avoidance mindset were significantly more likely to choose the name brand than control participants were.

#### BOLSTERING AND COUNTERARGUING

In a study more directly related to belief formation (Xu & Wyer, 2012), some participants first reported their thoughts about a series of propositions with which they agreed (e.g., “reading is good for the mind”) whereas others reported their thoughts about propositions with which they disagreed (e.g., “reading is bad for the mind”). They were expected to elaborate the positive implications of the statements in the first case but to counterargue the implications of the statements in the second, thereby inducing a bolstering or counterarguing mindset, respectively. As a result, participants in the first condition reported stronger beliefs that they would eat not only an appealing food but also an undesirable one. A further study showed that, when participants were confronted with a decision to make a charitable donation to Unicef, the desirability of which was difficult to refute, inducing a counterarguing mindset increased participants’ belief that the alternative was desirable rather than decreasing it and increased their willingness to donate.

In a third study, participants heard a speech by a presidential candidate that they either favored or opposed. Participants who liked the candidate, and consequently elaborated the content of his speech, were later more persuaded by a speech extolling the virtues of Toyota than participants who disliked the candidate and consequently counterargued the candidate’s speech.

The effect of bolstering and counterarguing in response to a persuasive communication has been studied extensively (Johnson, Wolf, & Maio, this volume; see also Wegener & Carlston, 2005). In this research, however, these processes were typically stimulated by the inconsistency of the message's implications with individuals' a priori opinions. The evidence that these dispositions can also be induced by situational factors that are irrelevant to the content of the message is therefore rather provocative.

#### COUNTERFACTUAL THINKING

Counterfactual thinking involves a consideration of reasons why an event should not have occurred. Contemplating such reasons might induce a disposition to entertain alternative courses of action and consequently decrease confidence in one's decisions. (To this extent, its effect may be similar to that of a deliberative mindset, as noted earlier.) Thus, in a study by Hirt, Kardes, and Markman (2004), participants who had generated alternative hypotheses concerning which television sitcom would win an award became less confident of their prediction that their favored team would win the NBA playoffs.

#### ANCHORING AND ADJUSTMENT

Some participants in a study by Schwarz and Wyer (1985) rank ordered a number of social issues from most important to least important. Others ranked the issues from least important to most important. Still other participants ranked them from either most to least trivial or from least to most trivial. Participants were then asked to rate the alternatives along either a category scale of importance or a scale of triviality.

Although the design of this study was complex, the results were very simple. That is, participants who ranked from most to least developed a disposition to think about high values before low values whereas those who ranked from least to most developed a set to think about low values before high ones. These dispositions then influenced the end of the response scale they used as an anchor and biased the judgments they made in the manner implied by an anchoring-and-adjustment heuristic (Tversky & Kahneman, 1974). Consequently, participants who ranked from most to least made higher ratings along the scale than those who had ranked from least to most, and this was true regardless of the ranking criteria they had used and regardless of the attribute they rated. (Thus, participants who had ranked issues from most to least importance rated the issues as both more important along a scale of importance and more trivial along a scale of triviality than participants who had ranked the issues from least to most important. Moreover, ranking with respect to triviality had identical effects.)

#### SUBJECTIVE EXPERIENCE

Mindsets can also be activated by internal states. Xu, Schwarz, and Wyer (2015) found that participants who were interviewed just before lunch, and presumably were hungry, reported stronger willingness to acquire not only foods but also nonfood objects than participants who were interviewed after lunch. Thus, the desire to acquire food activated an "acquisition" mindset that generalized to objects that were objectively unrelated to hunger, and this was independent of their reported liking for these objects.

Other subjective experiences can induce a mindset as well. For example, jealousy often results from perceptions that the attention one expects to receive from one's relationship partner is being usurped by another. These feelings can induce an attention-getting mindset that influences preferences for eye-catching products that are available in an unrelated situation (Huang, Dong, & Wyer,

2017). Moreover, this is true even if the product is likely to be used in situations that are likely to elicit social disapproval.

### *Global Processing*

A more general processing mindset, which has broad implications for the impact of information on beliefs and judgments, concerns the disposition to process information globally or, alternatively, to focus on specific details. If this disposition is activated in one domain, it can influence the criteria applied in making inferences in these domains. Extensive research on the effects of activating a global versus “local” mindset was reviewed by Förster and Dannenberg (2010). In this research, a disposition to focus on either global or more detailed features of a stimulus was induced by exposing participants to a large figure composed of small ones—e.g., a large “H” formed from a number of small “L”s (Navon, 1977) or a large square formed from a number of small triangles (Kimchi & Palmer, 1982)—and asking them to identify either the large figure or the small figures that compose it. Focusing on the large figure apparently leads people to think more broadly. Consequently, it increases the number of novel responses generated in a creativity task (Förster & Dannenberg, 2010). For similar reasons, a global mindset leads people to judge their ability to be similar to that of a target whereas a local mindset leads them to use the other as a standard of comparison, producing contrast effects (Förster, Liberman, & Kuschel, 2008).

The general dispositions to process information globally or locally have implications for other theories in which these dispositions play an important role. As noted earlier, construal level theory (Trope & Liberman, 2010) assumes that people’s disposition to use abstract or concrete (e.g., situation-specific) bases for judgment depends on their perception of the psychological distance between themselves and the stimulus being judged. To this extent, inducing a global or local processing mindset could dispose people to encode stimuli more or less abstractly, and this, in turn, could influence perceptions of their psychological distance from the stimuli. Thus, as Liberman and Förster (2008) found, activating a global (vs. local) mindset using the Navon (1977) letter-identification task led participants (a) to estimate that a longer time would elapse before they visited a free dental clinic, (b) to perceive themselves to be less close to members of their family, (c) to estimate a greater physical distance between themselves and another country, and (d) to believe they would be less likely to become a leader in their field.

People’s disposition to process information globally or concretely can influence not only their interpretation of specific pieces of information but also the type of information they select for use as a basis for judgment. That is, people are inclined to use global features of a product if they do not consider purchasing it until some time in the future but focus on concrete, situation-specific features if they consider purchasing it immediately (Trope & Liberman, 2000).

Many other situational factors can influence the disposition to process information globally or locally. Schwarz, Bless, and Bohner (1991), for example, hypothesized that people who feel happy tend to view their immediate situation as benign and to construe its implications globally without thinking carefully about it, whereas unhappy people view the situation as problematic and consequently are disposed to attend to details. These dispositions could also influence behavior in situations to which construal level theory pertains. When people have a goal of making a good decision, for example, happy persons may be more inclined to base their judgment of a stimulus on global features alone whereas unhappy persons may consider concrete, situation-specific features as well (Chen & Wyer, 2015). Thus, the implications of construal theory are more likely to be confirmed in the former case than in the latter. This difference reverses when people have an enjoyment goal. In this case, participants process more information if they are happy than if they are unhappy, and so construal level theory is less likely to be supported in the former case (Chen & Wyer, 2015).

### *Regulatory Focus*

Other determinants of the features that people take into account when making a judgment are implied by Higgins' (1997, 1998) conceptualization of regulatory focus. That is, individuals with a promotion orientation are likely to focus on positive consequences of a decision without considering the negative consequences that the decision might have. In contrast, individuals with a prevention orientation are more motivated to avoid negative outcomes and focus on features that facilitate this avoidance regardless of the positive consequences that might result. For example, if people are confronted with a choice between two stimuli, one of which has values of +3 and -3 along two dimensions and the second of which has values of +1 and -1 along the dimensions, a promotion-focused individual would presumably choose the first alternative but a prevention-focused person would choose the second.

As Higgins (1997) suggests, a promotion focus can be induced by the belief that one falls short of one's ideal self whereas a prevention focus can result from the belief that one falls short of the way that others would like one to be. Both situational and individual difference factors can influence these beliefs and the behavior that results from them. For example, Briley and Wyer (2002) found that inducing people to believe that they were participating in an experiment as individual induced a promotion orientation and increased their preference for outcomes that maximized the likelihood of positive consequences. Leading them to believe they were participating as part of a group, however, induced a prevention orientation, leading them to choose options that minimized the likelihood of negative consequences. Chronic cultural differences in these orientations also exist. For example, Asians typically have a collectivist orientation and think of themselves in relation to others whereas Westerners are more likely to have an individualistic, independent self-construal (Triandis, 1995; Markus & Kitayama, 1991). Thus, Asians are more inclined to have a prevention orientation, as manifested in their greater emphasis on the avoidance of negative outcomes of their behavior (Briley, Morris, & Simonson, 2000). Moreover, bicultural Hong Kong participants' orientation can be influenced the language in which the experiments are conducted (Briley, Morris, & Simonson, 2005).

### *Goals Versus Mindsets*

A distinction should be made between the generalization of a procedure for attaining a goal and the generalization of the goal itself. Because goals and the behaviors associated with their attainment are strongly associated (Kruglanski et al., 2002), the effects can sometimes be difficult to separate. However, the likelihood that a goal generalizes over situations can depend on its desirability. In contrast, the behavior that is governed by a mindset can often generalize over situations regardless of the desirability of the goals with which it is associated.

Shen, Wyer, and Cai (2012) confirmed this distinction. In one study, for example, participants performed a speech-shadowing task that led them to speak either quickly or slowly. Moreover, this was done under conditions that led their goal of speaking quickly to be viewed as either desirable or undesirable. When participants were later asked to complete a questionnaire and a goal of completing it quickly was activated, their speed of completing the questionnaire depended on whether the goal of speaking quickly was perceived to be more or less desirable. When a goal of completing the questionnaire quickly was not activated, however, participants completed it more quickly if they had spoken quickly in the first task than if they had spoken slowly, and this was true regardless of the goal with which the behavior was associated.

Behavior can sometimes become associated with positive or negative affect, and this affect can determine whether the behavior is performed or avoided. Nevertheless, Shen et al.'s findings call attention to the difference between the generalization of a goal concept over situations and the generalization of a behavior that is associated with the goal. As Kruglanski et al. (2002; Kruglanski &

Stroebe, 2005) point out, a goal concept can be associated in memory with several alternative sequences of behavior-related concepts, each of which describes an alternative means of attaining the goal. At the same time, a given behavior concept may be part of a sequence that is relevant to the attainment of more than one goal. Therefore, the pursuit of a goal in one situation can activate behavioral concepts that are also relevant to a quite different goal, and these concepts, once accessible in memory, can influence the strategy that is selected to attain this goal. This may occur without thinking about the goal that initially activated it.

These considerations place a different complexion on the notion of “unconscious goal activation” (Chartrand & Bargh, 2002; Chartrand, Huber, Shiv, & Tanner, 2008; Custers & Aarts, 2010) or, alternatively, “unconscious goal pursuit” (Chartrand, Cheng, Dalton, & Tanner, 2010; Chartrand, Dalton, & Chen, 2008). That is, they suggest that the activation of a goal concept in one situation may influence the behavior that is applied in pursuing a different goal in a later situation to which the behavior is relevant. However, this can occur without thinking about either the goal that activated the behavior or other goals other goals to which the behavior might happen to be *relevant*. However, the fact that a behavior is relevant to the attainment of a goal does not imply that the goal is being pursued unconsciously.

A study by Chartrand and Bargh (1996) provides an example. Participants were unobtrusively primed with concepts associated with either memory or impression formation. In an unrelated task, they were asked to comprehend a series of behaviors and later were unexpectedly asked to recall them. Participants’ recall protocols indicated that their spontaneous organization of the behaviors in memory was similar to that of participants who are explicitly told either to remember the behaviors or to form an impression of the person they described (Hamilton, Katz, & Leirer, 1980). However, these results do not necessarily reflect the effect of unconscious goal activation or unconscious goal pursuit. Rather, as in Shen et al.’ study, concepts activated by the priming task may have activated a behavioral mindset that affected participants’ interpretation and organization of the behaviors they processed later in pursuing a different goal. This processing was obviously relevant to the goal that was activated by the priming task. However, this does not necessarily imply that participants were unconsciously pursuing this goal any more than it implies that they were unconsciously pursuing any other, unmentioned goal to which they behavior might fortuitously have been related.

### ***Social Influences on Beliefs***

Information is typically exchanged in a social context. People receive information from a particular source, albeit another person or the media. Moreover, they communicate information to others. Regardless of whether they are a recipient of information or a communicator of it, the social context in which the information is exchanged can have a substantial impact. In the first regard, individuals’ interpretation of a message they receive can depend on not only the literal implications of the message but also their perceptions of why it was transmitted and the meaning the source intends to convey. At the same time, people who communicate information to others may tailor their message in a way that the recipient will understand. The implications of this latter possibility for belief processes is suggested by evidence that although individuals tailor their message others’ expectations, a representation of their message is retained in memory. Consequently, it may later be retrieved and used as a basis for their own beliefs out of the context of the conditions that led it to be formed (Carlston, 1980; Higgins & Rholes, 1978).

### ***Social Influences on Comprehension***

The processes that underlie the exchange of information in a social context have been analyzed by Grice (1975; see also Higgins, 1981; Sperber & Wilson, 1986; Wyer & Gruenfeld, 1995). Grice

postulates a number of principles of communication that are applied both by a communicator in transmitting a message and a recipient in construing the message's implications. For example, communications should be informative (to convey information that the recipient does not already have), they should convey the truth as the communicator sees it, and they should be relevant to the topic under discussion. Other norms are situation- or domain-specific. For example, communications exchanged in an informal conversation should be polite (i.e., they should not unduly offend the recipient) and modest (they should not unnecessarily extol one's own successes and virtues) (Wyer, Budesheim, Lambert, & Swan, 1994). Advertisements, on the other hand, are intended not only to be informative but also to convey favorable features of the product or service being advertised.

The informativeness and relevance principles are often applied spontaneously in everyday conversation. Consider the following interchanges:

- Q. Why did John pass the exam?  
A. He went to bed early the night before.  
Q. Why did John pass the exam?  
A. He stayed up late the night before.  
Q. Why did John fail the exam?  
A. He stayed up late the night before.

To understand the responses to these questions, one must spontaneously invoke both the informativeness principle, inferring that John's behavior was atypical and one must rely upon one's prior knowledge to infer the relevance of the answers to the question being asked. Thus, one is likely to infer from the answer to the first question that John normally stays up late but went to bed early to be sure he was alert at the time of the exam. However, the answer to the second question suggests that John stayed up late studying, but the answer to the last question suggests that John stayed up partying. These inferences are likely to influence beliefs about John's personality and motivation.

When individuals receive a communication, they are likely to assume that these norms are employed by the communicator in constructing it and interpret it accordingly. Thus, if a message's literal meaning does not conform to a norm, they are likely to construe its *intended* meaning in a way that is consistent with it. A study by Gruenfeld and Wyer (1992) identified implications of these reinterpretations. Participants read a series of statements that were ostensibly taken from either an encyclopedia or a newspaper. Several of the statements asserted the validity of propositions that participants were unlikely to believe on a priori grounds (e.g., "Lyndon Johnson was responsible for the assassination of John Kennedy"). Other statements denoted the validity of propositions that participants already assumed to be false (e.g., "Lyndon Johnson was *not* responsible . . .") and thus were objectively uninformative. Later, both these participants and control participants reported their beliefs that the propositions were true.

Encyclopedias are typically intended to preserve archival knowledge and not to convey new information. Consequently, participants took the statements from this source at face value and were positively influenced by them. That is, they believed more strongly in a target propositions when its validity was asserted than when it was denied. When the statements came from a newspaper, whose objective is to convey new information, this was not true. When a statement from a newspaper denied the validity of a target proposition that recipients already believed to be untrue, they attempted to interpret the statement in a way that would make it informative. Thus, they speculated that there might, in fact, be reason to believe that the proposition was true, making a denial of its validity informative. As a result, recipients *increased* their beliefs in the proposition relative to control conditions. In fact, this increase was nearly as great as the increase produce by a statement that asserted the proposition's validity.



As noted earlier, people assume that advertisements are intended to persuade recipients by conveying convey favorable information about the product being advertised. They may therefore attempt to interpret advertising claims in a way that is consistent with this assumption. Advertisers often exploit this tendency. Thus, they make assertions that appear to convey new information but in fact are meaningless. For example, ads often make “incomplete” claims (e.g., “Brand X’s sound quality is better”); recipients who attempt to make such claims informative may infer their completion (e.g., “better than most other brands”) and may later remember their completion of the claim as actually having been stated. Ironically, this strategy may be more effective when persons are more involved in the ad and consequently are more motivated to expend the cognitive effort required to make the inference (Johar, 1995).

A second advertising strategy involves the use of puffery. If recipients read that “Brand X contains shedigira extract,” they might infer that (a) shedigira extract is a favorable attribute and (b) other products are unlikely to have it. If recipients read that “Brand X contains *no* shedigira extract,” however, they might infer that shedigira extract is undesirable and that other products *do* have it. These inferences might be made even though recipients actually have no idea what “shedigira extract” actually is.

When recipients have general knowledge about the type of product being advertised, however, the aforementioned strategy may backfire. In a study by Xu and Wyer (2010), participants who believed they had either more or less knowledge about fabrics than their peers were exposed to an ad for a down jacket. The ad ostensibly appeared in either a poplar magazine or a magazine that was primarily read by fashion experts. Finally, the ad either contained puffery (meaningless descriptions of the product’s attributes) or did not. When the ad had ostensibly appeared in a magazine that was read by fashion experts, recipients assumed that although they could not personally understand the puffery, it was likely to be informative to persons to which the ad was directed and were positively influenced by it. This was also true when the ad came from a popular magazine and recipients believed they had relatively little knowledge about fabrics. When recipients believed they had more knowledge than the typical reader of the ad, however, they apparently inferred that, if they could not understand the meaningless attributes, other couldn’t understand it either and that it was intended only to persuade and not to inform. In this case, therefore, the puffery decreased the impact of the ad.

Unpublished dissertation research by Yixia Sun (2015) also suggests that violations of the informativeness principle in advertising can backfire. Participants received an ad for either chocolate or coffee that contained a picture of an energetic man. Participants were unlikely to associate chocolate with providing energy, and so they considered the ad to be informative. In contrast, the implication that coffee provided energy was redundant with recipients’ general knowledge and violated the informativeness principle. In this case, therefore, recipients attempted to identify alternative interpretations of the ad that would make it informative but were unable to do so. Consequently, they judged the ad to be difficult to comprehend, were less confident of their interpretation of it, and judged the product less favorably than they did when the ad was for chocolate.

### *Effects of Question Wording on Beliefs*

Subtle differences in the phrasing of a communication can influence recipients’ inferences about the message’s implications and consequently can influence the beliefs they report. These differences were identified in a quite different series of studies by Schwarz and his colleagues on the cognitive processes that underlie survey responses (Schwarz, 1994, 1996). For one thing, they find that the range of choice alternatives that individuals are given in a survey can influence their perception of the response that the questioner considers to be normative and that this can influence their beliefs about themselves. norms. This, in turn, can affect their self-evaluations. In a typical study (Schwarz,



Hippler Deutsch, & Strack, 1985), some participants were asked to report their television viewing habits along a scale that either ranged from “less than half an hour a day” to “over 4 hours a day,” whereas others were asked to report it along a scale from “less than 4 hours a day” to “over 8 hours a day.” Thus, the first scale suggests that people watch less television on average than the second scale does. In fact, the average time that Americans spend viewing television is around 4 hours a day. Consequently, people are likely to infer that they watch more television than average in the first condition but watch less television than average in the second. Moreover, because they typically regarded watching television to be a waste of time, they reported themselves to be less satisfied with their life as a whole in the first case.

The range of response alternatives can also influence the subset of knowledge that individuals retrieve and use as a basis for their judgment. Participants in a study by Schwarz, Strack, Müller, and Chassein (1988) were first asked to indicate how frequently they felt “really irritated” along a scale that implied either a high incidence of the behavior or a low incidence and then were asked to provide examples of the behavior. They gave more extreme examples of the behavior in the first case than in the second.

#### NUMEROSITY EFFECTS

Research of a quite different type also suggests that subtle differences in the scale along which judgments are reported can influence the beliefs. For example, people who are given numerical information often base their judgments on the numbers assigned to stimuli independently of the unit to which the numbers pertain. Thus, for example, they are likely to judge that the difference between 2 feet and 4 feet is subjectively less than the difference between 24 inches and 48 inches (Pelham, Sumarta, & Myaskovsky, 1994). Or, they are likely to believe that products are more expensive when their price is conveyed in low-valued currency (e.g., Hong Kong dollars) than if it is conveyed in a high-valued currency (U.S. dollars). For example, they may be less willing to buy a product that is priced at \$156 Hong Kong dollars than a product that is priced at \$20 US dollars although the actual cost is the same ( $\$7.8 \text{ HKD} = \$1 \text{ USD}$ ) (Raghubir & Srivastava, 2002). If they think about the money they personally have available to spend, however, they are likely to believe that they have more money to spend in the former condition than the latter and to be more willing to make a purchase (Werthenbroch, Soman, & Chattopadhyay, 2007)

Another indication of the disposition to focus on numerical information independently of the units to which it pertains was reported by Tao, Wyer, and Zheng (2017). They found that persons who are uncertain about the implications of a score along a numbered scale are a likely to infer its implications from the numerical distance of the score from the scale endpoint to which it is closer. Consequently, they judge a score of 8 to be higher along a scale from 0 to 10 than they judge a score of 80 along a scale from 0 to 100, but judge a score 2 to be lower than a score of 20.

A quite different effect of response scale differences was reported by Schwarz et al. (1991). They found that people were more likely to report undesirable characteristics along a scale from 0 (not at all) to 10 (extremely) than along a scale from—5 to 5 with identically labeled endpoints. (For example, 34% of respondents reported that their success in life was below the midpoint of the first scale, but only 13% did so along the second scale.)

#### *Further Considerations*

The effects of other linguistic features of communication are also worth noting. For example, people respond more affirmatively to the statement, “Did you see the book on the table?” than to the statement, “Did you see a book on the table?” (Loftus, 1975; Loftus & Palmer, 1974a,b), as the first statement presumes that a book was in fact on the table but the second statement does not. In a

similar vein, many attributes are “marked,” in that they presume that they are applicable when used to describe a stimulus. Thus, “How honest is John?” has no implications for John’s honesty, whereas “How dishonest is John?” presumes that John is at least somewhat dishonest and the questioner is only asking *how* dishonest he is. Thus, these factors can obviously influence the beliefs that people form. The effect of question wording can have important implications for the reliability of witness’s courtroom testimony (Davis & Loftus, 2004). For example, the inferences that people make in response to questions about an event they witnessed are stored in memory and later may be recalled out of context as having actually been seen (Loftus, 2005).

A linguistic category model proposed by Fiedler and Semin (1988; Semin & Fiedler 1988, 1991)) distinguishes four ways in which implications of an event might be described: descriptive action verbs (e.g., gives, kicks); interpretive action verbs (e.g., helps, harms); state verbs (e.g., likes, hates); and adjectives (e.g., friendly, aggressive). These descriptors may stimulate different inferences about the cause of the event. For example, if a fight between John and Jerry is described as “John hit Jerry,” its cause is unclear. However, the statement that “John hurt Jerry” might be attributed to the actor and “John hates Jerry” might be attributed to the target. On the other hand, people typically believe more likely that concrete descriptions are true than abstract ones (Hansen & Wänke, 2011). These linguistic constructs may be applied spontaneously by a communicator and their implications may be inferred spontaneously by the recipients.

### ***Motivational Influences***

The preceding discussion has focused primarily on informational and situational factors that influence the formation of beliefs. However, motivational factors can come into play as well. Many motives can influence the formation and change of beliefs in response to information including the need for cognition (Cacioppo & Petty, 1982); the need for closure (Kruglanski, 1980); the need for certainty (Roney & Sorrentino, 1995); the need for accuracy (Kruglanski, 1980); the need for consistency (Festinger, 1957); and the need to present a positive self-image (Baumeister, 1997). (For more general discussions of the impact of motivation on attitudes and beliefs, see Earl & Hall, this volume.)

A central factor underlying the influence of many motivational constructs is the desire to maintain a positive view of oneself. The most influential theory in social psychology, cognitive dissonance theory (Festinger, 1957) was specifically concerned with the motivational effects of an inconsistency between one’s beliefs and one’s behavior on belief change. However, a refinement of this theory by Cooper and Fazio (1984) assumes that, for dissonance to be reduced, the belief that is threatened must have implications for oneself. Thus, inducing participants to think about their positive attributes, leading them to bolster their self-esteem, can decrease the effect of their counter-attitudinal behavior on belief change (Tesser, 2000).

The construct of “self” can be broadly conceived, referring not only to one’s physical self but also other persons or groups with which one identifies and considers to be central to one’s self-definition. There is abundant evidence that people are likely to form beliefs about themselves and others whose implications will put them in a positive light. For example, people are typically optimistic. That is, they believe that they will have success in life and will be happy despite evidence that threatens their happiness. For example, students predict they will remain happily married to their first spouse despite their knowledge that 50% of all marriages end in divorce (Kunda, 1987, 1990). This is apparently because they attribute characteristics to themselves that are uniquely conducive to an enduring relationship.

The tendency to attribute positive outcomes to their own characteristics but failure to self-irrelevant external factors is well-known. An early study by Arkin, Gleason and Johnston (1976), for example, provided evidence that individuals take responsibility for a failure only if they cannot

plausibly attribute it to extrinsic situational factors but take responsibility for a success regardless of situational factors that might have accounted for it. That said, cultural differences may exist in these attributional dispositions and in self-perceptions more generally (Heine, Lehman, Markus, & Kitayama, 1999). Oishi, Wyer, and Colcombe (2000) found that although Americans typically attribute their successes to personal characteristics and their failures to external factors, East Asians typically attribute success to external factors and take responsibility for failure. (Interestingly, attributions of others' outcomes are the opposite; for example, Americans attribute others' success to external characteristics whereas Asians attribute them dispositionally.)

### *Beliefs in a Just World*

The effects of beliefs in a just world are worth considering in this context. Although initial conceptions focused on the effects of beliefs that the world is just in general (Lerner, 1980), more recent conceptualizations have distinguished between beliefs in a just world for others and beliefs in a just world for oneself (Lipkus, Dalbert, & Siegler, 1996; Khara, Harvey, & Callan, 2014). People's beliefs in a just world for others induces ego-defensive motives (Lerner, 1980); that is, they are motivated to believe that the world is generally just in order to convince themselves that they (admirable persons) will not personally fall victim to injustice. Thus, they derogate innocent victims of misfortune (Walster, 1966; Lerner & Simmons, 1966; Lerner, Miller, & Holmes, 1976; Wyer, Bodenhausen, & Gorman, 1985). In contrast, beliefs that the world is just for oneself can increase self-esteem (Dzuka & Dalbert, 2002) and decrease depression (Otto et al., 2006). Nevertheless, when people who hold these beliefs encounter a misfortune, however, they may be self-punitive, and this is true even when the misfortune occurs for reasons beyond their control (Callan, Kay, & Dawtry, 2014).

This research suggests that uncontrollable adversities can decrease people's beliefs in their self-efficacy and decrease achievement motivation. When adversities occur in a social context, they may influence people's social self-esteem (Heatherton & Polivy, 1991). That is, they can lead people to believe that others regard them as inferior and motivate them to acquire material goods that others are likely to admire; Huang & Wyer, 2008).

### *Mortality Salience*

People whose attention is called to their mortality appear to experience death anxiety, the consequences of which are widespread (Solomon, Greenberg, & Pyszczynski, 1991, 2004). On one hand, it can lead people to confirm their esteem in others' eyes. For example, it can increase their desire for products that might enhance their social image (e.g., suntan lotion) even though the use of these products could be detrimental to their longevity (Routledge, Arndt, & Greenberg, 2004). More generally, people's concern about their mortality can increase people's motivation to reaffirm their general worldview and the beliefs and values that they consider to be important. This can have diverse effects. For example, it increases conformity to others' opinions that exemplify cultural values (Renkema, Stapel, & Van Yperen, 2008) and leads people to adopt beliefs and behaviors that exemplify culture-defined standards. Cai and Wyer (2015), for example, found that inducing mortality salience led individuals to base their donations to a charity on the magnitude of others' contributions (an indication of the social desirability of contributing) rather than on the need for help. Similar motives can lead mortality salience to decrease the novelty of choices made in a product selection task (Huang & Wyer, 2015). When normative standards conflict, in which case the effects of mortality salience can depend on the particular norms that happen to be salient at the time (Jonas et al., 2008; see also Gailliot et al., 2008). For example, Halloran and Kashima (2004) found that mortality salience influences conformity to ingroup norms and the rejection of outgroup norms. However, these dispositions depend on which "ingroup" happens to be salient.

### ***Effects of Affect and Subjective Experience on Beliefs and Behavior***

The effects of subjective difficulty described earlier (Schwarz, 2004) exemplify people's use of their feelings and subjective experience as bases for the judgments and decisions they make. The most common examples of this influence are provided by the extensive research on the impact of affect as information (Clore & Schnall, this volume; Schwarz & Clore, 1983, 1996, 1988; Wyer, Clore, & Isbell, 1999). That is, people often use the affect they are experiencing at the time they judge a stimulus as information about their feelings toward the stimulus and use it as a basis for their reactions to it. Moreover, this can be true even though the affect is a result of extraneous factors that are irrelevant to the stimulus they are evaluating. Particularly relevant to the phenomena of concern in this chapter is evidence that affect can influence the amount and type of information that people use as a basis for judgment or decision and, as a result, can influence beliefs to which the information is relevant.

At least four, quite different examples of these effects are worth noting. First, people may use their feelings as a basis for assessing the benevolence of the situation with which they are confronted and, therefore, the degree to which they need to think carefully about the judgments or decision they make (Schwarz, Bless, & Bohner, 1991). Thus, happy people are less sensitive than unhappy people to the quality of arguments presented in a persuasive message and are consequently more likely to accept the message's implications regardless of whether these arguments are strong or weak (Bless, Bohner, Schwarz, & Strack, 1990). Second, affective reactions can be used to evaluate not only the quality of the information contained in a message but also the quality of their cognitive responses to this information. Wegener, Petty, and Smith (1995) found that when a message contained strong arguments and stimulated recipients to elaborate their implications, those who were experiencing positive affect were more confident of their elaborations and thus were more persuaded by the message than control subjects. When the arguments in the message were weak and recipients were inclined to counterargue, happy participants were more confident of the quality of these counterarguments and consequently were *less* persuaded than control participants.

Third, if individuals are engaged in goal-directed activity, they can use the affect they are experiencing as information about whether their goal has been obtained (Martin, Ward, Achee, & Wyer, 1993). If people have an achievement goal that could require consideration of a number of pieces of information, they may use their affect as a basis for inferring whether the amount they have considered is sufficient to attain their objective. Therefore, they may stop processing sooner when they are happy than when they are sad. If, however, they are processing information for enjoyment, they may use their feelings as a basis for inferring whether they are attaining this goal and may persist longer if they feel happy than if they are not (Martin et al., 1993; Chen et al., 2015). Research on the use of stereotypes can be interpreted in this manner. In this research, a stereotype of a person is often activated first, before more specific information about the person. If this is so, and if persons' objective is to make a good judgment, they should stop processing sooner, and consequently be more influenced by the stereotype, if they are happy than if they are sad. In fact, this appears to be true (Bodenhausen, 1993).

Finally, the affect can influence perceptions of the applicability of information to a judgment or decision. For example, a decision of whether to spend or save money can depend in part on whether individuals perceive that the need for the money will be greater in the future or in the present, and this can be influenced by their mood at the time their decision is made. In a study by Cai et al. (2017), concepts of a "bitter life" were activated by asking participants to consume a bitter-tasting drink. They were then asked to imagine receiving a sum of money unexpectedly and asked if they would be likely to spend it or save it. Their decision depended on whether participants applied the concepts to their present life or their life in the future. Happy participants, who perceived that their present life situation was benign (Schwarz, Bless, & Bohner, 1991), believed the concepts to be

more applicable to their future life situation than to their present one and decided to save. Unhappy participants, however, were likely to apply the concepts to their immediate life circumstances and consequently were more inclined to spend the money to help alleviate these circumstances.

Subjective experiences can vary along many dimensions, however. In addition to feeling happy or unhappy, or uncertain or confident, people can feel tired, assertive, bored, powerful, embarrassed, or ashamed. These and other feelings can potentially have direct implications for judgments to which they are relevant and can also influence their interpretation of information and the features they select to use as a basis for judgments and behavioral decisions.

Many of these effects have been investigated in the context of research on embodied cognition (Barsalou, 1999, 2008; Barsalou et al., 2003; Niedenthal et al., 2005; for a review, see Schwarz & Lee, this volume). As Cai et al.'s (2017) study indicates, a subjective experience can activate semantic concepts that are metaphorically related to it, and these concepts can influence the interpretation of stimuli to which the experience is objectively unrelated. Thus, a drink that tastes bitter can activate concepts that affect the interpretation of one's current or future life and beliefs that one should spend or save money. Moreover, standing erect or in a stooped position can influence beliefs about one's assertiveness (Stepper & Strack, 1993) and activating facial muscles associated with smiling can increase estimates of the amusement elicited by cartoons (Strack, Martin, & Stepper, 1988). Carrying a heavy weight can influence perceptions of a social issue as "important" (Zhang & Li, 2012), and a fishy smell can affect suspiciousness of an experimenter's deception (Lee & Schwarz, 2012). Washing one's hands can influence gamblers' belief that a winning or losing streak has terminated and consequently can affect their betting behavior (Xu, Zwick, & Schwarz, 2012). In one of the more provocative demonstrations of the metaphorical impact of subjective experience (Lee & Schwarz, 2010), participants were induced to tell a lie either orally or on email. In a later product-choice task, participants who lied orally preferred mouthwash to other products whereas those who had lied over email preferred hand soap. Numerous other examples of the interplay of cognition, behavior and body sensations are reviewed by Niedenthal et al. (2005).

Conceptualizations of these effects are difficult to explain on the basis of most conceptualizations of mental representation. However, Barsalou's (1999, 2008) theory of perceptual symbol systems permits many of the phenomena to be interpreted. This conceptualization assumes that many concepts, beliefs, emotional reactions, and behavioral dispositions are grounded in physical experience (see also Lakoff & Johnson, 1980) and become associated, leading one associated feature to activate others. The implications of this conceptualization for belief and attitude processes deserve more extensive consideration.

### Future Directions

Despite its length, this chapter does not scratch the surface of the many phenomena in which beliefs come into information processing and the implications of these phenomena for attitudes and behavior. Many important areas of theory and research, notably the seminal research and theorizing by William McGuire (1960, 1964, 1981; McGuire & McGuire, 1991) although discussed in the earlier edition of this *Handbook* (Wyer & Albarracín 2005), are conspicuous by their absence.

In conceptualizing the determinants and effects of beliefs, we distinguished several different stages of processing at which they play a role, including comprehension, memory storage and retrieval, inferences, and the generation of an overt response or behavioral decision. Any conceptualization of the effect of information on judgments and decision necessarily makes implicit if not explicit assumptions concerning the stage and which these effects operate. However, the validity of these assumptions, and the implications of alternative assumptions concerning the point at which the observed effects are localized, are seldom specified. (For an exception, see Albarracín & Wyer, 2001.)



Most research on the organization of the concepts and knowledge to which beliefs pertain has considered the relations among a small number of cognitive elements. This approach avoids the confrontation of a much more challenging problem, concerning the manner in which beliefs associated with general knowledge is organized in memory (e.g., knowledge about the events that occurred during World War II) and factors that lead one belief to influence others. An initial attempt to specify the structure and operation of human thought systems was reported by William and Claire McGuire (1991). Based on individuals' spontaneous responses to propositions about the world and cognitive reactions to a change in the validity of these propositions, the McGuires developed a number of general principles that govern the way propositions about real-world events are associated and the likelihood that thinking about one proposition would stimulate thoughts about its antecedents and consequences (for a summary of this research, see Wyer & Albarracín, 2005). Aside from this pioneering effort, however, few attempts have been made to conceptualize the general structure of real-world knowledge and the subsets of this knowledge that people spontaneously activate and apply in the course of their daily life.

The McGuires' analysis makes salient an important conceptual issue. That is, beliefs per se may not be part of the cognitive system. Rather, they result from mental operations that are performed on propositions about past, present, and future events and lead estimates of likelihood or subjective probability to be computed. To this extent, a specification of the cognitive structure of general knowledge and a conceptualization of the processes that underlie the computation of beliefs on the basis of this knowledge are separate issues, each of which is worthy of investigation in its own right. However, the results of these investigations must ultimately be combined to provide a full understanding of the relations among beliefs, attitudes, and behavior.

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