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RESEARCH DIALOGUE

Metacognitive Experiences in Consumer Judgment and Decision Making

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Human reasoning is accompanied by metacognitive experiences, most notably the ease or difficulty of recall and thought generation and the fluency with which new information can be processed. These experiences are informative in their own right. They can serve as a basis of judgment in addition to, or at the expense of, declarative information and can qualify the conclusions drawn from recalled content. What exactly people conclude from a given metacognitive experience depends on the naive theory of mental processes they bring to bear, rendering the outcomes highly variable. The obtained judgments cannot be predicted on the basis of accessible declarative information alone; we cannot understand human judgment without taking into account the interplay of declarative and experiential information.

Most theories of human judgment assume that we form judgments on the basis of declarative information that is applicable to the target and happens to come to mind at the time of judgment (for reviews see Higgins, 1996; Wyer & Srull, 1989). Accordingly, we should evaluate a product more favorably the more positive attributes come to mind. Similarly, we should evaluate the validity of a product claim by drawing on relevant accessible knowledge about the respective content domain. These widely shared assumptions miss, however, that there is more to thinking than thought content. Our thought processes are accompanied by metacognitive experiences, such as the ease or difficulty with which some information can be brought to mind or the fluency with which new information can be processed. These experiences are informative in their own right and people draw on them in forming judgments and making decisions. As a result, their judgments and decisions often deviate from what one would predict on the basis of accessible declarative information. For example, consumers have been found to like a product less, the more positive attributes they brought to mind (e.g., Menon & Raghubir, 2003; Wänke, Bohner, & Jurowitsch, 1997) and to be more likely to defer choice the more reasons they generated for making a choice (e.g., Novemsky, Dhar, Simonson, & Schwarz, 2003). Other research found that people are more likely to endorse a statement as true when the color in which it is printed makes it easy rather than difficult to read (e.g., Reber & Schwarz, 1999) or when the words rhyme (e.g., McGlone & Tofighbakhsh, 2000).

Findings of this type are difficult to reconcile with content-focused models of judgment. Instead, they show that the subjective experiences that accompany the thought process qualify the implications of accessible declarative information, often to the extent that the judgment is opposite to what the accessible content seems to imply. What exactly people conclude from their metacognitive experiences depends on their naive theories of memory and cognition, that is, their assumptions about what makes it easy or difficult to think of certain things or to process new information. Moreover, people do not draw on their subjective experiences when their informational value is called into question, for example, when they have reason to assume that recall is only difficult because they are currently distracted by an unrelated event. This interplay between (a) accessible declarative information, (b) accompanying metacognitive experiences, (c) the perceived informational value of these experiences, and (d) the naive theories used to interpret them, gives rise to many complexities that cannot be accounted for on the basis of content-focused models of judgment.

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This article provides a selective review of what has been learned and offers a number of conjectures that await testing. The conceptualization offered here differs from my own earlier theorizing (e.g., Schwarz, 1998; Schwarz & Clore, 1996) by emphasizing the role of naive theories as a necessary link between people's experiences and the inferences they draw from them. The first section addresses the role of accessibility experiences, that is, the ease or difficulty with which the respective content can be brought to mind, in judgment and decision making. The second section addresses the influence of processing fluency, that is, the ease or difficulty with which new information can be processed. A final section highlights parallels between the use of these metacognitive experiences in judgment and the use of other sources of experiential information (namely moods, emotions, and bodily sensations) and addresses related conceptual issues.

ACCESSIBLE CONTENT AND ACCESSIBILITY EXPERIENCES: BEYOND WHAT COMES TO MIND

Suppose you are asked to list half a dozen outstanding new restaurants in Chicago. The first two or three easily come to mind; after that, the task becomes effortful and you have to search memory for additional candidates. But you eventually manage to complete your list of six excellent new restaurants. What do you conclude from the difficulty you experienced in coming up with six examples? That Chicago doesn't have many new outstanding new restaurants? That your memory for restaurants is poor and you can hardly recall them, even if you liked them? That new restaurants aren't very important to you and you hardly pay attention to them? That you really have other things on your mind and find it hard to concentrate on restaurants at the moment? Or that you don't know much about Chicago to begin with?

Each one of these conclusions is potentially plausible and entails a different metamemory theory that explains the experienced difficulty of recall. Some of these naive theories bear on the world out there, for example, that examples are easy to recall when there are many, and hence your difficulty probably reflects a lack of good new restaurants. Other naive theories pertain to the working of your own mind, for example, that it is hard to recall things one doesn't pay attention to. Yet others pertain to temporary situational influences, for example, that it is hard to recall things when one is preoccupied with something else. Which of these, or many other, naive theories of memory you draw on, will determine what you conclude from your recall experience. All of these conclusions, however, imply that the subjective experience is informative in its own right and provides information that goes beyond the implications of the recalled examples per se.

Moreover, the application of any one of these theories entails an explanation of the accessibility experience that renders the experience uninformative for judgments that require a different theory as an inference rule. Once you concluded, for example, that there aren't many outstanding new restaurants, it no longer follows that you simply have poor memory for restaurants; conversely, after you concluded that you have poor memory for restaurants, it no longer follows with any certainty that there aren't many new ones. And if you attribute your difficulty to being distracted by something else, or to being thoroughly unfamiliar with Chicago in the first place, your accessibility experience is uninformative for any of the other judgments.

This theory-driven nature of inferences from accessibility experiences implies that the same experience may give rise to many different conclusions, including conclusions that are mutually exclusive. Different judgment tasks recruit different applicable theories, although other contextual variables may also influence the accessibility of relevant theories and their application. Next, I illustrate the profound impact of accessibility experiences and subsequently review some of the naive theories of memory that determine their operation.

An Example

If judgments were solely based on what comes to mind, we should observe, for example, that a task that renders many of an individual's own assertive behaviors accessible in memory results in judgments of higher assertiveness than a task that renders only a few assertive behaviors accessible. Empirically, this is not the case. In an initial series of studies, we asked participants to recall either 6 or 12 examples of their own assertive or unassertive behavior (Schwarz et al., 1991). Subsequently, participants rated their own assertiveness. As shown in Figure 1, participants rated themselves as more assertive after recalling six examples of assertive behavior than after recalling six examples of unassertive behavior. Yet increasing the number of recalled examples not only failed to increase the difference but reversed the observed pattern: Participants who successfully recalled 12 examples of asser-

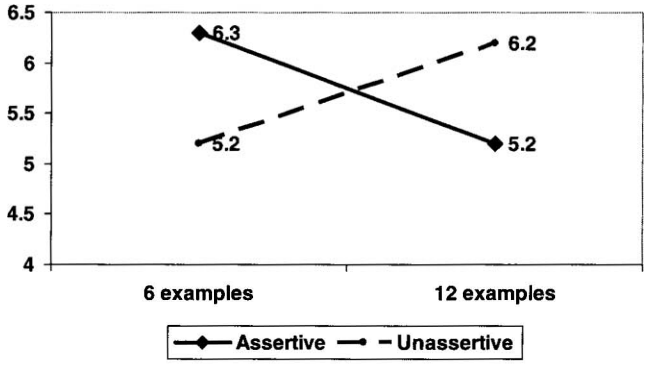

FIGURE 1 Self-reports of assertiveness as a function of valence and number of recalled behaviors. Note: *N* is 9 or 10 per condition. Mean score of three questions is given; possible range is 1 to 10, with higher values reflecting higher assertiveness (see Experiment 1, Schwarz, Bless, Strack, et al., 1991)

tive behavior rated themselves as less assertive than participants who recalled 12 examples of unassertive behavior. Moreover, those who recalled 12 assertive (unassertive, respectively) behaviors rated themselves as less (more, respectively) assertive than those who recalled only 6 examples.

Perhaps this reversal merely indicates that the quality of the examples deteriorated the more participants had to recall, leaving participants in the 12-examples condition with a poorer set of accessible examples? Content analyses indicated that this was not the case. Instead, the observed reversal reflected participants' experience that it was easy to recall 6 examples, but difficult to recall 12. This difficulty, in turn, presumably suggested to participants that they can't be so (un)assertive after all, or else it wouldn't be so difficult to come up with 12 examples. Supporting this interpretation, the impact of participants' subjective accessibility experience was eliminated when they were led to attribute the experience to the influence of background music played to them (Schwarz et al., 1991, Experiment 3), reversing the otherwise obtained pattern. In this case, they drew on the recalled content and reported higher (lower, respectively) assertiveness the more examples of assertive (unassertive, respectively) behaviors they had recalled.

Other studies provided converging evidence by isolating the role of accessibility experiences in different ways. For example, Stepper and Strack (1993, Experiment 2; see also Sanna, Schwarz, & Small, 2002) asked all participants to recall six examples of assertive or unassertive behavior, thus holding actual recall demands constant. To manipulate the experienced ease of recall, they induced participants to contract either their corrugator muscle or their zygomaticus muscle during the recall task. Contraction of the corrugator muscle produces a furrowed brow, an expression commonly associated with a feeling of effort. Contraction of the zygomaticus muscle produces a light smile, an expression commonly associated with a feeling of ease. As expected, participants who recalled six examples of assertive behavior while adopting a light smile judged themselves as more assertive than participants who adopted a furrowed brow. Conversely, participants who recalled six examples of unassertive behavior while adopting a light smile judged themselves as less assertive than participants who adopted a furrowed brow. Finally, Wänke, Bless, and Biller (1996) controlled for accessible content by asking some participants to generate a few or many examples and subsequently presented these examples to other, yoked participants. As expected, participants who actively generated examples drew on their accessibility experiences and were more influenced when the task requested few rather than many examples. In contrast, yoked participants, who merely read the examples generated by others, were more influenced the more examples they read.

In combination, these studies demonstrate that subjective accessibility experiences are informative in their own right and qualify the implications of recalled content. Moreover, people do not draw on their accessibility experiences when their informational value is called into question, paralleling earlier observations about the informational functions of moods (e.g., Schwarz & Clore, 1983; for a review, see Schwarz & Clore, 1996). Subsequent research highlighted, however, that the specific conclusions drawn from experienced ease or difficulty of recall or thought generation depend on the naive theory that people bring to bear on them, as illustrated by the restaurant example.

NAIVE THEORIES

Some naive theories of memory link one's recall experiences to the external world, whereas other theories trace them mostly to one's own state of knowledge or to situational influences. An analysis in terms of the underlying naive theories is conceptually useful, although different theories may occasionally lead to the same conclusions, as becomes apparent.

The World Out There

One naive theory that links one's recall experience to characteristics of the external world holds that the more exemplars exist, the easier it is to bring some to mind. This generally correct belief is at the heart of Tversky and Kahneman's (1973) availability heuristic and people infer higher frequency and probability when examples are easy rather than difficult to bring to mind. Because frequent exemplars are also more typical for their category, ease of recall further suggests that the examples that come to mind are relatively typical.

Most of the currently available studies can be interpreted in terms of this metamemory belief, which was the focus of our initial studies (Schwarz et al., 1991). Our results (see Figure 1) presumably reflected that participants drew on the ease or difficulty of recall to determine the frequency and typicality of the respective behaviors in making trait judgments. A host of other studies reliably replicated the less-is-more effect observed in our initial studies: Dutch students reported using their bicycle more often after recalling three rather than eight instances of bicycle use (Aarts & Dijksterhuis, 1999; see also Wänke, Schwarz, & Bless, 1995); British students liked Tony Blair more after listing only a few rather than many favorable thoughts about him (Haddock, 2002); German investors liked mutual funds more after listing only a few rather than many advantages they offer (Florack & Zoabi, 2003); American men inferred that they are at higher risk of heart disease after recalling few rather than many risk-increasing behaviors (Rothman & Schwarz, 1998; see also Raghubir & Menon, 1998); and students who had to generate only a few arguments in favor of an attitude position held this position with greater confidence than those who had to generate many arguments (Haddock, Rothman, Reber, & Schwarz, 1999; Haddock, Rothman, & Schwarz, 1996).

Throughout, experienced ease of recall or thought generation resulted in judgments that were consistent with recalled content, whereas difficulty of recall or thought generation resulted in judgments opposite to the implications of recalled content.

Moreover, application of this metamemory theory (The more exemplars exist, the easier it is to bring some to mind) can thwart the success of otherwise plausible strategies designed to debias judgment, as the case of hindsight bias may illustrate. After the outcome of an event is known, people assume that they knew it all along and could have predicted the outcome in advance (Fischhoff, 1975; see Hawkins & Hastie, 1990, for a review). To guard against this bias, people are often encouraged to search for reasons why the event might have turned out otherwise, thus counteracting the influence of outcome knowledge (e.g., Fischhoff, 1982a, 1982b). Yet the more they try to do so, the harder it is to generate such reasons—leaving them all the more convinced that there weren't many ways in which the event could have turned out otherwise. Hence, they conclude that the outcome was, indeed, inevitable, thus increasing rather than attenuating the size of the hindsight bias (Sanna & Schwarz, 2003; Sanna, Schwarz, & Stocker, 2002). Moreover, furrowing one's brow while thinking about counterfactual outcomes is enough to increase hindsight bias, whereas thinking about many reasons why the event just "had to happen" reduces hindsight, in contrast to what recommended debiasing strategies would suggest (Sanna, Schwarz, & Small, 2002). As these examples indicate, successful debiasing strategies need to take the interplay of accessible content and accessibility experiences into account, as Sanna and Schwarz (2004) illustrated for a broad range of temporal biases.

Other naive theories about one's memory and the world out there have received less attention. One relevant belief holds that details of recent events are easier to recall than details of distant events. Accordingly, we may expect that accessibility experiences affect event dating. Supporting this assumption, Xu and Schwarz (2004) observed that participants who had to recall 10 details of the Oklahoma City bombing inferred that it was more distant in time than those who had to recall 2 details.

My Mind

Another set of naive theories about accessibility experiences pertains to the working of one's own mind. One of them correctly holds that examples from categories that are well represented in memory are easier to recall than examples from categories that are poorly represented in memory. Accordingly, individuals use the ease or difficulty of recall to infer how much information about a category is stored in memory. For example, Winkielman, Schwarz, and Belli (1998) observed that participants who had to recall 12 childhood events subsequently rated their childhood memory as poorer than participants who had to recall only 4 events, despite the fact that the former had just recalled three times as many events. This effect was eliminated when the researchers acknowledged that most people would find the task difficult, thus allowing participants to attribute their difficulty experience to the nature of the task rather than their poor memory.

Other beliefs about the mind have received less attention, although initial results are promising. For example, people correctly believe that the more they know about something the easier it is to come up with examples and that things that are important to them are better represented in memory than things that are unimportant. Accordingly, accessibility experiences are likely to feed into judgments of interest, expertise, and personal relevance. Schwarz and Schuman (1997; see also Bishop, 1987; Lasorsa, 2003), for example, observed that survey respondents reported less political interest, and less attention to public affairs, after they had a difficult time answering political knowledge questions—unless they were induced to attribute their difficulty to poor media coverage. Conversely, attributing difficulty of recall to one's lack of knowledge renders the accessibility experience uninformative for judgments about the world out there (e.g., Biller, Bless, & Schwarz, 1992; Sanna & Schwarz, 2003). When asked to recall the names of 12 Spanish matadors, for example, you would hardly infer from recall difficulty that there aren't many matadors—after all, you're aware that you know little about bullfights. Accordingly, any experienced difficulty of recall is only informative when people assume some expertise to begin with. Consistent with this assumption, Tybout, Sternthal, Malaviya, Bakamitsos, and Park (in press) observed that accessibility experiences influenced consumer judgments when the brand was familiar, but not when it was unfamiliar.

As a specific theory relevant to persuasion, Wänke and Bless (2000) suggested that recipients of a persuasive message may assume that plausible and compelling arguments are easier to remember than specious ones. Consistent with this conjecture, they observed that the same argument was more influential the more contextual cues facilitated its recall, thus inducing an experience of ease. As may be expected on the basis of the observation that recipients only draw on argument quality under conditions of high processing motivation (Petty & Cacioppo, 1986), this theory pertaining to argument quality was only applied under high motivation conditions, but not under low motivation conditions. This presumably reflects that the relevant theory only came to mind when recipients considered argument quality to begin with.

Multiple Theories

Some findings are ambiguous with regard to the underlying memory beliefs and can plausibly be traced to several different naive theories, which may contribute to the robustness of the observed phenomena. For example, Novemsky, Dhar, Simonson, and Schwarz (2003) explored the impact of acces-

sibility experiences on product choice. In one of their experiments, participants read two product descriptions and were asked to rate how easy it would be to generate either 2 or 10 reasons for choosing one of them, expecting that they may later have to provide their reasons. Subsequently, participants had the opportunity to indicate their choice or to defer the decision to a later date. In the 2-reason condition, 49% opted for deferral, whereas 61% did so in the 10-reason condition. In a related experiment, the same manipulation doubled the size of a compromise effect in choice (Simonson, 1989) from 22% in the 2-reason condition to 44% in the 10-reason condition (Novemsky et al., 2003). Quite clearly, accessibility experiences affect choice behavior in important ways. The accessibility experiences produced in these experiments, however, may have affected participants' perception of how many advantages a given choice alternative has or how knowledgeable and competent they are in the respective domain. Either of these experience-based inferences may result in choice deferral or a compromise choice. Although such multiple pathways to the same outcome make for a robust phenomenon, it is worth noting that they may have differential implications for subsequent behavior. I would expect, for example, that deferrals based on a perceived lack of expertise generalize to other decisions in the same domain, whereas deferrals based on a perceived lack of good reasons to pick one of the specific alternatives do not.

Another phenomenon that can be traced to multiple naive theories is the influence of accessibility experiences on confidence. Tormala, Petty, and Briñol (2002; see also Haddock et al., 1996, 1999; Nelson & Narens, 1990) observed that ease of recall increases, and difficulty of recall decreases, one's confidence in the recalled content. Such differential confidence judgments may be derived from many of the naive theories discussed earlier: Higher confidence in the recalled content can follow from the belief that ease of recall indicates that there are many examples, that the recalled ones are highly typical, that I'm very knowledgeable about the domain, that I paid considerable attention to the domain, have good memory for events in the domain, and so on. The relation between these beliefs and confidence is asymmetrical, however, and high confidence per se does not allow the derivation of the other beliefs. I therefore consider confidence a derivative of the naive theories discussed earlier, although inferences of confidence may profoundly influence how we use recalled information.

Determinants and Consequences of Theory Selection

Given that different naive theories are applicable to the same accessibility experience, it is important to understand the determinants of their use. Earlier, I suggested that one key determinant is the judgment task itself, which presumably recruits a relevant theory that can serve as an applicable inference rule. I'd therefore expect, for example, that a person who finds it difficult to recall many examples of an event class infers (a) that there aren't many when asked about frequency (e.g., Aarts & Dijksterhuis, 1999); (b) that the relevant events happened a long time ago when asked about event dating (e.g., Schwarz, 2003); (c) that his or her memory for this information is poor when asked about memory quality (e.g., Winkielman et al., 1998); (d) that he or she isn't following events in this domain very closely when asked about interest (e.g., Schwarz & Schuman, 1997); or (e) to overestimate the level of background noise when asked about distraction, and so on. Although support for several of these predictions is available from different studies, they still await testing in one unified experiment.

Importantly, application of one theory typically renders most other theories inapplicable. Suppose, for example, that the first task (e.g., a frequency judgment) recruits a theory that entails an explanation of the experienced difficulty in terms of characteristics of the external world (e.g., there aren't many). Once this explanation is instantiated, the experience no longer bears on judgments that require a different theory as an inference rule, like judgments of memory quality or interest in the domain. After all, if this is a rare event to begin with, the fact that I can't recall many examples doesn't imply that I have poor memory—there simply aren't many examples. Accordingly, strong order effects should emerge in a series of judgments that require the application of different inference rules. At present, the relevant evidence is limited to studies that induced participants to explain their accessibility experiences in terms of situational influences (e.g., Haddock et al., 1999; Schwarz et al., 1991) or their own expertise in the respective domain (e.g., Sanna & Schwarz, 2003), prior to assessing other judgments. As expected, these manipulations render the accessibility experience nondiagnostic for subsequent judgments. Under these conditions, participants turn to recalled content to arrive at a judgment, reversing the otherwise observed patterns.

Finally, people's naive theories are highly malleable, to the extent that theories with opposite implications can be successfully induced. For example, Winkielman and Schwarz (2001) asked participants to recall either 4 or 12 childhood events, without further instructions with regard to the happy or sad quality of these events. Following this recall task, we suggested to some participants that unpleasant events might be poorly represented in memory because we avoid thinking about the "bad stuff," making it difficult to recall details of unpleasant periods of one's life. In contrast, we suggested to other participants that pleasant events might be poorly represented because we don't ruminate about the "good stuff," making it difficult to recall details of pleasant periods of one's life. As predicted, participants who had to recall 12 events, a difficult task, evaluated their childhood as less happy when the accessible metamemory belief entailed that negative life-periods are difficult to remember than when it entailed that positive life-periods are difficult to remember.

PROCESSING MOTIVATION

Complicating things further, individuals' reliance on accessible content versus accessibility experiences depends on the processing motivation they bring to the task. In most cases, judges are likely to rely on their accessibility experiences as a source of information when processing motivation is low, but turn to accessible content when processing motivation is high, even when this content was difficult to recall. This observation is consistent with the assumption that reliance on accessibility experiences is a heuristic processing strategy, whereas reliance on accessible content is a systematic processing strategy (Schwarz, 1998).

For example, Rothman and Schwarz (1998; for a conceptual replication, see Grayson & Schwarz, 1999) asked male participants to recall either a few or many behaviors that increase or decrease their risk for heart disease. To manipulate processing motivation, participants were first asked to report on their family history of heart disease. Presumably, this recall task has higher personal relevance for those with a family history of heart disease than for those without, once this history is rendered salient. As expected, men with a family history of heart disease drew on the relevant behavioral information they recalled. They reported higher vulnerability after recalling eight rather than three risk-increasing behaviors, and lower vulnerability after recalling eight rather than three risk-decreasing behaviors. In contrast, men without a family history of heart disease drew on their accessibility experiences, resulting in the opposite pattern. They reported lower vulnerability after recalling eight rather than three risk-increasing behaviors, and higher vulnerability after recalling eight rather than three risk-decreasing behaviors. These findings (and their conceptual replication by Grayson & Schwarz, 1999) suggest that individuals are likely to draw on their subjective accessibility experiences under low processing motivation, but on accessible content under high processing motivation.

Research into the interplay of mood and accessibility experiences provides further support for this conclusion. Earlier work showed that being in a happy mood fosters heuristic processing strategies, whereas being in a sad mood fosters systematic processing strategies (for reviews, see Schwarz, 2002; Schwarz & Clore, 1996). Drawing on this work, Ruder and Bless (2003) expected that people in an induced happy mood would rely on their accessibility experiences, whereas people in an induced sad mood would rely on recalled content. Four studies consistently supported these predictions. Finally, Florack and Zoabi (2003) observed higher reliance on accessibility experiences among participants low in need for cognition. In combination, these findings suggest that variables that commonly foster heuristic processing will also foster reliance on accessibility experiences.

Although this generalization is likely to hold for many recall and thought generation tasks, Wänke and Bless (2000) reported an interesting exception. As already noted, they assumed that individuals may hold the belief that it is easier to remember plausible and compelling arguments rather than specious ones. If so, they may consider a given argument more compelling when they find it easier to recall. To manipulate participants' accessibility experience, Wänke and Bless provided participants with retrieval cues that made it either easy or difficult to recall a given argument from a previously presented message. As expected, participants were more persuaded by the same argument when this manipulation facilitated its recall. Consistent with the general observation that argument quality is more likely to influence attitude judgments under high processing motivation (for reviews, see Eagly & Chaiken, 1993; Petty & Cacioppo, 1986), this effect was more pronounced under high than low motivation conditions.

This finding suggests that motivation may influence the recruitment of relevant naive theories. Under high motivation, recipients of a persuasive message focus on message content, which renders message related beliefs (e.g., plausible arguments are easier to remember) relevant to the task. When relying on the number of arguments as a heuristic cue, on the other hand, participants may recruit the belief that when there are many arguments, it is easy to recall some, rendering accessibility experiences more influential under the low motivation conditions that facilitate reliance on peripheral cues. These conjectures, and the role of motivation in the recruitment of naive theories, await further research.

Summary

In sum, the reviewed research indicates that the ease or difficulty with which information can be recalled, or relevant thoughts can be generated, is informative in its own right. Which conclusions people draw from their accessibility experiences depends on which of many potentially applicable naive theories they apply. In many cases, a relevant theory is recruited by the judgment task itself, although other contextual influences may bring theories to mind that are unrelated to the task. Whenever the accessibility experience seems uninformative for the task at hand, people instead turn to recalled content. As a result, judgments are (a) consistent with the implications of accessible content when recall was experienced as easy, but (b) opposite to the implications of recalled content when recall was experienced as difficult, unless (c) the informational value of the accessibility experience for the judgment at hand is called into question through the application of a different naive theory (e.g., I lack expertise, I was distracted, and so on). Accordingly, the truism that judgments depend on the applicable declarative information that comes to mind at the time of judgment fails to capture the complexity of the underlying processes. Put simply, there is more to thinking than what comes to mind. Similar considerations apply to the processing of new information, as the next section illustrates.

PROCESSING FLUENCY

Whereas accessibility experiences pertain to the ease or difficulty with which information can be recalled or relevant thoughts can be generated, processing fluency pertains to the ease or difficulty with which new, external information can be processed. Empirically, fluency can be manipulated by a large number of variables. Some of these variables affect the speed and accuracy of low-level processes concerned with the identification of a stimulus' physical identity and form; they influence perceptual fluency (e.g., Jacoby, Kelley, & Dywan, 1989). Relevant variables include figure-ground contrast, the clarity with which a stimulus is presented, the duration of its presentation, or the amount of previous exposure to the stimulus. Other variables influence the speed and accuracy of high-level processes concerned with the identification of stimulus meaning and its relation to semantic knowledge structures; these variables influence conceptual fluency (e.g., Whittlesea, 1993). Relevant variables include semantic predictability, the consistency between the stimulus and its context, and the availability of appropriate mental concepts for stimulus classification.

Empirically, both types of fluency tend to show parallel influences on judgments (for a review, see Winkielman, Schwarz, Fazendeiro, & Reber, 2003) and can be subsumed under the general term *processing fluency*. Processing fluency can be captured with objective measures, like processing speed and accuracy, as well as subjective measures, like subjective impressions of low effort, high speed, and accuracy.

NAIVE THEORIES

Because the diverse variables that influence processing fluency result in similar phenomenological experiences of fluent processing, the meaning of the experience is open to interpretation. Which interpretation people choose, and which inferences they draw from their experience, again depends on the naive theory they bring to bear. Some of these theories pertain to characteristics of the stimulus and presentation conditions, whereas others pertain to one's own state of knowledge. As in the case of accessibility experiences, applicable theories are recruited by the judgment task and application of one theory usually renders the experience uninformative for inferences that require a different theory. I first illustrate the operation of different theories and subsequently turn to implications of particular interest to consumer researchers, namely the role of processing fluency in judgments of truth and preference.

Stimulus and Presentation Related Theories

Stimulus-related theories include, for example, the theory that it is easier to perceive a stimulus when it is shown with high rather than low clarity and the theory that it is easier to perceive a stimulus when it is shown for a long rather than short duration. These theories affect judgments of clarity and duration, even when the fluency experience is due to some other variable, like previous exposure to the stimulus. Hence, people who saw the stimulus before infer that the current presentation lasted longer, or had higher clarity, than people who were not previously exposed to the stimulus (e.g., Whittlesea, Jacoby, & Girard, 1990; Witherspoon & Allan, 1985). Similarly, Masson and Caldwell (1998) observed that participants inferred that a target word was presented for a longer duration, or with higher visual clarity, when a preceding semantic task (e.g., complete the sentence, "An archer shoots a bow and ___") had rendered the target word ("arrow") highly accessible. In these cases, fluency resulting from previous exposure to the stimulus or related concepts gave rise to erroneous inferences about physical characteristics of the stimulus once the physical judgment task brought an applicable theory to mind.

Another naive theory correctly holds that distraction makes information more difficult to process. For example, Jacoby, Allan, Collins, and Larwill (1988) presented participants with new or previously studied sentences, accompanied by background noise. As expected, participants attributed the differential fluency with which they could process this material to differential levels of background noise. Hence, they rated the noise as louder when combined with new rather than old sentences (see also Goldinger, Kleider, & Shelley, 1999; and Kelley & Rhodes, 2002, for an extensive review).

Knowledge-Related Theories

Other naive theories relate processing fluency to one's own state of knowledge. The most important one holds that familiar (previously seen) material is easier to process. Accordingly, people erroneously conclude that novel material is familiar when it is easy to process due to the influence of other variables. For example, Whittlesea et al. (1990) exposed participants to a study list of rapidly presented words. Subsequently, participants completed a recognition test that manipulated the fluency with which test words could be processed through differential visual clarity. As expected, test words shown with higher clarity seemed more familiar and were hence more likely to be recognized as having appeared on the previous list. This effect was eliminated when participants were aware that the clarity of the visual presentation was manipulated and hence accounted for their experience in terms of a theory that rendered it uninformative for the recognition task. As Kelley and Rhodes (2002, p. 296) concluded on the basis of a comprehensive review, "when sources of fluency are noticed and appreciated by the rememberer, enhancements in perceptual processing may be attributed to features of the test conditions and so not give rise to a feeling of familiarity."

Even when processing fluency is correctly attributed to previous exposure, it may result in erroneous judgments when perceivers misidentify the specific source of the previous exposure. For example, previous exposure to a list of names of nonfamous individuals may subsequently result in erroneous judgments of fame (e.g., Jacoby, Kelley, Brown, & Jasechko, 1989; Jacoby & Woloshyn, 1989). This is the case when a given name is fluently processed but participants can't recollect that they saw it on the earlier list, leading them to conclude that the person is probably famous—or else why would the name seem familiar?

As already observed in the context of accessibility experiences (Sanna, Schwarz, & Small, 2002; Stepper & Strack, 1993), bodily sensations that convey mental effort can mirror the effects of low processing fluency. Strack and Neumann (2000) asked participants to rate the fame of famous and nonfamous individuals and induced some participants to contract the corrugator muscle while doing so (resulting in a furrowed brow). As expected, all individuals were rated as less famous when participants furrowed their brow than when they did not. Apparently, participants misread the feeling of effort induced by corrugator contraction as low processing fluency resulting from an unfamiliar target.

Other Theories

There is probably a large number of other naive theories that link fluency of processing to judgments that have so far remained unexplored. For example, Oppenheimer (2004) presented participants with texts that were easy or difficult to read, either because the text used simple or complicated words or was printed in an easy or difficult to read font. As expected, the alleged author of the text was rated as less intelligent, and less likely to be admitted to graduate school, when the text was difficult to process. This suggests a background assumption that intelligent authors can express their thoughts in easily accessible ways. On the other hand, had participants been asked to rate the novelty of the material or their own expertise in the area, the same experience of low fluency may have suggested high novelty or low expertise in the domain (i.e., unfamiliar material is more difficult to process). These conjectures, and the previous examples, illustrate the wide range of judgments on which fluency experiences can be brought to bear and future research will certainly extend this list.

Summary

In sum, processing fluency can give rise to a wide variety of inferences, depending on the naive theory applied. Fluency due to physical characteristics of the stimulus presentation can serve as input into judgments of one's own knowledge ("seen before"), much as fluency due to earlier exposure can serve as input into judgments of physical characteristics of the stimulus (e.g., Witherspoon & Allan, 1985). Once one theory is applied, the experience is usually uninformative for inferences that require the application of a different theory. Moreover, experiences of mental effort resulting from other sources, like bodily feedback (Strack & Neumann, 2000), can mirror the effects of low processing fluency resulting from stimulus characteristics or (lack of) previous exposure.

JUDGMENTS OF TRUTH

Fluency-based familiarity inferences have important implications for judgments of truth. When the objective truth of a statement is difficult to evaluate, people often draw on social consensus information to arrive at a judgment, based on the assumption that what many people believe is probably true (Festinger, 1954). To determine whether they have heard particular information before, people may assess the apparent familiarity of the information, drawing on the fluency with which it can be processed as a relevant input. If so, variables that increase processing fluency should increase the perceived truth value of the processed information. Empirically, this is the case.

Not surprisingly, one relevant variable is actual exposure frequency. In a classic study of rumor transmission, Allport and Lapkin (1945) observed that the strongest predictor of belief in wartime rumors was simple repetition. Numerous subsequent studies demonstrated that a given statement is more likely to be judged true the more often it is repeated. This illusion of truth effect (Begg, Anas, & Farinacci, 1992) has been obtained with trivia statements or words from a foreign language (e.g., Hasher, Goldstein, & Toppino, 1977) as well as advertising materials (e.g., Hawkins & Hoch, 1992). Illusions of truth are even observed when participants are explicitly told at the time of exposure that the information is false, as a recent study by Skurnik, Yoon, Park, and Schwarz (in press) may illustrate. Older and younger adults were exposed once or thrice to product statements like "shark cartilage is good for your arthritis" and these statements were explicitly marked as "true" or "false." Not surprisingly, all participants were less likely to accept a statement as true the more often they were told that it is false—but only when they were tested immediately. After a 3-day delay, repeated warnings backfired for older adults: They were now more likely to assume that a statement is true, the more often they were exposed to it and were explicitly told that it is false. This finding is consistent with the observation that explicit memory declines with age, whereas implicit memory remains largely intact (see Park, 2000). Hence, after a 3-day delay, older adults could not recall whether the statement was originally marked as true or false, but still experienced its content as highly familiar, leading them to accept it as true. Ironically, this mechanism turns warnings into recommendations, with important implications for educational campaigns.

Theoretically, any other variable that increases processing fluency should have the same effect as message repetition.

Supporting this prediction, Reber and Schwarz (1999) found that participants were more likely to accept statements like "Osorno is a city in Chile" as true when the statements were presented in colors that made them easy (e.g., dark blue) rather than difficult (e.g., light blue) to read against the background. In a conceptually-related study, McGlone and Tofighbakhsh (2000) manipulated processing fluency by presenting substantively equivalent novel aphorisms in a rhyming (e.g., "woes unite foes") or nonrhyming form (e.g., "woes unite enemies"). As expected, participants judged substantively equivalent aphorisms as more true when they rhymed than when they did not.

In combination, these findings indicate that processing fluency serves as an experiential basis of truth judgments. In the absence of more diagnostic information, people draw on the apparent familiarity of the statement to infer its likely truth value—if it seems they heard it before, there's probably something to it (Festinger, 1954). This inference involves the application of the naive theory that familiar material is easy to process—and the application of any other theory (e.g., good figure-ground contrast makes things easy to read; Reber & Schwarz, 1999) would presumably render the fluency experience uninformative for truth judgments.

Finally, fluent processing not only increases judgments of truth, but also the feeling that one knew the truth all along, as Werth and Strack (2003) recently demonstrated. Following the usual procedures of "knew-it-all-along" studies, they presented participants with a knowledge question along with the answer (e.g., "How high is the Eiffel tower?"—"300 m"). Next, participants had to report what they would have answered had they not been given the solution. The usual finding is that participants' answers are closer to the true value than is the case when that value is not provided. In a novel variation on this paradigm, Werth and Strack (2003) presented the questions and answers in easy or difficult to read colors to manipulate processing fluency. They observed that high fluency increased the "knew-it-all-along" effect, whereas low fluency attenuated it. Apparently, participants found the easy to read versions more familiar and hence concluded they knew this information all along and thus would have provided the correct answer.

JUDGMENTS OF PREFERENCE

So far, the reviewed effects of processing fluency follow the logic of theory-driven inferences developed in the context of accessibility experiences, where the fluency experience itself serves as the relevant input. The robust influence of processing fluency on judgments of liking, preference, and beauty, on the other hand, is probably more affective in nature and reflects that processing fluency itself is hedonically marked and experienced as positive (for a more detailed discussion, see Winkielman, Schwarz, Fazendeiro, & Reber, 2003, Winkielman, Schwarz, Reber, & Fazendeiro, 2003). This positive affect, in turn, results in more favorable evaluations of the stimulus.

Fluency and Preference

A growing body of research demonstrates that any variable that facilitates fluent processing is likely to increase liking. The best known example is the mere exposure effect identified by Zajonc (1968): Repeated exposure to an initially neutral stimulus, without any reinforcement, leads to a gradual increase in liking (for reviews, see Bornstein, 1989; Zajonc, 2000; for limiting conditions, see Bornstein, 1989). Several authors proposed that the mere-exposure effect might reflect increases in perceptual fluency (e.g., Jacoby, Kelley, & Dywan, 1989; Seamon, Brody, & Kauff, 1983, Whittlesea, 1993). If so, we may expect that any variable that facilitates fluent processing similarly results in increased liking, even under conditions of a single exposure. Empirically, this is the case.

For example, Reber, Winkielman, and Schwarz (1998, Study 1) presented participants with slightly degraded pictures of everyday objects and manipulated processing fluency through a visual priming procedure. Depending on conditions, the target picture was preceded by a subliminally presented, highly degraded contour of either the target picture or a different picture. As expected, pictures preceded by matched contours were recognized faster, indicating higher fluency, and were liked more than pictures preceded by mismatched contours. Moreover, participants were unaware of the fluency manipulation, thus eliminating the possibility of strategic responding to pictures preceded by various primes. Extending this work, Winkielman and Fazendeiro (2003; reported in Winkielman, Schwarz, Fazendeiro, & Reber, 2003) showed participants unambiguous pictures of common objects and manipulated processing fluency through semantic primes. In the high fluency condition, the picture (e.g., of a lock) was preceded by a matching word ("lock"), in the moderate fluency condition by an associatively related word (e.g., "key"), and in the low fluency condition by an unrelated word (e.g., "snow"). As predicted, pictures preceded by matching words were liked significantly more than pictures preceded by related words, which, in turn, were liked significantly more than pictures preceded by unrelated words. Follow-up studies indicated that these fluency effects do not require that the concept primes immediately precede the target pictures. Instead, the same pattern of effects was obtained when participants studied a list of concept primes well before they were exposed to the pictures. Lee and Labroo (in press) obtained similar findings in the consumer domain and found, for example, that consumers reported more positive attitudes toward ketchup when they were previously exposed to a closely related product (mayonnaise) rather than an unrelated one (vitamins).

A host of other variables that affect processing fluency shows parallel effects, from figure-ground contrast and pre-

sentation duration (e.g., Reber et al., 1998) to the prototypicality of the stimulus (e.g., Halberstadt & Rhodes, 2000; Langlois & Roggman, 1990). Moreover, the influence of many variables addressed in the psychology of aesthetics (see Arnheim, 1974; Tatarkiewicz, 1970), like figural goodness, symmetry, and information density, can be traced to the mediating role of processing fluency (for a comprehensive review, see Reber, Schwarz, & Winkielman, in press). In combination, these findings suggest that aesthetic pleasure may be grounded in the processing experience of the perceiver. It is also worth noting that the parallel effects of processing fluency on judgments of truth and aesthetic preference shed new light on Keats's famous assertion that "beauty is truth, truth beauty, that is all ye need know" (Keats, 1821/1988, p. 310), both beauty and truth are in part judged on the basis of the same experiential information.

Affective Response

Importantly, the influence of processing fluency is not limited to explicit judgments of preference, but can also be captured with psychophysiological measures. For example, Winkielman and Cacioppo (2001; see also Harmon–Jones & Allen, 2001) assessed participants' affective responses to fluent stimuli with facial electromyography (EMG). This methodology relies on the observation that positive affective responses increase activity over the region of the zygomaticus major ("smiling muscle"), whereas negative affective responses increase activity over the region of the corrugator supercilli ("frowning muscle;" e.g., Cacioppo, Petty, Losch, & Kim, 1986). As expected, high fluency was associated with stronger activity over the zygomaticus region (indicative of positive affect), but was not associated with the activity of the corrugator region (indicative of negative affect). Moreover, the observed differences occurred in the first 3 sec after stimulus presentation, indicating a spontaneous affective response to processing fluency. Similarly, Monahan, Murphy, and Zajonc (2000) observed that repeated exposure to initially neutral stimuli improved participants' self-reported mood.

As Winkielman, Schwarz, Fazendeiro, and Reber (2003) proposed, this spontaneous affective response presumably mediates the impact of fluency on preference judgments, paralleling the influence of other affective states on evaluation (for a review, see Schwarz & Clore, 1996). Supporting this assumption, Winkielman and Fazendeiro (2003) observed that the influence of fluency on liking was eliminated when participants attributed their positive affective response to music played in the background. What is less clear is why processing fluency is experienced as affectively positive. Relevant proposals range from the adaptive value of a preference for familiar stimuli (Zajonc, 1968) to the adaptive value of fast stimulus identification (Winkielman, Schwarz, & Nowak, 2002) and their empirical evaluation awaits further research.

Finally, it is worth noting that the relation between perceived familiarity and affective response is bidirectional. As Monin (2003) demonstrated, stimuli that evoke a positive affective response are judged more familiar, even when fluency of processing is controlled for. Similarly, Garcia–Marques and Mackie (2001) observed that participants in a good mood are more likely to perceive novel arguments as familiar, which may contribute to their acceptance as true.

Summary

In sum, processing fluency influences different judgments through two different pathways, both of which involve reliance on experiential information. On the one hand, perceived fluency of processing influences judgments of physical stimulus characteristics, familiarity, and truth, through the application of naive theories, which provide relevant inference rules. The relevant input for these judgments is the fluency experience itself. On the other hand, fluency elicits spontaneous affective reactions, which can be captured by psychophysiological measures (e.g., Winkielman & Cacioppo, 2001). These affective reactions, in turn, serve as input for preference judgments. However, neither source of experiential information exerts an influence when its informational value is called into question. This is the case when judges are aware that their fluency experience (for a review, see Kelley & Rhodes, 2002) or apparent affective reaction to the target (for a review, see Schwarz & Clore, 1996) is due to an irrelevant source.

Finally, some phenomena may reflect the operation of both processes. Studying the role of processing fluency in consumer choice, Novemsky et al. (2003) presented participants with descriptions of two digital cameras, printed in a font that was easy or difficult to read. As expected, participants were less likely to defer choice when the description was easy (56% deferral) rather than difficult to read (71% deferral), unless their attention was drawn to this characteristic of the font (57% deferral). This result may reflect that the described camera seemed less attractive under low fluency conditions or that the information seemed less credible, both of which would contribute to a higher rate of deferral. In either case, the finding highlights that the fluency with which consumers can process product information enters into the decision process, as has been observed for accessibility experiences (Novemsky et al., 2003).

CONCLUSIONS, IMPLICATIONS, AND OPEN ISSUES

The reviewed research demonstrates that there is more to thinking than thought content: The subjective experiences that accompany our thought processes are informative in their own right. We therefore can't understand human judgment and decision making without taking the interplay of de-

clarative and experiential information into account. In this final section, I address some theoretical issues raised by these observations and offer some conjectures that go beyond the data given.

Inferences and Naive Theories

People generally assume that the thoughts that come to mind while thinking about X are relevant to X—or why else would they come to mind at this point? Higgins (1998) referred to this pervasive tendency in the perceived relevance of declarative information as the *aboutness principle of human inference.* The perceived relevance of our thoughts is further enhanced when they come to mind easily (Clore, 1992; Higgins, 1998; Menon & Raghubir, 2003). By the same token, any subjective experience we have while thinking about X also seems relevant to X (which Clore, Wyer, Dienes, Gasper, Gohm, & Isbell, 2001, termed *the immediacy principle of affective information*). From this perspective, our thoughts and experiences while thinking about X seem relevant by default and do not require a deliberate attribution to X to serve as input into X-related judgments.

What exactly we conclude from these "relevant" inputs depends on accessible background knowledge that provides a link between X and the input. I refer to these links as naive theories and assume that they are rendered accessible by the respective judgment task, as illustrated by the examples discussed earlier. Their high contextual accessibility presumably contributes to the perception that the naive theory is relevant and applicable, consistent with the reviewed findings. Note also that this logic holds as well for inferences drawn from declarative information, although this is rarely made explicit in content-focused models of judgment. When we learn that Bob solved the New York Times crossword puzzle in record time, we are likely to conclude that he is smart. Yet we would not arrive at this conclusion without a naive theory which entails that solving crossword puzzles in record time requires intelligence. As research into the automaticity of trait inferences illustrates (for a review, see Uleman, 1999), people often apply their naive theories automatically. Hence, the conclusion that Bob is smart appears as an immediate impression rather than a deliberate inference, and the inferential steps are unlikely to show up in think-aloud protocols. In much the same way, fluently processed stimuli just "feel" familiar and the person is unlikely to have the phenomenal experience of going through an inference process akin to "Previously seen stimuli are easy to recognize. This one was easy, so I probably saw it before."

In sum, I assume that the inference processes involved in the use of experiential information are largely automatic and that individuals can usually not report on them introspectively. This assumption does not preclude, however, that naive theories can be used in a deliberate way, for example, when the theory is novel and unfamiliar (as was the case for the suggested theories in Winkielman & Schwarz, 2001). In contrast, the disuse of experiential information is often deliberate, as addressed later.

Expectations

In general, the influence of experiential information is more pronounced, the more the experience deviates from expected baseline values. That is, the relative intensity of the experience is more important than its absolute level. This was first observed for the influence of moods, where moods marked as "neutral" on manipulation checks typically have effects that resemble the influence of negative moods. Because most people are in a slightly positive mood most of the time, neutral moods are experienced as a negative deviation (for a discussion, see Schwarz, 1987). The same is likely to hold true for accessibility and fluency experiences, although little is known about the relevant baseline expectations. When expectations are experimentally manipulated, however, unexpected fluency has been found to be more influential than expected fluency (e.g., Whittlesea & Williams, 1998, 2000). Similarly, difficulty of recall exerts no influence when people are aware of their own lack of expertise in the domain and presumably expect recall to be difficult to begin with, as discussed earlier. Understanding the nature of the relevant expectations, and their contextual determinants, is an important issue for future research.

Awareness and Discounting

Whenever people are aware that their experience may be due to a source that is unrelated to the judgment task, the otherwise observed influence is eliminated. This is usually portrayed as a discounting effect, but may reflect two different processes. I illustrate both with research into the misattribution of mood and arousal before I turn to metacognitive experiences.

The first possibility is, as commonly assumed, a straightforward attributional discounting effect (Kelley, 1972), which renders the experience uninformative for the judgment at hand. For example, Schwarz and Clore (1983) observed that people were in a poorer mood and reported lower general life-satisfaction on rainy than on sunny days. Drawing their attention to the rainy weather eliminated the influence of negative moods on life-satisfaction judgments, but did not change the mood itself. People still felt bad on rainy days, but they did not infer from this momentary feeling that their life as a whole was unsatisfactory once they realized that their current mood may only be due to the weather. Such discounting effects require awareness of an irrelevant source of the experience and are usually deliberate in nature.

The second possibility is that awareness of another source prompts the application of a different naive theory, which may result in a different phenomenal experience. Suppose, for example, that participants watch a fear-arousing video and are given the opportunity to misattribute the resulting

physiological arousal to the side-effects of a placebo pill (Schwarz, Servay, & Kumpf, 1985). In this case, the pill provides an applicable theory that lends itself to an interpretation of the experienced arousal in terms unrelated to fear—and, in fact, participants reported lower fear under this condition. This process again requires awareness of the (alleged) source of arousal (the pill), but the subsequent use of the resulting experience in judgment may be automatic—and the lack of a fear effect does not necessarily mean that experienced fear was discounted; instead, it may never have been experienced to begin with.

In either case, the experiential information has different implications for subsequent judgments, but for different reasons: In the first case, the feeling per se is unaffected, but rendered differentially informative for the judgment at hand (Schwarz & Clore, 1983); in the latter case, the feeling is qualitatively different (fear vs. mere bodily arousal) and hence influences subsequent judgments in different ways (Schwarz et al., 1985). These possibilities bear on the influence of metacognitive experiences, but have received little attention.

Accessibility experiences. The informational value of accessibility experiences is undermined when people attribute the experience to an irrelevant influence, like background music (e.g., Schwarz et al., 1991), features of the presentation format (e.g., Wänke et al., 1995), or other contextual influences (e.g., Oppenheimer, in press). Conversely, their informational value is enhanced when people perceive extraneous influences that run counter to their experience, for example, when they find a recall task easy despite influences that should make it difficult (e.g., Wänke et al., 1995). These are "classic" discounting and augmentation effects (Kelley, 1972), which influence the perceived informational value of the experience, but not necessarily the experience itself—the task still is difficult, for example, but that has little to say, given that it is apparently due to a distracting extraneous influence. Such discounting and augmentation processes are deliberate and require mental resources. Accordingly, Menon and Raghubir (2003, Study 4) observed that discounting cues only eliminated ease-of-recall effects when participants were not under cognitive load. Participants who were under cognitive load continued to rely on accessibility experiences despite the presence of discounting cues. This pattern is consistent with the assumption that the use of accessibility experiences is relatively automatic and effortless, whereas their disuse is deliberate.

However, the consideration of naive theories suggests additional ways in which accessibility experiences can lose their informational value for the judgment at hand. To return to my earlier example, being unable to recall many excellent new restaurants in Chicago, I may conclude, among many other things, that there aren't many or that I'm apparently not paying much attention to new restaurants. Once I draw the latter inference, my difficulty of recall is utterly uninformative for whether there are many new restaurants. That is, using a given experience as input into a judgment that requires application of theory X renders the experience uninformative for judgments that require theory Y. Given that my initial use of the experience may be effortless and automatic, this process may result in unintended and nondeliberate discounting effects that follow from previous judgments. This possibility deserves systematic investigation.

Finally, Menon and Raghubir (2003, Study 3) observed that discounting cues were only effective when they were introduced prior to the recall task. Other studies, however, obtained successful discounting even when the discounting cues were introduced after the recall task (e.g., Sanna & Schwarz, 2003; Sanna, Schwarz, & Small, 2002). Theoretically, the crucial variable is not the temporal relation between the recall task and the discounting cue (as Menon & Raghubir, 2003, suggested), but the temporal relation between the recall task and the judgment. In the Menon and Raghubir (2003) studies, participants recalled product attributes and may have spontaneously formed product judgments along the way, prior to receiving the discounting cue. In contrast, participants in the hindsight studies by Sanna and colleagues generated ways in which an obtained event could have turned out otherwise, and subsequently judged their prior likelihood expectations for the event (Sanna, Schwarz, & Small, 2002) or recalled the likelihood judgments that they had reported earlier (Sanna & Schwarz, 2003). It seems unlikely that participants would make such judgments spontaneously while thinking about alternative outcomes. In combination, these findings suggest that people can discount their accessibility experiences even when the discounting cues follow rather than precede the subjective experience. But when they form a spontaneous judgment prior to receiving discounting information, they cannot undo the previous influence of subjective experience, consistent with the extant literature on mental contamination and correction (see Strack & Hannover, 1996; Wilson & Brecke, 1994).

Processing fluency. As in the case of accessibility experiences, the use of processing fluency as a source of information is largely automatic. Moreover, people are unlikely to be aware of the tacit inferential steps that guided their responses. Thus, a fluently processed stimulus just feels familiar and the person does not have a phenomenal experience of going through inferential steps akin to "Previously seen material is easy to recognize. I recognized this one quickly, so I must have seen it before." As Kelley and Rhodes (2002, p. 295) put it, the person attributes fluency of processing to previous experience "unconsciously—the conscious experience of fluent processing is that something seems familiar."

When the person is aware that fluency may result from a source that is irrelevant to the judgment at hand (e.g., the presentation format), however, the otherwise observed effects are again eliminated. On the one hand, this may reflect a deliberate discounting process. On the other hand, awareness of

differences in the presentation format may trigger the application of a different naive theory, resulting, for example, in subjective experiences of higher clarity or loudness, as reviewed earlier. If so, feelings of familiarity, which require the application of a different naive theory, may never arise to begin with (see Kelley & Rhodes, 2002, p. 296, for a related discussion). This possibility is analogous to undermining the informational value of accessibility experiences through their use in previous judgments in which a different naive theory was applied.

I suppose that both of these pathways to undermining the informational value of metacognitive experiences are viable, as suggested by earlier misattribution research into moods and emotions (e.g., Schwarz & Clore, 1983; Schwarz et al., 1985). Exploring these different possibilities in the case of metacognitive experiences provides a promising avenue for future research.

Motivation

At present, little is known about the role of processing motivation in the use of fluency experiences. Theoretically, I would expect that people are more likely to assess the diagnosticity of their experiences under high motivation conditions, rendering discounting effects more likely, but relevant data are not available.

With regard to accessibility experiences, the bulk of the available work suggests that low motivation, manipulated through low personal relevance (e.g., Grayson & Schwarz, 1999; Rothman & Schwarz, 1998), low need for cognition (Florack & Zoabi, 2003), or happy moods (Ruder & Bless, 2003), foster reliance on accessibility experiences. In contrast, high motivation, manipulated through high personal relevance (e.g., Grayson & Schwarz, 1999; Rothman & Schwarz, 1998), sad moods (Ruder & Bless, 2003), or instructions (Aarts & Dijksterhuis, 1999), attenuate the influence of accessibility experiences and foster reliance on accessible content. Exceptions to this generalization have been observed in persuasion paradigms (e.g., Wänke & Bless, 2000), as discussed earlier. People's high reliance on experiential information under low motivation conditions renders these inputs particularly relevant for many consumer and advertising contexts.

It is also worth noting that we have not observed self-serving tendencies in the selection of inputs, although the experimental paradigm used in many ease of retrieval studies would lend itself easily to motivated biases. Suppose, for example, that you are asked to recall many behaviors that increase or decrease your risk of heart disease and find this task difficult (Rothman & Schwarz, 1998). After recalling risk-increasing behaviors, you could arrive at the presumably desired inference of low risk by drawing on your accessibility experience—given that it is so hard to think of risk-increasing behaviors, you apparently don't do much that puts you at risk. Conversely, you'd like to rely on recalled content when your recall task pertained to risk-decreasing behaviors—given that you recalled so many, you apparently do a lot to prevent high risk. We have not observed such motivated switches in the selection of applicable inputs (Rothman & Schwarz, 1998; see also, Grayson & Schwarz, 1999). Instead, people for whom heart disease was personally relevant due to their family history drew on recalled content, independent of whether this resulted in a favorable or unfavorable conclusion. Conversely, people for whom heart disease was of low personal relevance drew on their accessibility experiences, again independent of the resulting conclusion. Given that people are likely to select self-serving inputs when they can justify their use (for reviews, see Dunning, 2001; Kunda, 1999), this suggests that the phenomenal experience has a compelling immediacy in the absence of salient discounting cues.

Metacognitive Experiences and Processing Style

To date, research into metacognitive experiences is limited to their use as inputs into judgments. Given the extensive parallels to other sources of experiential information, such as moods, emotions, and bodily sensations, it is tempting to speculate about the role of metacognitive experiences in the choice of processing strategies.

As a growing body of research indicates, any information that conveys that one's current situation is problematic increases the likelihood that people engage in a systematic, bottom-up processing style that is characterized by considerable attention to the information at hand. Conversely, any information that conveys that one's current situation is benign increases the likelihood that people rely on business-as-usual strategies, resulting in a more heuristic, top-down processing style (for a review, see Schwarz, 2002). Thus, people who are in a sad rather than happy mood process persuasive messages more systematically (for a review, see Schwarz, Bless, & Bohner, 1991); rely less on stereotypes and more on individuating information (for a review see Bless, Schwarz, & Kemmelmeier, 1996); and perform better on analytic problem-solving tasks, but are less likely to engage in the playful thinking that fosters creativity (for a review, see Schwarz & Skurnik, 2003). Similarly, bodily avoidance feedback provided by arm extension (a problem signal) improves performance on analytic tasks, whereas bodily approach feedback provided by arm flexion (a benign signal) improves performance on creativity tasks (Friedman & Förster, 2000, 2002). Even external signals that convey differential affect, like the upbeat or depressed color of the paper on which a task is presented, have been found to influence processing strategy and performance (Sinclair, Soldat, & Mark, 1998; Soldat, Sinclair, & Mark, 1997). These effects can be conceptualized by assuming that human cognition is situated and adaptively tuned to meet the processing requirements of the situation,

requirements that are signaled by immediate affective responses (see Schwarz, 2002).

In light of these findings, it seems likely that low processing fluency may give rise to more deliberate, systematic processing strategies than high processing fluency. This conjecture is compatible with the observation that fluently processed information seems more familiar and is more likely to be accepted as true, as reviewed earlier, either of which would reduce the likelihood of further systematic scrutiny. Similarly, difficulty of recall or thought generation may undermine confidence in one's thoughts and trigger more effortful processing, consistent with Tormala et al.'s (2002) self-validation hypothesis. These possibilities also await further research.

Variability of Inferences

As already emphasized, the conclusions that people may draw from their metacognitive experiences are as variable as the naive theories they may bring to bear. This renders the outcomes more variable than has previously been assumed. With regard to accessibility experiences, for example, our early studies were guided by Tversky and Kahneman's (1973) availability heuristic (for a review, see Schwarz & Vaughn, 2002). The conceptualization proposed here, however, suggests that the availability heuristic is just one of many applicable naive theories, albeit a particularly important one. Exploring the naive theories of memory and cognition that people may apply is likely to uncover numerous influences of metacognitive experiences that have so far gone unnoticed.

Moreover, we know little about the theories that observers apply when they watch performances that differ in ease and fluency. For example, Kruger, Wirtz, Van Boven, and Altermatt (2004) proposed "that effort is used as a heuristic for quality" (p. 91). In their experiments, participants rated the quality and value of poems, paintings, and suits of armor, more favorably when they thought that it took much time and effort to produce them. But would they have arrived at the same conclusion if they had watched the artist struggle with the material? Or would they have inferred inferior talent from the artist's difficulty? Again, different naive theories may be recruited when asked to evaluate the quality of the product versus the talent of the producer—and the order in which both tasks are presented may very well reverse the outcome. Thus, the initial judgments of high quality observed by Kruger et al. (2004) can reverse the outcome. Indeed, the influence of perceived effort on judgments of quality is eliminated when participants first assess the artist's talent (Cho & Schwarz, 2004).

Finally, I am not aware of any studies that addressed the role of metacognitive experiences at the group level, for example, in the context of group decision making. Presumably, a group would find it easier to generate many reasons in favor of a decision alternative than any of its members alone, sparing participants the difficulty of thought generation they may experience individually. Does the ease of collective thought generation influence judgments and decisions in ways that parallel the effects observed at the individual level? Under which conditions, if any, do members discount the ease of collective thought generation by taking into account that the task is easier for groups than for individuals? Conversely, is a collective experience of difficulty considered particularly diagnostic? The answers to these questions will presumably depend on members' naive theories of group performance, yet these theories are largely unknown. Exploring them may fill an important gap in our understanding of group decision making.

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