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Affective Processes in Cognition and Emotion

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Jochen Musch
Karl Christoph Klauer
University of Bonn

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Chapter 8

The Hedonic Marking of Processing Fluency: Implications for Evaluative Judgment

Piotr Winkielman
University of Denver

Norbert Schwarz
University of Michigan

Tedra A. Fazendeiro
University of Denver

Rolf Reber
University of Berne

Each organism faces a variety of evaluative tasks. We need to distinguish what is hospitable and what is hostile, what to approach and what to avoid, what is valuable and what is worthless, what to pursue and what to abandon. We make these judgments often, we make them throughout life, we make them about trivial issues, and about issues of substantial consequences. Psychological research echoes these observations and increasingly adds to the image of the social perceiver as the evaluating human—*homo evaluaticus.* Given the importance and variety of situations that call for an assessment of valence, it is not surprising that people's evaluative toolbox includes mechanisms that draw on different sources of information, ranging from attributes of the target of judgment to the person's own feelings and phenomenal experiences. In this chapter, we propose that one source of relevant information is the fluency with which information about the target can be

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Correspondence should be addressed to: Piotr Winkielman, Department of Psychology, University of Denver, 2155 S. Race St., Denver, CO 80208, U.S.A.; e-mail: pwinkiel@du.edu; phone: (303) 871-3638; fax: (303) 871-4747.

processed. We further propose that high fluency is associated with positive affect and results in more favorable evaluations.

We first consider the range of evaluative mechanisms and locate our proposal in that context. Next, we elaborate on the concept of fluency and discuss possible reasons for the link between fluency and affective reactions. Subsequently, we present empirical evidence consistent with our proposal. Finally, we discuss boundary conditions of the fluency-affect link.

DECLARATIVE AND EXPERIENTIAL BASES OF JUDGMENT

To form evaluative judgments, people can draw on a range of different processes. These processes vary in complexity and automaticity and use different sources of information as their primary input. In a nutshell, we can distinguish between evaluative judgments that are primarily based on declarative information, such as features of the target, and evaluative judgments that are primarily based on experiential information, such as the person's feelings or phenomenal experiences. Moreover, declarative as well as experiential information may be integral as well as incidental to the target of judgment, as will become apparent further on in this chapter.

Traditionally, models of evaluative judgment have focused on declarative information about the target. According to these models, we attend to features of the target, assess their evaluative implications and integrate them to arrive at an overall judgment. This process has been prototypically described in the theory of information integration (Anderson, 1981). Which features of the target we attend to, or recall from memory, may be a function of the target itself (i.e., integral to the target) or may depend on influences that are incidental to the target. Thus, preceding events (e.g., Schwarz & Bless, 1992) or our mood at the time of judgment (e.g., Bower, 1981) can render some aspects of the target more accessible than others. Moreover, incidental influences can determine how ambiguous features are interpreted, as illustrated by the rich literature on knowledge accessibility effects (for a review see Higgins, 1996). Finally, inferences about the features of the target may be qualified by experiential information, like the ease or difficulty with which some content can be recalled. For example, we may conclude that the target does not have many positive features when we find it difficult to bring relevant examples to mind (for a review see Schwarz, 1998).

Alternatively, evaluative judgments may be primarily based on experiential information, at the expense of declarative information about the target (for a review see Schwarz & Clore, 1996). It is useful to distinguish between experiential information that is feature-based and nonfeature-based. Feature-based affective responses reflect the analysis of the evaluative implications of the stimulus attributes (e.g., Ortony, Clore, & Collins, 1988). Such

an analysis may range from sophisticated appraisals resulting in complex emotions (e.g., Frijda, 1988; Smith & Ellsworth, 1985) to the detection of rudimentary attributes resulting in a fairly undifferentiated response (Bargh, Chaiken, Raymond, & Hymes, 1996; LeDoux, 1996). Furthermore, the stimulus that elicits the affective response may be the target itself, in which case the response constitutes *integral affect* in Bodenhausen's (1993) terminology. Alternatively, the affective response may be "incidental" to the target and may have been elicited by a previously viewed movie, a compliment, or the valence of a priming word (see Schwarz & Clore, 1996).

On the other hand, some affective responses are not based on stimulus features. This possibility is best documented for the role of various biological variables that underlie affective states. For example, transient feelings can be influenced by changes in neurotransmitter levels (e.g., Berridge, 1999), electrical brain activity (e.g., Davidson, 1993), brain temperature (e.g., Zajonc, Murphy, & Inglehart, 1989), body posture (e.g., Stepper & Strack, 1993) or facial expressions (e.g., Strack, Martin, & Stepper, 1988). However, nonfeature-based influences on affective reactions are not limited to biological factors. The possibility explored in our chapter is that affective responses may also result from the dynamics of information processing itself. Specifically, we propose that individuals monitor the *fluency* with which they can extract information from the presented stimulus. We further propose that the fluency signal is hedonically marked and that high fluency elicits a positive affective reaction. In fact, this affective reaction can be captured with psychophysiological measures, as reviewed later. This reaction, in turn, contributes to a more positive evaluation when a given stimulus can be processed with high rather than low fluency.

It is worth noting that fluency-based affective reactions are *not* a function of stimulus attributes in the same way that regular feature-based affective reactions are. Although some attributes of a stimulus, like figure-ground contrast or semantic predictability may themselves facilitate fluent processing, the same positive influence is observed when fluency of processing is enhanced through variables that do not affect the features of the stimulus, but only the dynamics of its processing. For example, exposure frequency, exposure duration, or perceptual priming have been found to influence recognition speed as well as evaluations. This work, discussed in more detail further in this chapter, highlights that it is useful to distinguish fluency-based affective reactions from feature-based affective reactions. This distinction is also important because it contributes to an understanding of some otherwise paradoxical phenomena. For example, this distinction suggests that an organism can have affective reactions to stimuli that are neutral, simply because processing of *any* stimulus can generate a fluency signal, which itself leads to an affective response. Furthermore, this distinction suggests that organisms can have affective reactions to stimuli before fully extracting their attributes because the fluency signal may be generated and

trigger an affective response at a very early stage of information processing, as discussed later.

Note, however, that the assumption that fluency-based affective reactions do not *derive* from stimulus features does not entail that the affective reaction is not *perceived* as a response to the meaning of the stimulus. As Higgins (1998) suggested, the influence of incidental experiential or declarative information reflects the operation of a tacit *aboutness* principle: We assume that any feelings we experience, or any information that comes to mind, while we think about a target bears on the target—or why else would we feel like this, or think these thoughts, at this point? Accordingly, the respective influence is typically eliminated when we become aware of its incidental nature (e.g., when we realize that some information may only come to mind due to a preceding priming episode; e.g., Strack, Schwarz, Bless, Kübler, & Wänke, 1993) or are aware that our mood may be due to a source unrelated to the target (e.g., Schwarz & Clore, 1983). At present, the only known exception to this rule are affective responses that are too subtle to be consciously experienced, which precludes their discounting (Winkielman, Zajonc, & Schwarz, 1997). It is therefore not surprising that at least some fluency-based affective reactions are also subject to misattribution effects, as we shall see later on in this chapter.

A Preview

In the remainder of this chapter we review our research into the role of processing fluency in evaluative judgment. We show that conditions that facilitate fluent processing result in more positive evaluations of the stimulus, as reflected in judgments as well as physiological responses. We provide a comprehensive review of this robust finding, which has been obtained across a range of different experimental procedures. What is less clear, however, is why processing fluency would have this effect? We propose that the fluency signal is hedonically marked and present empirical evidence in support of this conjecture. We also highlight that the impact of fluency on evaluative judgments reflects the operation of the "aboutness" principle in which participants, by default, rely on their affective responses in forming evaluative judgments, but discount them when they are aware of their incidental nature. The chapter concludes with a discussion of boundary conditions that shape the role of fluency in evaluative judgment.

MONITORING INTERNAL PROCESSING DYNAMICS

The Concept of Fluency

Stimulus processing is characterized by a variety of internal mental events that are nonspecific to the stimulus content. For example, mental representations carrying the same content may differ in the degree of activation

(Mandler, 1980), and processing of the same content may differ in speed (Jacoby, 1983) or effort (Schwarz, 1998). Although there are substantial differences between these various parameters, it is useful to encompass them under a general term of *fluency* (for reviews see Clore, 1992; Jacoby, Kelley, & Dywan, 1989; Schwarz, 1998). It is generally assumed that the *fluency* of processing can be read by the perceiver via some internal metacognitive feedback mechanism (Mazzoni & Nelson, 1998; Metcalfe & Shimamura, 1994). Such a feedback mechanism can make the fluency signal available to other processing modules, including the affect system (Fernandez-Duque, Baird, & Posner, 2000). The signal can be available to the other processing modules either directly, presumably via an automatic process, or indirectly, in the form of a conscious experience of processing ease. It is also interesting that the availability of the fluency signal may not require the simultaneous availability of the stimulus content, and may occasionally precede it, as we discuss below (Curran, 2000; Koriat, 2000; Seamon, Brody, & Kauff, 1983).[1]

A few additional distinctions are useful. First, fluency may or may not be reflected in conscious experience. We use the term *objective* fluency to refer to a mental process characterized by high speed, low resource demands, high accuracy, or other indicators of efficient processing, without necessarily assuming that these processes are reflected on a subjective level. Conversely, we use the term *subjective* fluency, to refer to a conscious experience of processing ease, low effort, high speed, and so on. One consequence of this distinction is that objective and subjective fluency may become dissociated under some conditions. For example, a well-practiced, automatic mental process may have a high objective fluency, but it may not elicit an experience of processing ease. Furthermore, it is possible that objective and subjective fluency may even go in opposite directions, as in cases where alcohol slows down the actual processing, yet creates a strong experience of subjective fluency. Finally, objective fluency may function differently in judgments than subjective fluency. Whereas objective fluency may enter judgments via automatic processes, subjective fluency may enter judgments via theory-driven interpretations of its source, meaning, and diagnosticity. Accordingly, the judgmental impact of subjective fluency may depend on (mis)attributions and theory-driven processes (Skurnik, Schwarz, & Winkielman, 2000).

Second, fluency can reflect processes and manipulations occurring at different levels. *Perceptual* fluency reflects the ease of low-level, data-driven operations that deal primarily with surface features of the stimulus, or its perceptual form. As a consequence, perceptual fluency is influenced by

[1]This possibility accounts for metacognitive states in which a person has a strong cognitive "experience", but is not aware of the specific content responsible for that experience.

variables like simple repetition, form priming, contrast, duration, and so on. These manipulations have been shown to influence responses primarily by changing the speed and accuracy of perceptual identification (Jacoby, 1983; Roediger, 1990; Tulving & Schachter, 1990). On the other hand, *conceptual* fluency reflects the ease of high-level operations concerned primarily with categorization and processing of a stimulus' relation to semantic knowledge structures. Accordingly, conceptual fluency is influenced by variables like semantic priming, semantic predictability, context congruity, rhyme, and so on (e.g., Kelley & Jacoby; 1998; McGlone & Tofighbakhsh, 2000; Poldrack & Logan, 1998; Roediger, 1990; Whittlesea, 1993). Of course, perceptual and conceptual processes usually operate in concert, and support each other, especially when the information about the stimulus is "poor" (brief, degraded, ambiguous, etc.). However, this distinction is validated by evidence of a perceptual representation system, the operation of which is most sensitive to manipulations of form processing, and a conceptual representation system, the operation of which is most sensitive to manipulations of semantic processing (Schacter, 1992; Squire, 1992). These systems can be dissociated on the level of manipulations and judgmental consequences as well as on the level of underlying neural structures (Desimone, Miller, Chelazzi, & Lueschow, 1995). For example, neuroimaging and single-cell recording studies suggest that perceptual priming and simple repetition decrease neural responses in brain areas responsible for processing stimulus form, such as the sensory cortex (Desimone et al., 1995). On the other hand, conceptual priming decreases activation in brain areas responsible for processing stimulus meaning, such as the prefrontal cortex (Demb, Desmond, Wagner, Vaidya, Glover & Gabrieli, 1995).[2]

For the time being, however, we will subsume both perceptual and conceptual fluency under the summary term *fluency*. Such a generalization is justified by the fact that perceptual and conceptual manipulations have similar effects on judgments. For example, evaluative judgments as well as judgments of previous occurrence can be influenced by both perceptual priming as well as conceptual priming, as we shall see below. More important, perceptual and conceptual manipulations can influence judgments in the respective "other" domain. For example, simple perceptual manipulations, like repetition or figure-ground contrast, have been shown to influence conceptual judgments of fame or truth (e.g., Jacoby, Kelley, Brown, & Jasechko, 1989; Reber & Schwarz, 1999), much as conceptual manipulations like semantic priming have been shown to influence perceptual judgments of duration and visual clarity (e.g., Masson & Caldwell, 1998). In summary, the available research suggests that conceptual and perceptual manipulations of processing ease tend to result in a similar signal of "fluency."

[2]The decrease in neural activity in response to repeated stimuli has several interpretations. Some researchers view it as attenuation of a signal to higher brain systems for allocation of resources to novel stimuli (Desimone et al., 1995). It is also possible that the decrease reflects "sharpening" of the neural response, with "new" stimuli nonspecifically activating more neurons and "old" stimuli selectively activating fewer neurons (Norman, O'Reilly, & Huber, 2000).

The Fluency-Affect Link

As noted earlier, the same stimulus is evaluated more positively when it can be processed with high rather than low fluency. We propose that this is the case because the fluency signal itself is hedonically marked. In general, high fluency is indicative of positive states of the environment or the cognitive system, whereas low fluency is indicative of negative states of the environment or the cognitive system. Consistent with these conjectures, the empirical evidence suggests that high fluency selectively increases positive, but not negative evaluations of the stimulus. Furthermore, high fluency elicits positive affect, as reflected in psychophysiological measures. Empirical evidence also suggests that people "by default" assume that their fluency-based affective reactions reflect their disposition toward the stimulus. Consistent with this thesis, the positive effects of high fluency on evaluative judgment are eliminated under conditions that invite the misattribution of affect to an irrelevant source. Before we review the available evidence, however, it is useful to ask *why* fluency may be hedonically marked. Several alternatives, which are not mutually exclusive, deserve consideration.

Fluency as a Cue to Familiarity. High fluency may be positive because it is a cue that a stimulus has been encountered before, or is in some way familiar.[3] Such a fluency-familiarity link is supported by empirical findings and computer simulations that identified several differences in the processing dynamics of familiar and novel stimuli. First, familiar stimuli are processed faster than novel stimuli (e.g., Haber & Hershenson, 1965; Jacoby & Dallas, 1981). Second, familiar stimuli elicit less attentional orienting than novel stimuli (Desimone et al., 1995). Third, familiar stimuli result in a faster, sharper, and more coherent network response than novel stimuli (Lewenstein & Nowak, 1989; Norman, O'Reilly, & Huber, 2000). Fourth, familiar stimuli do not generate a global "mismatch" signal (Carpenter & Grossberg, 1995; Metcalfe, 1993). It is also important that all four differences may emerge at early stages of stimulus processing and precede the recognition of specific features. Accordingly, an organism that monitors processing fluency may be able to detect novelty/familiarity even before it can fully de-

[3]The link between fluency, familiarity, and affect does not assume that the process is mediated by a conscious experience of familiarity, but simply that fluency provides a reliable cue to stimulus "oldness."

code the content of the stimulus (see Lewenstein & Nowak, 1989; Norman et al., 2000; Smith, 2000; Winkielman, Schwarz, & Nowak, in press; for discussions of these mechanisms).

Why, however, would familiarity be associated with positive valence? This connection may be grounded in a biological predisposition for caution in encounters with novel, and thus potentially harmful objects (Zajonc, 1998). Such instinctual "fear of the unknown" has been observed in a variety of species with a range of different stimuli (for a review see Hill, 1978). Moreover, a strong connection between signals of familiarity and positive affect has also been demonstrated by research testing the reverse order of this link—from positive affect to familiarity. For example, subliminal positive primes tend to increase judgments of familiarity for novel stimuli (Phaf, Rotteveel, & Spijksma, 1999), whereas the induction of positive moods increases judgments of truth, presumably via the "positive = familiar = true" connection (Garcia-Marques & Mackie, 2000).

Fluency as a Cue to Prototypicality and Symmetry. A related fluency-valence link is suggested by the observation that prototypical and symmetrical stimuli are associated with faster and less complex processing (Checkosky & Whitlock, 1973; Posner & Keele, 1968; Palmer, 1991). Again, monitoring processing fluency may allow an organism to estimate the likely prototypicality or symmetry of the stimulus at very early processing stages.

Why, however, would prototypicality or symmetry be associated with positive valence? One possible answer is based on the notion that animals (including insects) have a built-in preference for prototypicality (averageness) and symmetry due to the association of these variables with high mate quality (e.g., Thornhill & Gangestad, 1993). In humans, such preferences have been observed in several domains. For example, average and symmetrical faces are reliably preferred over alternatives (e.g., Langlois & Roggman, 1990; Rhodes & Tremewan, 1996), as are symmetrical shapes (Berlyne, 1974). Similarly, studies have observed a preference for prototypical birds, cars, watches, and colors over less prototypical ones (e.g., Halberstadt & Rhodes, 2000; Martindale & Moore, 1988). Moreover, the notion of prototypicality entails familiarity: For a given perceiver, a stimulus is prototypical for its class due to its global similarity to previously encountered stimuli. Hence, familiarity may contribute to prototypicality effects in evaluation, rendering the two difficult to separate.

Fluency as a Cue to Cognitive Progress. Finally, fluency may trigger affective responses because it provides feedback about the ongoing cognitive operations. Specifically, highly fluent (fast, easy, coherent) processing tends to be indicative of progress toward successful recognition and interpretation of the target (Carver & Scheier, 1990; Simon, 1967; Vallacher & Nowak, 1999). If such progress is experienced as rewarding, it may motivate bringing the cognitive activity to completion. Ramashandran and Hirnstein (1999) draw on this notion in their analysis of Capgrass Syndrome (i.e., a lack of the ability to integrate successive encounters with the same persons into a stable person representation). They suggest that this deficit may be due to limbic system damage that prevents Capgrass patients from experiencing "a warm fuzzy emotional response" to a familiar face. Ramashandran and Hirnstein (1999) proposed that "in the absence of limbic activation—the 'glow' of recognition—there is no incentive for the brain to link successive views of a face, so that the patient treats a single person as several people" (p. 31). It is worth noting that the fluency-as-progress notion suggests that preference for familiarity, symmetry, prototypicality, and many other variables is a by-product of their influence on speed, effort, and coherence of processing.

Summary: Fluency as a Hedonically Marked Signal

The just discussed notions converge on the assumption that the fluency signal is hedonically marked because it says something about a positive or negative state of affairs, either in the world or within the cognitive system. In general, high fluency indicates a positive state of affairs, whereas low fluency indicates a negative state of affairs. Consistent with this *hedonic marking* thesis, our research shows that fluency triggers genuine affective responses that can be detected with psychophysiological measures. Moreover, the impact of fluency on stimulus evaluation is eliminated when people attribute this affective response to an irrelevant source, suggesting that the affective response is a crucial mediator of the fluency-evaluation link. In the next section, we review this work. We first address the influence of perceptual fluency and subsequently turn to parallel influences of conceptual fluency. Throughout, we contrast the hedonic marking thesis with competing theoretical accounts.

PERCEPTUAL FLUENCY ENHANCES LIKING

Historically, the interest in the fluency-evaluation link was stimulated by research into the mere-exposure effect (Zajonc, 1968; i.e., the observation that repeated exposure to an initially neutral stimulus enhances liking of the stimulus; for review see Bornstein, 1989). Several authors proposed that the mere-exposure effect might be based on changes in perceptual fluency (Bornstein & D'Agostino, 1994; Klinger & Greenwald, 1994; Seamon et al., 1983). This proposal is consistent with the observation that repeated exposure speeds up stimulus recognition and enhances judgments of stimulus

clarity and presentation duration (e.g., Haber & Hershenson, 1965; Jacoby & Dallas, 1981; Witherspoon & Allan, 1985; Whittlesea, Jacoby, & Girard, 1990). If so, any variable that increases perceptual fluency should result in more positive evaluations of the stimulus, even with a single exposure. Our initial studies were designed to test this conjecture.

Perceptual Fluency Facilitates Recognition and Increases Evaluative Judgments

In one of these studies (Reber, Winkielman, & Schwarz, 1998, Study 1), we presented participants with pictures of everyday objects, such as desk, bird, or plane (Snodgrass & Vanderwart, 1980). The quality of the pictures was slightly degraded and their processing fluency was manipulated through a visual priming procedure. Depending on conditions, the target was preceded by a subliminally presented, highly degraded contour of either the target picture or a different picture. We expected that a matching contour would facilitate processing (high fluency), consistent with research showing that subliminal visual primes enhance target's naming accuracy (Bar & Biederman, 1998).

Some participants were asked to indicate how much they liked the target pictures. Other participants were asked to press a key as soon as they could recognize the object in the picture, thus providing us with a measure of recognition speed, an indicator of fluency. The data were consistent with our predictions: Pictures primed by matched contours were recognized faster, indicating higher fluency, and were liked more than pictures preceded by mismatched contours. Post-experimental interviews revealed that participants were unaware of the fluency manipulation, thus eliminating the possibility of strategic responding to pictures preceded by various primes.

Additional studies replicated and extended these findings in several ways. First, we wanted to show that fluency enhances liking even when it is manipulated by means other than visual priming. This is important because the priming procedure requires a previous exposure to a similar stimulus, and thus is subject to interpretational debates on the mechanism by which repetition enhances preferences (Zajonc, 1998). Second, we wanted to show that liking can be increased by manipulations of fluency that do not rely on inhibitory influences. This is important because the matched/mismatched contour procedure may influence liking by either increasing or decreasing the fluency of processing. Third, we wanted to show that fluency could enhance liking without changes in the visual appearance of the stimulus. Again, this is important because the matched/mismatched contour procedure may potentially influence the quality of the visual input. Based on these considerations, we conducted several studies using other manipulations of perceptual fluency.

In one study (Reber et al., 1998, Study 3), we manipulated perceptual fluency through unobtrusive changes in presentation duration, taking advantage of the observation that longer presentation durations facilitate the extraction of information (Mackworth, 1963). As expected, participants evaluated the same stimulus more positively when it was presented for a longer duration. In another study (Reber et al., 1998, Study 2), we manipulated perceptual fluency through different degrees of figure-ground contrast, a variable that has been shown to influence identification speed (Checkosky & Whitlock, 1973). Again, participants liked the same stimulus more when it was presented with higher figure-ground contrast, and hence could be processed more fluently.

In combination, the just discussed studies based on visual priming, presentation duration, and figure-ground contrast consistently show that increases in perceptual fluency result in more positive evaluations of the perceived stimuli. Subsequent studies, to be reviewed further in this chapter, confirmed and extended this conclusion.

Perceptual Fluency Selectively Enhances Positive Responses: A Comparison with "Two-Step" Models

Our experiments on perceptual fluency also allowed us to further characterize the nature of the evaluative reactions elicited by processing facilitation, a question that bears on the mechanisms underlying the observed effects. As already noted, our hedonic marking thesis predicts that high fluency is associated with positive valence and hence selectively increases positive responses. This prediction is contrary to the predictions of so called *two-step models,* which hold that fluency is affectively neutral and can lead to increases in positive as well as negative responses, depending on the judgment task.

According to the nonspecific activation model proposed by Mandler and colleagues, the effects of fluency manipulations (e.g., repetition, priming) "are assumed to be content free and merely produce the greater accessibility of the activated representation" (Mandler, Nakamura, & Van Zandt, 1987, p. 646). This increased activation, in turn, leads the person to make more extreme judgments of the target, with the specific outcome depending on the judgment task. Summarizing their position regarding the mere-exposure effect, Mandler and colleagues wrote: "The hypothesis is that the prior exposure generates and activates the stimulus representations, and that such activation may then be related to any judgment about the stimuli that is stimulus relevant" (p. 647). This hypothesis predicts, for example, that increased fluency results in judgments of increased brightness when the question pertains to brightness, but of increased darkness when the question pertains to darkness. Empirically, this is the case (Mandler et al., 1987).

A related two-step model, proposed by Jacoby and colleagues, offers similar predictions. This model suggests that processing facilitation leads to an affectively neutral, "arousal-like" experience of fluency (Jacoby, Kelley, & Dywan, 1989). Based on contextual cues, this neutral fluency experience is then disambiguated and results in a more specific feeling. For example, in the context of a memory task, high fluency is presumably experienced as a feeling of familiarity, whereas in a context of a problem-solving task, the same fluency is presumably experienced as a feeling of confidence. This logic is analogous to Schachter and Singer's (1962) two-factor theory of emotion, which holds that in the presence of proper contextual cues, nonspecific arousal can lead to opposite emotions (see Jacoby et al., 1989; p. 395).

The two-step models presented by Mandler et al. (1987) and Jacoby et al. (1989) were primarily developed to account for implicit memory phenomena and discussed affective judgments rather parenthetically. Embracing the above logic, however, psychologists advanced closely related explicit models of the mere-exposure effect. For example, Bornstein and D'Agostino (1992, p. 106) suggested that the mere-exposure effect results from participants' attempts to arrive at "the most parsimonious and reasonable explanation" of "the experience of perceptual fluency, given situational constraints and the available contextual cues." In the process, the fluency experience may be attributed "to liking or, for that matter, to any variety of stimulus properties that the subject is asked to rate" (p. 107). Similarly, Klinger and Greenwald (1994) suggested that "in the context of performing liking judgments, misattributions to liking and disliking are likely because the goal of the subject is to form a preference" (p. 77). Two-step models of this type, which explicitly acknowledge their indebtedness to Schachter and Singer (1962), converge on the prediction that high fluency can result in judgments of increased liking as well as increased disliking, depending on the specific nature of the judgment task.

Yet, as Reisenzein (1983) noted in a comprehensive review, Schachter and Singer's (1962) prediction that nonspecific arousal can equally result in positive as well as negative emotions has received little empirical support. The same appears to hold true for the above extensions of the two-factor theory, which have received considerable support in the nonevaluative domain and little support in the domain of preferences. Specifically, the impact of fluency on nonevaluative judgments depends, indeed, on the focus introduced by the judgment task, as illustrated by the brightness/darkness findings of Mandler et al. (1987) and the truth/fame/recognition findings of Jacoby and colleagues (Kelley & Jacoby, 1998). Yet, attempts to demonstrate a similar focus-dependency in the evaluative domain have consistently failed. For example, in Mandler et al.'s (1987) studies, as well as a follow-up by Seamon, McKenna, and Binder (1998), increased fluency led to higher judgments of liking, but not to higher judgments of disliking. This pattern contradicts two-step accounts, but is consistent with the assumption that fluency itself is positively marked. Our own studies reiterate this observation.

In one study (Reber et al., 1998, Study 2), we asked some participants to judge the "prettiness" of the targets, but asked other participants to judge the "ugliness" of the targets. In another study (Reber et al., 1998, Study 3), we asked some participants to make "liking" judgments, but asked others to make "disliking" judgments. In both studies, increased perceptual fluency resulted in higher judgments of "prettiness" and "liking" and lower judgments of "ugliness" and "disliking," as reflected in significant interactions of fluency and judgment focus. In combination, these findings indicate that increased fluency does not facilitate more extreme judgments in general, but selectively increases positive evaluations.

Note, however, that these studies are subject to the objection that judgments of disliking or ugliness may be less "natural" than judgments of liking and prettiness. Thus, Mandler et al. (1987) suggested that, in their studies, repeated exposure did not enhance disliking because "disliking is a complex judgment, often based on the absence of a liking response. Linguistically, liking is the unmarked and disliking the marked end of the imputed continuum" (p. 647). That is, participants may always evaluate stimuli in terms of likeability/prettiness and only subsequently reverse their response to report it along a disliking/ugliness scale, which would thwart the attempt to manipulate judgment focus. Although possible in principle, this explanation cannot account for results of a study by Winkielman and Cacioppo (2001, Study 1). In this study, participants were presented with targets that varied in fluency, manipulated via a visual priming manipulation. Some participants were told to selectively monitor and report only their positive affective reactions, while other participants were told to selectively monitor and report only their negative affective reactions. We framed the question this way because it is hard to argue that it is more "natural" for participants to monitor or report positive responses than negative responses, especially because participants have been able to provide such valence-specific reports in other research (see Cacioppo & Berntson, 1994; Cacioppo, Gardner, & Berntson, 1997 for reviews). As expected, we found a selective effect of the fluency manipulation on affective responses. Specifically, participants who focused on positive affect indicated more positive responses to the stimuli under high rather than low fluency conditions. In contrast to the predictions of two-step models, however, participants who focused on negative affect did *not* indicate more negative responses under high rather than low fluency conditions.

In summary, studies that tested the predictions of two-step models in the evaluative domain, using initially neutral stimuli, failed to support the hypothesis that increased fluency may equally result in more positive as well as more negative evaluations, depending on the focus of the judgment task. In-

stead, the available findings are consistent with the assumption that fluency is positively marked and selectively enhances positive evaluations of the processed stimuli. The next set of studies further supports this conclusion.

Perceptual Fluency Elicits Genuine Affective Responses

Another theoretically important question concerns the nature of the evaluative responses elicited by processing facilitation. According to our hedonic marking thesis, changes in fluency lead to genuine affective responses. If so, increases in fluency should manifest themselves in psychophysiological indicators of affective activation. Demonstrating this is important for several reasons. The evidence of genuine affective responses would indicate that fluency makes "hot" contact with the affective system (Winkielman, Berntson, & Cacioppo, 2001). As such, this observation would argue against the core assumption of two-step models that fluency is associated with evaluation by virtue of "cold", context-dependent inferential processes. Furthermore, psychophysiological measures can provide evidence for the positive hedonic marking of high fluency without relying on self-reports, thus avoiding complexities inherent in interpretation of response scales discussed earlier (Mandler et al., 1987; Schwarz, 1999).

To provide such evidence, Winkielman and Cacioppo (2001) measured affective responses to fluency with facial electromyography (EMG). This technique is based on observations that affective responses are reflected in the electrical activity of facial muscles (Cacioppo, Petty, Losch, & Kim, 1986; Lang, Greenwald, Bradley, & Hamm, 1993). Specifically, positive affective responses increase activity over the region of the zygomaticus major ("smiling muscle"). On the other hand, negative affective responses increase activity over the region of the corrugator supercilli ("frowning muscle"). More important, facial EMG responses can be elicited by stimuli that vary subtly in valence and do not produce overtly visible facial expressions (Cacioppo, Bush, & Tassinary, 1992; Dimberg, Thunberg, & Elmehed 2000). In the Winkielman and Cacioppo (2001) studies, participants were again asked to watch pictures of everyday objects. The fluency with which these pictures could be processed was manipulated through visual priming in Study 1 and through variations in presentation duration in Study 2. While participants watched the pictures, the EMG activity was recorded from several muscle sites, including the zygomaticus major and corrugator supercilli. Participants were also asked to rate each picture using scales designed to tap selectively into positive and negative affect, as described previously. To avoid a contamination with spontaneous EMG responses, however, participants gave these ratings several seconds after the presentation of the picture. The results of both studies were very consistent. 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). Furthermore, these differences in activity occurred in the first 3 seconds after the presentation of the stimulus, several seconds before subjects made their overt judgments, indicating a spontaneous affective response to processing fluency.

In combination, the findings of the Winkielman and Cacioppo (2001) studies suggest that manipulations of processing fluency have genuine affective consequences, thus supporting our theoretical assumption that fluency is hedonically marked and triggers the affect system. Furthermore, these findings suggest that the affect generated by processing facilitation is positive, thus providing another argument against the assumption of the two-step models that fluency is equally likely to elicit positive as well as negative responses.

Perceptual Fluency and the Mere-Exposure Effect

Research into the fluency-evaluation link was initially stimulated by debates about the mere-exposure effect (Zajonc, 1968, 1998). More than 30 years of research have shown that repetition reliably enhances liking for an initially neutral stimulus (for review see Bornstein, 1989). As noted earlier, several authors have proposed that the mere-exposure effect may be based on changes in perceptual fluency (Bornstein & D'Agostino, 1994; Jacoby et al., 1989; Seamon et al., 1983). Although our findings are incompatible with the two-factor models that have been stimulated by this assumption, they highlight that any variable that increases fluency of processing will result in more positive evaluations of the stimulus. From this perspective, repetition is just one of the many variables that increase fluency of processing and priming, duration, figure-ground contrast, and probably many other variables, are functionally equivalent.

Further supporting the parallels between effects of stimulus repetition and other manipulations of processing fluency, Monahan, Murphy, and Zajonc (2000) observed that repeated exposure elicits positive affect. In their study, participants were exposed to 25 ideographs under subliminal conditions, and were later asked to report their tonic mood. For some participants, each of the 25 ideographs was different, while for other participants, 5 different ideographs were repeated 5 times each. The results showed that participants subliminally exposed to repeated ideographs reported being in a better mood than participants exposed to 25 different ideographs. Moreover, Harmon-Jones and Allen (2001) observed that repeatedly presented stimuli elicited stronger EMG activity over the zygomaticus region, indicative of positive affect, without changing the activity over the corrugator region. These findings are consistent with the EMG results obtained by Winkielman and Cacioppo (2001), based on different ma-

nipulations of processing fluency. In combination, the Monahan et al. (2000), Harmon-Jones and Allen (2001), and Winkielman and Cacioppo (2001) studies demonstrate that stimulus repetition, as well as other manipulations of processing fluency, can elicit a positive affective response.

Although we suggest that the mere-exposure effect is driven by the impact of stimulus repetition on processing fluency, we agree with Zajonc (1998) that the mere-exposure effect cannot be fully explained by the two-step models discussed earlier (Bornstein & D'Agostino, 1994; Jacoby et al., 1989; Klinger & Greenwald, 1994; Mandler, 1980). Instead, we propose that the positive hedonic marking of the fluency signal is the crucial ingredient, consistent with the accumulating evidence that high fluency elicits positive affect. Furthermore, we suggest that the role of perceptual fluency in the mere-exposure effect is consistent with the notion of "preferences without inferences" (Zajonc, 1980, 2000). After all, affective responses may result from changes in the dynamics of perceptual processing that are generated very early and do not derive from analysis of stimulus features.

CONCEPTUAL FLUENCY ENHANCES LIKING

So far, we have focused on the consequences of *perceptual fluency*. Accordingly, the studies reviewed here relied on manipulations like visual priming, presentation duration, figure-ground contrast, or stimulus repetition, which are designed to influence low-level stages of processing, concerned with identifying the stimulus' physical identity. As the following studies indicate, parallel effects can also be observed for increases in *conceptual fluency*. These studies relied on manipulations designed to influence high-level stages of processing, concerned with identifying the meaning of the stimulus. In addition to extending the fluency-evaluation link from perceptual to conceptual fluency, these studies address theoretical issues related to the relative contributions of perceptual and conceptual fluency, the automaticity of the mediating processes, and the nature of subjective fluency experiences.

Conceptual Fluency Increases Evaluative Judgments

To our knowledge, the first experiment that directly examined the influence of conceptual fluency on evaluative judgments was conducted by Whittlesea (1993, Experiment 5). In his study, the fluency with which target words could be processed was manipulated by embedding them in a predictive or nonpredictive semantic context ("stormy seas tossed the *boat*" vs. "stormy seas tossed the *lamp*"). Words embedded in the predictive context (e.g., boat) were pronounced faster than words embedded in a nonpredictive context (e.g., lamp), indicating higher fluency. More important, when participants were asked how much they like the target words, the semantically predicted words (boat) were rated as more pleasant than the nonpredicted words (lamp). Unfortunately, Whittlesea's study is ambiguous in several respects. First, it is unclear if the preferences for target words were influenced by a facilitation of fluency in the predictive context, an impediment in fluency in the nonpredictive context, or both. Second, it is unclear to what extent participants' preferences actually reflected the fluency with which they processed the target words, rather than their reactions to the (in)congruity of the whole sentence. That is, participants may have found the sentences like "stormy seas tossed the lamp" to be ill-formed or highly unusual, and may have generalized this reaction to the word "lamp." Hence, Whittlesea's (1993) pioneering exploration of conceptual fluency is consistent with the perceptual fluency results reviewed above, but suffers from some ambiguities.

To avoid these ambiguities, we used a cross-modal semantic paradigm to test the evaluative consequences of conceptual fluency. This paradigm has previously been used to examine the contribution of conceptual fluency to recognition memory (Fazendeiro & Luo, 2000; Roediger, Srinivas, & Weldon, 1989; Weldon, 1993). Specifically, participants are first exposed to "study" stimuli (primes) that are presented in one representational form (e.g., words) and subsequently respond to "test" stimuli (targets) that are presented in a different form (e.g., pictures). The relation between test and study stimuli may be of different kinds. The stimuli can be unrelated (word "dog", picture "shovel") or they can be semantically related, based either on their associative link or membership in a common category (word "key," picture "lock"). Research using this paradigm showed that participants are more likely to erroneously recognize a test item as previously presented when the item is semantically related to study items than when it is not (Fazendeiro & Luo, 2000). It is worth emphasizing that this effect reflects the influence of primes on conceptual fluency for targets, and does not depend on changes in perceptual fluency (Roediger et al., 1989).

We used two versions of the cross-modal semantic paradigm to examine evaluative consequences of conceptual fluency (Fazendeiro & Winkielman, 2000; Winkielman & Fazendeiro, 2000). In some studies, a prime word immediately preceded each picture target (cross-modal semantic priming) whereas in other studies, a list of prime words was presented first and was followed after a small delay with a list of picture targets (cross-modal semantic memory).

Cross-Modal Semantic Priming. Participants were shown a series of pictures of common objects and animals. Each picture was preceded by a letter string consisting either of a word or a nonword. Participants were kept from

focusing on the word–picture relation by performing two different tasks. First, the participants indicated, as fast as possible, if the letter string was an actual English word. Second, the participants reported their liking for the picture. The letter strings served as the manipulation of conceptual fluency. Specifically, some pictures were preceded by matched words (e.g., word "dog" - picture "dog"), introducing the highest level of fluency. Other pictures were preceded by associatively related words (e.g., word "key" - picture "lock"), introducing a medium level of fluency. Yet other pictures were preceded by an unrelated word (e.g., word "snow" - picture "desk"), introducing the lowest level of fluency. The results showed a robust effect of conceptual fluency on participants' evaluation of the target pictures. As expected, 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.

Cross-Modal Semantic Memory. We replicated and extended the above findings using a paradigm where participants first studied a list with 32 pictures and words, each presented for 250 ms. After a short delay, participants were presented with another list of items and indicated their liking for them. The items on this test list were of three different types. Some test items were previously presented on the study list in the same modality (e.g., picture "bird" - picture "bird"). Other items were semantically related to items from the study list and appeared in a different modality (e.g., word "snow" - picture "shovel"). Finally, yet other test items had no semantic relation to the study items (e.g., word "snow" - picture "desk").

We conducted several studies using this paradigm. Across these studies, we observed that participants liked pictures that were associatively related to words from the study list significantly more than pictures that had no semantic relationship to words from the study list. Moreover, participants tended to like the new, but "related" pictures as much as the previously presented "old" pictures. This finding suggests that conceptual fluency elicited by a cross-modal semantic associate may increase liking as much as perceptual fluency from previous exposure to the same stimulus in the same modality.[4] This finding is consistent with other research that observed an equal, and occasionally greater, influence of conceptual as compared to perceptual fluency (Poldrack & Logan, 1998; Whittlesea, 1993).

[4]In this, as in all other studies using the memory paradigm, fluency increased liking only in the "word at study - picture at test" direction. No systematic effects were observed in the "picture at study - word at test" direction. This finding suggests a picture superiority effect—very good memory for information presented in the picture form (Israel & Schachter, 1997). Specifically, because participants remember the study pictures very well, they are less likely to (mis)attribute the fluency to the related words at test (Jacoby & Whitehouse, 1989).

The Role of Automatic Processes

Our studies in the cross-modal semantic memory paradigm have also allowed us to address theoretical issues regarding the mechanisms underlying the observed influence of fluency. As discussed earlier, we assume that fluency elicits a positive affective reaction that is perceived as being about the target (Higgins, 1998). This process does not require conscious inferences about the meaning of fluency or conscious attributions of positive affect to the target. Instead, conscious inferences are only involved when the informational value of the experience is discounted, an issue to which we return further in this chapter (see Schwarz, 1990, for a discussion). Accordingly, the previously observed effects of fluency on liking judgments should be obtained even when participants' cognitive resources are limited. In fact, we may expect that fluency effects increase under resource limitations, because these limitations interfere with the integration of additional information about the stimulus. This prediction parallels the observation that mood effects increase under time pressure (Siemer & Reisenzein, 1998), consistent with the predictions of the mood-as-information model (Schwarz, 1990).

To test this prediction, we asked some participants to hold an 8-digit number in mind while evaluating the test stimuli. As expected, the impact of fluency increased under resource limitations. Specifically, participants preferred "related" pictures more strongly to "unrelated" pictures when they were under cognitive load than when they were not. This finding suggests that reliance on the hedonically marked fluency signal is automatic and does not require extensive inferences (Bargh, 1996).

The Role of Attribution

The earlier observation that reliance on the affective reactions elicited by fluency is a "default" strategy that requires few cognitive resources does not imply, however, that the observed influence is unconditional. If participants are aware that their response to the stimulus may be influenced by external variables, they may discount their response as irrelevant to the judgment at hand, as has been observed for other sources of experiential information (for a review see Schwarz & Clore, 1996). Note, however, that the informational value of the fluency signal may be undermined in two different ways. On the one hand, people may become aware that a variable like exposure duration influences the ease with which the stimulus can be processed. Such awareness may undermine the informational value of the fluency signal, along with the informational value of the affective experience that is part and parcel of the fluency signal (as suggested by the EMG studies; Winkielman & Cacioppo, 2001). On the other hand, people may at-

tribute their affective response to an external variable, thus undermining only the informational value of the elicited affect. We addressed both of these possibilities in two studies based on the cross-modal semantic memory paradigm.

In one study, we manipulated participants' attributions by varying the presentation time for study words. For some participants, the study words were presented for 250 ms (short condition); for other participants, the words were presented for 2000 ms (long condition). We expected that participants in the long condition would be more likely to identify the true source of the enhanced fluency and would accordingly discount their fluency-based reaction to test pictures. The logic of this manipulation is based on research that shows that awareness of the priming episode undermines the otherwise observed effects (e.g., Jacoby & Whitehouse, 1989; Lombardi, Higgins, & Bargh, 1987; Strack et al., 1993). The results confirmed our predictions. Participants in the short exposure condition liked the "related" pictures more than "unrelated" pictures. Yet, no difference in liking was obtained in the long exposure condition, presumably reflecting the discounting of fluency-based reactions.

In a second study, we introduced two different misattribution manipulations designed to undermine either the informational value of the affective response or the informational value of the fluency experience. Specifically, we told participants, before they made their liking judgments, that their reactions to the stimuli might be influenced by background music played to them. The music was an ambiguous new-age piece recorded at half-speed (see Schwarz, Bless, Strack, Klump, & Rittenauer-Schatka, 1991, for details on this manipulation). Some participants were told that the music might bias how easily stimuli come to mind (i.e. their fluency experience), whereas other participants were told the music might influence how they feel about the various stimuli (i.e. their affective experience). The results were highly informative. Specifically, attributing subjective fluency to music did not eliminate the effect of processing facilitation on liking. That is, participants who were informed that the music might influence how easily things come to mind still judged pictures as more likeable when they were preceded by related rather than unrelated words, replicating our previous findings. In contrast, attributing the affective response to the music *did* eliminate the effect of processing facilitation on liking. That is, participants who were informed that the music might influence their feelings toward various stimuli no longer judged new pictures as more likeable when they were preceded by related rather than by unrelated words. We interpret this pattern of results as suggesting that processing facilitation may immediately lead to an affective reaction. It is this affective reaction, and not the fluency experience itself, that is attributed to the target picture, resulting in enhanced liking. This interpretation is consistent with the findings reviewed previously, which indicate that facilitation of perceptual processing elicits a positive affective experience, as revealed in judgment asymmetries (Reber et al., 1998; Seamon, Luo, & Gallo, 1998), electromyographic findings (Harmon-Jones & Allen, 2001; Winkielman & Cacioppo, 2001), and mood reports (Monahan et al., 2000).

CONCLUSIONS AND BOUNDARY CONDITIONS

This chapter presented theoretical and empirical arguments for a causal influence of processing fluency on evaluations. The reviewed studies demonstrate that perceptual and conceptual manipulations of processing fluency reliably influence evaluative judgments. The findings further indicate that processing fluency elicits positive affect, which can be captured with psychophysiological measures. Finally, the misattribution studies suggest that this positive affect is the crucial link between fluency and positive evaluations: When the informational value of the affective reaction is undermined, fluency effects on preference judgments are no longer obtained. Several variables are likely to moderate the impact of fluency on preference judgments and we conclude this chapter with a discussion of these variables and the identification of likely boundary conditions.

First, human findings and computer simulations suggest that the fluency signal is generated at very early stages of information processing (Curran, 2000; Lewenstein & Nowak, 1989; Norman et al., 2000; Smith, 2000). Accordingly, the fluency-based affective response might be the *first* evaluatively relevant information available. We would therefore expect fluency effects on preference judgments to be strongest under conditions that limit the extraction of additional information, which may compete with the fluency signal in the computation of a judgment. Such conditions include time pressure, limited cognitive capacity and a lack of motivation to process the stimulus in sufficient detail. So far, only the cognitive capacity prediction has been tested and has received clear support, as reviewed above.

Second, the fluency signal may be the most informative input when little other information can be extracted from the stimulus (e.g., because the stimulus is an unknown Chinese ideograph; e.g., Zajonc, 1968) or a neutral geometrical shape with little inherent meaning (e.g., Reber et al., 1998). When the stimuli are more meaningful, the impact of the fluency signal may be attenuated, provided that the conditions allow for the extraction of stimulus meaning. Consistent with these assumptions, exposure frequency, exposure duration and figure-ground contrast have been found to have the strongest influence on preference judgments when the stimuli are novel, neutral, and presented for relatively short durations (e.g., Bornstein & D'Agostino, 1992; Reber & Schwarz, 2001).

Third, by the same token, highly familiar or simple stimuli may initially elicit a positive reaction because they can be processed with high fluency but may seem uninteresting and boring once their features are extracted and attended to (Bornstein, Kale, & Cornell, 1990). The observation that fluency increases liking is therefore not at odds with the observation that people may sometimes prefer novel, complex, and surprising stimuli over simple and familiar ones (Cox & Cox, 1988). We propose, however, that the latter preference emerges at a later stage of processing and is different from, and independent of, the immediate positive affect elicited by fluency at an earlier stage.

Fourth, when fluency derives from incidental variables, like exposure duration, exposure frequency or priming manipulations, awareness of these variables is likely to undermine the perceived informational value of fluency and its accompanying affective response. This is consistent with the misattribution studies reviewed previously, as well as with the observation that mere-exposure effects decrease with increasing awareness of the manipulation (Bornstein & D'Agostino, 1992). Moreover, these findings parallel similar observations with regard to other sources of experiential information (for a review see Schwarz & Clore, 1996).

Fifth, to avoid overgeneralization, it is worth emphasizing that many evaluative judgments (e.g., judgments of morality) require a consideration of stimulus meaning. The degree to which initial fluency-based affective reactions influence such judgments is an open question, which deserves attention in future research.

Sixth, when forming *nonevaluative* judgments, individuals are likely to ignore the hedonic component of their fluency experience, but still draw on its other aspects. In that case, they need to interpret the implications of their fluency experience for the judgment at hand, as suggested by the two-step models (Jacoby et al., 1989; Mandler et al., 1987). Under these conditions, the impact of fluency depends on the focus of the judgment task and high fluency may, for example, enhance judgments of different conceptual qualities, such as fame or truth, or different perceptual qualities, such as loudness or clarity. However, such focus-of-judgment effects are not observed for evaluations, as discussed earlier.

Seventh, it is possible that the impact of experienced fluency is moderated by the person's processing expectations. Whittlesea and Williams (1998) observed, for example, that participants who initially expected a stimulus to be uninterpretable were more likely to attribute processing fluency to prior exposure than participants who did not expect interpretation difficulties. Hence, the former were more likely than the latter to conclude that they had seen the stimulus before. The role of processing expectations in the fluency-affect link has so far received no attention.

Finally, it is possible that high fluency may lead to more *negative* evaluations under some specific conditions. Although such a reversal of the usually obtained positive influence has not yet been observed, it is conceivable under two conditions. First, in an environment where, say, familiarity or prototypicality are associated with danger, fluency may become a reliable cue to negativity. A test of this possibility awaits the identification of a suitable environment. Second, and less speculative, such reversals are likely when people are lead to consciously believe that the subjective experience of processing fluency is an indicator of negative value. In this case, their initially automatic positive reaction to high fluency may be overridden by deliberate, theory-driven inference processes that result in a negative judgment. The fact that individuals' "naive" theories about the meaning of subjective experiences can determine which inferences they draw from a feeling is well documented (e.g., Skurnik, Moskowitz, & Johnson, 2000; Winkielman & Schwarz, 2001; see Skurnik, Schwarz, & Winkielman, 2000, for a discussion), but has not yet been tested for the influence of fluency on evaluative judgments.

As this discussion of moderators and boundary conditions indicates, we generally expect fluency-based affective reactions to exert their strongest influence under the conditions that are also known to give rise to pronounced mood effects in evaluative judgment: When little other information is available; when the person's processing capacity or motivation is low, thus limiting more deliberate information search and integration; and when the informational value of the affect has not been called into question (for discussions see Schwarz, 1990; Schwarz & Clore, 1996). However, these parallels should not distract from the unique character of fluency-based affect. Most important, fluency-based affect is not based on the analysis of the stimulus meaning (in contrast to specific emotions), nor does it necessarily reflect incidental influences that are completely unrelated to the stimulus (such as the weather or an earlier compliment), as is typical for moods. Instead, it results from the dynamics of information processing itself. In this sense, processing fluency allows preferences that do not depend on the affective content of the stimulus proper.

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