

## Hot Cognition and Social Judgments

### *When and Why Do Descriptions Influence Our Feelings?*

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I always heard  
I could get hurt  
I knew that from the start.

Break my face, my back  
My arms, my neck  
But please, do not break my heart.

K's Choice "My heart"

#### INTRODUCTION

Affect plays a pivotal role in our mental and social lives, in what we think and in what we do. Whether a stimulus elicits a positive reaction ("I like

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this") or a negative reaction ("I hate this") or puts us in a positive affective state ("I feel good") or a negative affective state ("I feel bad") is a determining force in whether we act or do not act, whether we remember or forget, and whether we approach or avoid. The affect-laden features of stimuli help us to discriminate between what matters and what does not. Affect infuses our thoughts with meaning and fuels our actions with purpose (see also Forgas & East, this volume). In fact, in most if not all major psychological processes, affect plays an important role, for a world bereft of affect cannot exist. In such a world, there would be no evaluations, no feelings, no preferences, no moods, and no emotions, and therefore no affiliation, friendship, solidarity, mating, love, or hate, and hence no life (Zajonc, 1998). In other words, not only does affect make our heart beat quicker (or slower), it makes the world go round. Affect goes at our hearts and makes or breaks us.

#### AFFECT AND SURVIVAL

Affect not only plays a prominent role in our daily lives, it also is important when we consider our evolutionary past. The evolutionary advantage of affect-based discrimination is obvious: Evolutionary forces do not value knowledge or truth *per se*, but rather a species' survival (see also Haselton & Buss, this volume). For a species to survive, affect-based processing is essential because it helps to differentiate between hospitable (good) and hostile (bad) stimuli. In other words, affective categorizations, such as good-bad or positive-negative discriminations, allow organisms to avoid becoming a meal. As Hunt and Campbell (1997) argue, the human brain and body have been shaped by natural selection to perform affective categorizations quickly and effectively and to respond accordingly. Affective categorizations and responses are so critical for survival that humans have rudimentary reflexes for such categorizing ("Is this good or bad?"), as well as for approaching or withdrawing from certain classes of stimuli and for providing metabolic support for such actions (Cacioppo & Gardner, 1999).

The importance of affective processing is also immediately clear if one considers its role in classical conditioning, that is, in the emergence and sustainability of learning and performance. After all, for conditioning to occur, a response must previously be succeeded by a reinforcing event. And an event is reinforcing only if the organism can discriminate it as a positive or a negative event. Put differently, an organism that could not discriminate between the positive and negative consequences of its actions could not acquire stable response dispositions and therefore could not survive (Tesser, 1993).

#### AFFECT'S ADVANTAGE

On an empirical level, the importance of affective processing, of quickly detecting and reacting adequately to the affective features of stimuli, is

probably illustrated most convincingly by studies on Zajonc's (1980) *theory of affective primacy*. This theory holds that affective reactions are basic, automatic, and autonomous, occurring prior to and separately from cognitive responses. Zajonc has typically been quite vague about what he means exactly by *cognitive responses*, and has been and still is heavily criticized for attacking a straw person by (either implicitly or explicitly) assuming that *cognition* is by definition conscious, verbal, and controllable (Stapel, Koomen, & Ruijs, 2002). However, if we repackage Zajonc's theory of affective primacy in terms of the present analysis, it is clear that there is strong empirical support for (at least components) of his central thesis.

One important aspect of the theory of affective primacy is that the affective system, concerned with the processing of affective stimulus features (e.g., "Is this positive or negative?"), is separate from and partially independent of the nonaffective (in Zajonc's terms, cognitive) system, concerned with the processing of stimulus description (e.g., "Is this a woman or a man?"). This independence hypothesis is now supported by psychological as well as neuropsychological evidence (Zajonc, 1998).

Another aspect of the theory of affective primacy is the hypothesis that affective reactions (e.g., positive-negative classifications) occur *prior* to nonaffective reactions (or more descriptive responses, such as big-small classifications). And indeed, several lines of research indicate that mere detection of a stimulus by the perceiver's sensory apparatus is sufficient to classify this stimulus as positive or as negative, whereas nonevaluative classifications need longer exposure times. For example, in a series of studies Murphy and Zajonc (1993) found that very brief exposure to smiling (positive) versus frowning (negative) faces influenced participants' subsequent evaluations of novel ambiguous stimuli (Chinese ideographs), whereas very brief exposure to geometric shapes (e.g., circles) varying on nonevaluative, more descriptive dimensions (e.g., size) had no impact on participants' judgments. However, at longer (optimal, supraliminal) exposure times, these nonevaluative primes did influence participants' judgments.

These and other studies (for a review, see Stapel et al., 2002) support Zajonc's (1980, 1998) hypothesis that the affective qualities of stimuli are processed more readily than their nonaffective attributes.

#### IS A DIET OF AFFECTIVE PROCESSING ENOUGH TO SURVIVE?

Quick detection of affective stimulus features is important for survival. Therefore, the processing of affective features occurs quickly, automatically, and prior to the processing of their nonaffective counterparts. That is what the studies of the theory of affective primacy (see earlier) have shown. Affect precedes cognition because affect is more important, because affect has more survival value. Taken to its extreme, this line of reasoning seems to suggest that affect is enough to survive. If one knows whether

an environment or a stimulus is hostile or hospitable, then one has sufficient knowledge to avoid becoming a meal. The question is, of course, whether this is true. Is the (quick and automatic) detection of affective features enough to postpone death? Is knowing that something is positive or negative enough to prepare for proper action? Is assessment of the valence of things enough to respond adequately and efficiently to the diverse and ever-changing stimuli and events in the world? I do not think so.

The stimuli in the world are complex and multidimensional, seemingly incomparable. Our perceptual system has evolved to be tuned to specific features, resulting in the expression on common metrics (Cosmides & Tooby, 2000). But what are the features our system tunes to spontaneously and automatically? Are translations of multidimensional stimuli to relatively gross and nonspecific dimensions such as positive–negative, good–bad, or hospitable–hostile sufficient to regulate our feelings, thoughts, and actions successfully? Some have argued that gross, nonspecific, valence-based classifications are indeed sufficient to prepare us for proper responses to affect-laden stimuli (Bargh, 1997; Kahneman, 1998; Zajonc, 1998). I disagree.

Although valence detection is necessary, I posit that it probably is not always sufficient for successful adaptation in a complex social environment. Following and extending Scherer's (e.g., 1984) as well as Öhman's theorizing on the function of emotions (see also Öhman & Mineka, 2001), I propose that to function successfully, people need to be flexible in their (automatic) reactions and behavioral adaptations to their environment and that *descriptive* (nonaffective) processing allows for such flexibility.

In terms of evolutionary history, the flexibility of the behavioral adaptation of organisms to their environment is largely due to the ability to make *descriptive* rather than *affective* classifications. Attending and reacting solely to the affective tone of things is not enough. Descriptive classifications *decouple* the behavioral reaction from an affect-infused stimulus event by replacing rigid reflex-like stimulus–response patterns or instinctive innate releasing mechanisms. As higher species evolve, they develop a need for increasingly complex information processing together with greater flexibility and variability of behavioral inventories. To accomplish this, the organism requires a mechanism to allow for the quick, efficient, and adequate adaptation of its behavior to changing external and internal stimuli (Cacioppo & Gardner, 1999). Such a mechanism makes possible the constant evaluation and reevaluation of complex stimuli, situations, and events without much time delay. The quick and efficient detection of not only affective but also nonaffective (i.e., descriptive) stimulus features is such a mechanism.

Description adds specificity to affective processing. Description shapes affective processing by making it specific, and specificity is essential to obtain flexibility in processing and variability in responding. Without the

processing of its descriptive features, an affect-laden stimulus is classified only in terms of its valence (i.e., on a positive–negative dimension), and knowing only that something is positive or negative is hardly enough to prepare for proper action (Robinson, 1996). To give an example from the domain of emotions: To react quickly but properly to someone expressing fear, it is important to detect the valence of this emotion (negative), as well as its descriptive meaning. Only then can we react appropriately and distinctively. After all, seeing fear demands a different reaction than seeing disgust, sadness, or anger. And often, this reaction needs to be quick and effective. If one is not capable of quickly determining whether a person (or an animal) expresses anger, disgust, or fear, one may get hurt (Forgas, 2001; Zajonc, 1998). To react quickly and properly to changes in the environment, it is important to detect automatically affective as well as nonaffective features of the stimuli inhabiting that environment.

I thus argue that even though affective (i.e., diffuse, nondescriptive) stimulus components constitute the main (and relatively early) input of our feelings, emotions, evaluations, and behaviors, affect seldom is the only input. The meaning of an affective reaction changes when it is enriched by particular descriptive inferences. Being in a good mood is pleasant, but being in a good mood after a hard day's work feels different from being in a good mood after winning the lottery. Similarly, noticing a colleague smile at you while you leave the building is likely to be different when you have just been fired than when you have just become a parent.

Descriptive inferences that accompany affective reactions thus constitute an important determinant of the content of affect-infused feelings, thoughts, and actions. Moreover, because descriptive processing is essential for adequate maneuvering through our complex social world (i.e., has survival value), it is likely to occur in the earliest stages of the information processing chain. If it is so important, descriptive processing should be quick. In other words, descriptive processing of affect-laden information is likely to occur automatically, without awareness, intention, or control (cf. Bargh, 1997).

#### VARIETIES OF AUTOMATICITY: AUTOMATIC EVALUATION AND DESCRIPTION EFFECTS

If we consider what the human mind is designed for, it is only logical to assume that the information processing system is designed in such a manner that both affective and nonaffective appraisals of affect-laden stimuli can occur in the earliest stages of the processing chain, that is, spontaneously and automatically. Because early detection of affective as well as nonaffective stimulus features is essential for survival, there is no a priori reason to assume that the domain of automaticity should be reserved for the processing of affective stimulus properties.

Surprisingly, to date, studies on automaticity and affective processing have been concerned mainly with demonstrating that the evaluative or *affective* meaning of affect-laden stimuli can be processed without awareness. There is now a small cottage industry of studies showing this *automatic evaluation effect* (Bargh, 1997; Fazio, 2001; Glaser & Banaji, 2001), but there is hardly any research demonstrating the automatic detection of nonaffective features of affect-tinged stimuli. Reviews of automaticity research (Bargh, 1997; Bargh & Ferguson, 2001) and affect priming studies (Fazio, 2001; Glaser & Banaji, 2001; Zajonc, 1998) tend to equate automatic processing with affective processing. I posit that in the processing of affect-laden stimuli, nonaffective as well as affective features can be processed automatically.

Even though there is a large number of studies corroborating Zajonc's idea that affective information is picked up prior to nonaffective information, there is no reason to conclude from such affect-precedes-cognition findings that only affective and information can be perceived without awareness. In fact, in both the cognitive psychology and social psychology literatures, there is ample evidence that nonaffective, descriptive, denotative meaning can be picked up without awareness. A number of studies have demonstrated that people may process the meaning of *neutral* words, such as *table*, *cat*, or *building*, without awareness (e.g., Greenwald, Draine, & Abrams, 1996), and several investigations have shown effectively the impact of suboptimally presented, *neutral* (nonaffective) information on judgment and behavior (Stapel & Koomen, 2000). However, even though the notion that descriptive meaning can be processed automatically can hardly be called new, the possibility that the descriptive processing of *affect-laden* stimuli could occur automatically is typically overlooked and under-researched in the relevant literature (Bargh, 1997; Forgas, 2001; Zajonc, 1998).

#### EARLY AND LATE AFFECT

A functionalist perspective on affective processing that focuses on what kind of processing is needed to survive suggests that there may be varieties of unconscious affect. Previous studies on automaticity and affective priming have shown that the detection of affective stimulus features may occur without awareness and has a stable processing advantage over the detection of nonaffective features. It is logical to assume, however, that because crude affective (e.g., positive-negative) classifications will seldom be sufficient to adapt adequately in a complex social environment, nonaffective (e.g., big-small) classifications should also occur quickly and automatically. In Zajonc's terminology: Affect may precede cognition, but both affective and cognitive reactions may occur without awareness.



Figure 11.1. What we see when we see without awareness. When exposed to a smiling, young, dark-haired female face (a), exposure time may be an important determinant of what one actually perceives. At very short subliminal exposure, only affect (the valence of the facial expression) should be detected (b). At slightly longer subliminal exposure, however, information about other features of the picture, such as hair color or gender, will become available (e.g., a smiling dark-haired woman), filling in one's initial affective reaction with more descriptive appraisals, resulting in a representation that is akin to what is actually presented (a).

This suggests that what we see when we see without awareness depends (at least in part) on the *exposure duration* of the presented information. At very short exposures, affective influences might take place, giving rise to gross affective classifications (positive–negative). These early affective reactions will be unencumbered by more descriptive, nonevaluative reactions that may require fuller access if the stimuli are to be fully encoded. At longer exposures, stimuli also are likely to activate more complex networks of associations allowing for feature identification and recognition (Bargh, Litt, Pratto, & Spielman, 1989; Murphy & Zajonc, 1993). Thus, when one is exposed to a smiling, young, dark-haired female face (Figure 11.1a), exposure time may be an important determinant of what one actually perceives. At very short exposures, only the valence of the facial expression should be detected (e.g., positive; Figure 11.1b). At longer exposure, however, information about other features of the picture, such as hair color or gender, will become available (e.g., a smiling, dark-haired woman), filling in the initial affective reaction with more descriptive appraisals.

An important difference between early and late reactions to stimuli possessing affective as well as nonaffective features is that, by definition, affective information that is activated early is more simple, gross, or *diffuse* (e.g., positive versus negative) than affective information that is activated late (e.g., "happy dark-haired woman" versus "angry blond man"). Early affective reactions are, by definition, diffuse and unspecified because they are cognitively unappraised. Early affect is "free-floating" and "undecided" (Murphy & Zajonc, 1993, p. 591). Later in the information processing chain (but still without awareness), these diffuse, gross, affective appraisals may become enriched by descriptive (cognitive) appraisals. In other words, even within the domain of affect-infused reactions to suboptimally presented stimuli, one may distinguish early affect-only (Figure 11.1b) reactions that are relatively gross and *diffuse* and late affect-plus-cognition

(Figure 11.1a) reactions that may result in the activation of affect-infused exemplar information that is relatively specific and *distinct*.

#### THE CONSEQUENCES OF EARLY (DIFFUSE) AND LATE (DISTINCT) AFFECT

This distinction between early and late affective reactions in terms of the distinctiveness of the activated representations may have important implications for affect's effects. That is, the distinction between *diffuse affect* and *distinct affect* is essential when it concerns the consequences of affect-laden stimuli on subsequent evaluations and actions. Why should distinctness matter for the impact of suboptimally activated information? In earlier studies, my colleagues and I tested the hypothesis that distinctness is important for the direction of *supraliminal* priming effects. The reasoning behind these investigations was as follows: Many impression formation models assume (either implicitly or explicitly) a direct relation between the *direction* of the impact of activated information on judgment (assimilation or contrast) and the *component* of the impression formation process on which such information mainly exerts its influence (interpretation or judgment) (for extensive reviews, see Stapel & Koomen, 2001a, 2001b). That is, activated information should be more likely to yield assimilation when it is used during encoding or interpretation, whereas contrast is more likely when this information serves as a comparison standard during judgment (see also Bless, Schwarz, & Wänke, this volume; McClure, Sutton, & Hilton, this volume). But what determines whether accessible knowledge will serve predominantly as an interpretation frame or as a comparison standard?

In a number of studies, we showed that one important determinant of the direction of accessibility effects is the distinctness of the activated information. Whereas diffuse information is more likely to be used as an interpretation frame during the encoding of a stimulus and result in assimilation, distinct information is more likely to be used as a comparison standard in the judgment stage and result in contrast (Stapel & Koomen, 2001a). Distinct information constitutes a separate entity with clear object boundaries (e.g., a person exemplar, "a sad, dark-haired woman") and is therefore more likely to be used as a specific comparison standard in the construction of judgments than diffuse information (e.g., an abstract construct, positive). When information is diffuse, assimilation is likely to occur. As Murphy and Zajonc (1993, p. 736) put it in their discussion of the impact of diffuse affect, such affect "can 'spill over' onto unrelated stimuli" (for a similar line of reasoning, see Forgas & East, this volume; Schwarz & Clore, 1996). Or as Zajonc (1998, p. 54) wrote when summing up some of the features of diffuse affect, "It is more like moisture, it is like odor, like heat. It can disperse, displace, scatter, permeate, float, combine, fuse,

blend, spill over, and become attached to any stimulus, even one totally unrelated to its origins.”

There are now several empirical studies that support the distinctness hypothesis in domains as diverse as person perception, self-perception, advertising effects, and organizational decision making (Stapel & Koomen, 2001a). For example, we found that when the task is to judge a target person, priming diffuse trait information (“hostile” versus “friendly”) before a target person (vaguely hostile Mike) has to be judged results in assimilative interpretation effects, whereas priming distinct person information (“Dracula” versus “Mandela”) yields contrastive comparison effects.

The present functionalist analysis of the processing of affect-laden stimuli suggests that my previous research on the impact of supraliminally presented context information could be taken one important step further. That is, the preceding analysis of the differences between early and late affective reactions implies that distinctness may be an important determinant not only of the impact of optimally presented stimuli, but also of the effect of suboptimally exposed stimuli. In the impression formation chain, one can distinguish between the early, diffuse activation of affective information and the later, distinct activation. We also know that diffuse information is more likely to yield assimilation, whereas distinct information is more likely to lead to contrast. Combining these two principles suggests that automatic effects of (affect-laden) information may be assimilative and diametrically opposed to the effects of later, distinct information that is more likely to produce contrast effects. Whether assimilation or contrast is observed should thus depend on the latency of the response. Following Zajonc’s affect-precedes-cognition logic and recent research on the role of information distinctness in determining the direction of context effects, it could be assumed that the impact of suboptimally presented affective stimuli (e.g., positive versus negative faces) may be contrastive as well as evaluative on evaluative judgments of neutral target stimuli. Specifically, subliminal exposure to a distinct, specific emotion face (e.g., Figure 11.1a) should result in assimilation when this face is flashed very briefly, such that affective features only can be detected, and diffuse information is activated (e.g., Figure 11.1b). Contrast should occur when this emotion face is flashed somewhat longer, such that affective as well as nonaffective features can be detected, and a distinct face exemplar may be activated (e.g., Figure 11.1a).

### **Very Short versus Moderately Short Priming**

In a first study, we (Stapel et al., 2002) tested this line of thinking, and this was precisely what we found. In this study, we used an unrelated-task subliminal priming paradigm. Participants were told that they would participate in a number of ostensibly unrelated tasks. First, participants performed a parafoveal vigilance task in which line drawings of



Figure 11.2. Priming and target stimuli used in the first study. In a vigilance task, participants were first primed subliminally (very short or moderately short) with positive (happy) or negative (sad) male faces. After having completed the vigilance task, participants were presented with a drawing of the neutral male face and were asked to rate this face on a sad–happy dimension.

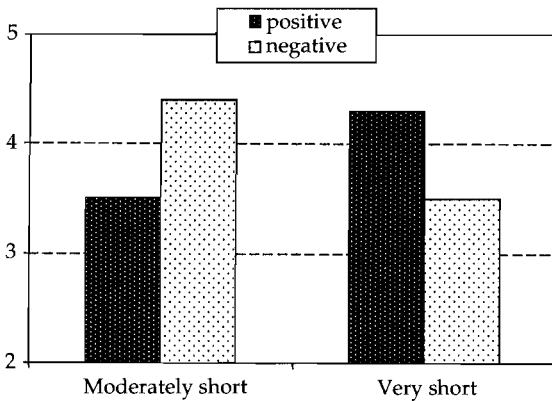


Figure 11.3. Mean sad–happy (1–7) ratings of a neutral male target face drawing as a function of prime exposure (moderately short, extremely short) and prime valence (positive, negative) using male faces as priming stimuli.

positive (happy) or negative (sad) facial expressions of a male person (see Figure 11.2) were presented outside of awareness. In the *very short* exposure conditions, these pictures were primed suboptimally, but for a very short time (30 ms). In the *moderately short* exposure condition, the drawings were also primed suboptimally (for relevant tests, see Stapel et al., 2002), but for a slightly longer time (100 ms). Participants were told that their task was to decide as quickly and accurately as possible whether the flash appeared on the left or right side of the screen. After having completed the vigilance task, participants were presented with a drawing of a neutral male face (see Figure 11.2) and were asked to rate this face on a sad–happy dimension.

As can be seen in Figure 11.3, the impact of subliminally primed positive versus negative emotion faces on judgments of a neutral target face is a function of prime exposure. In the *extremely short* exposure conditions, exposure to positive male faces yielded more positive target judgments than

exposure to negative male faces, an assimilation effect. In the moderately short exposure conditions, however, this pattern was reversed. Exposure to a positive male face yielded less positive target judgments than exposure to a negative male face, a contrast effect.

These findings corroborate the present perspective on (automatic) affective processing effects. They suggest that even though affective stimulus features are picked up earlier than their nonaffective counterparts, both affective and nonaffective stimulus features may be picked up outside of conscious awareness. They also demonstrate that exposure time is an important determinant of whether subliminal priming of affect-laden stimuli results in assimilation or contrast, which is in line with the hypothesis that early affect is diffuse, whereas late affect can be distinct.

### **Affect Only versus Affect and Cognition**

To test the robustness of these first findings, we performed a second experiment in which we expanded the design of our first study in a way that allowed us to test more directly the early-diffuse-assimilation versus late-distinct-contrast logic that constitutes the cornerstone of the current argument (Stapel et al., 2002). That is, in a second study, we not only primed participants with faces that possessed affective features (valence-related cues, e.g., a smiling mouth) as well as nonaffective cues (valence-unrelated cues, e.g., a male hairdo), but also added a condition in which participants were exposed to an emotion face that is "pure affect," which possesses no nonaffective features (no hair, no moustache, no necklace, no earrings, no tie, no eyebrows).

If the distinctness argument is correct, then exposure time should become less of an issue when participants are exposed to affect-only stimuli. When the priming stimulus itself is relatively diffuse, longer exposure time is unlikely to make it a distinct, specific entity that could serve as a comparison standard when judging a particular target stimulus. Thus, similar to the way in which priming diffuse trait information ("intelligent") yields assimilation, whereas priming distinct person information ("Einstein") yields contrast (Stapel & Koomen, 2000), presenting participants with happy emotion faces that are diffuse "by nature" should produce assimilation, independent of exposure time.

Using the same parafoveal priming paradigm as before, this is exactly what we found. As can be seen in Figure 11.4, when the same distinct *affect-and-cognition* primes as in our first study were used, the results of that study were replicated. In the *extremely short* exposure conditions assimilation occurred, whereas in the moderately short exposure conditions contrast occurred. However, when diffuse affect-only primes were flashed, exposure time had no effect. In both the very short and the moderately short exposure conditions, exposure to positive male faces yielded more

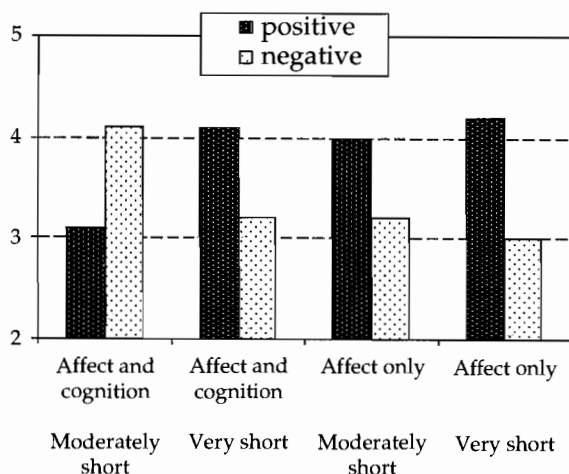


Figure 11.4. Mean sad-happy (1-7) ratings of a neutral male target face drawing as a function of prime type (affect, no cognition or affect and cognition), prime exposure (moderately short, extremely short), and prime valence (positive, negative).

positive target judgments than exposure to negative male faces, an assimilation effect. This finding further supports the early-diffuse-assimilation versus late-distinct-contrast logic: Priming diffuse, affect-no-cognition faces yields assimilation, independent of exposure time. Priming affect-and-cognition faces also yields assimilation, but only when exposure time is sufficiently short to avoid the detection of the cognitive features of these stimuli. At longer exposure, contrast occurs, suggesting that cognitive features were picked up and a more distinct representation of the face was activated.

### Not Drawings But Real Faces

In the studies just reported, we (Stapel et al., 2002) used drawings of happy, sad, and neutral facial expressions that consisted of more or less gender-specific features to provide empirical evidence for the early-diffuse late-distinct affect hypothesis. Using face drawings allowed us to control and manipulate systematically both the evaluative and nonevaluative features of our priming and target stimuli. To ensure that the effects we found in the previous studies were not an artifact of the fact that we used drawings instead of facial expressions of real people, we decided to replicate the design of the first study described. Instead of face drawings we used photographs of real facial expressions as priming and target stimuli (see Figure 11.5).

In line with the findings of our first study, we found that the impact of suboptimally exposed positive and negative male faces on the perception



Figure 11.5. Priming and target stimuli used in the real human faces study. Participants were first primed subliminally (very short or moderately short) with positive (happy) or negative (sad) male faces. After having completed the vigilance task, participants were presented with a picture of a neutral male face and were asked to rate it on a sad-happy dimension.

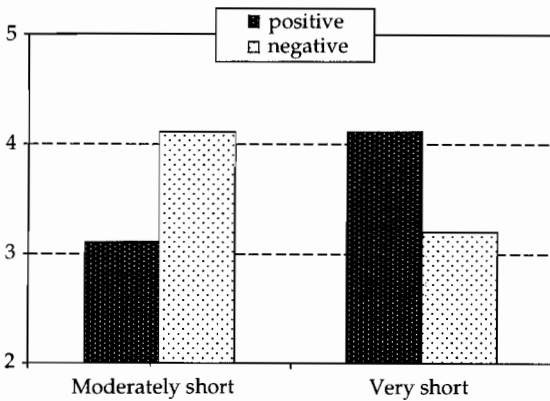


Figure 11.6. Mean sad-happy (1-7) ratings of a picture of a neutral male target face drawing as a function of prime exposure (moderately short, extremely short) and prime valence (positive, negative) using pictures of male faces as priming stimuli.

of a neutral male face would switch from assimilation to contrast, depending on whether these primes were flashed for an extremely short or a moderately short time. As can be seen in Figure 11.6, the impact of subliminally primed positive versus negative real emotion faces on judgments of a neutral target face is a function of prime exposure. In the *extremely short* exposure conditions, exposure to positive male faces yielded more positive target judgments than exposure to negative male faces. In the moderately short exposure conditions, however, this assimilative pattern was reversed. Exposure to a positive male face yielded less positive target judgments than exposure to a negative male face.

## WHAT ABOUT THE MURPHY-ZAJONC STUDIES?

It is interesting to compare and contrast these findings to the famous, frequently cited study on the consequences of subliminal affect by Murphy and Zajonc (1993). These investigators *did* vary the exposure time of their priming stimuli, emotion faces. And indeed, they found that at very short exposures (e.g., 10 ms), priming emotion faces resulted in assimilation – as the present analysis suggests. However, contrary to the present analysis, Murphy and Zajonc found that at longer exposures (e.g., 1000 ms), priming emotion faces did not yield contrast. At such exposures, priming had no effect at all. How can we explain the discrepancy between these Murphy-Zajonc findings and the findings presented earlier?

### The Problem of Comparing Supraliminal and Subliminal Priming

One way to answer this question is by pointing to the fact that, strictly speaking, the Murphy-Zajonc studies are irrelevant to the present proposal. In those studies, the difference between short and long exposure conditions was such that the impact of subliminal stimulus exposures (below individuals' conscious thresholds) was compared to that of supraliminal exposures (above individuals' conscious thresholds). The present proposal concerns the impact of *subliminal* exposure to affect-laden stimuli. I posit that even *within* the category of subliminal presentation, one can distinguish (early) diffuse and (late) distinct affective reactions that may have diametrically opposite effects on subsequent judgments.

The problem with supraliminal priming is that this technique may introduce ambiguity as to what may have caused its effects (Martin, 1986; Schwarz & Bless, 1992; Wegener & Petty, 1995; Wilson & Brekke, 1994). Priming emotion faces above people's conscious threshold may not only lead to more descriptively appraised, more distinct affective reactions (Stapel & Koomen, 2001a, 2001b), it may also make participants aware of the potentially contaminating impact of the primed faces on judgment. As Petty and Wegener (1998, p. 338) contend when discussing Murphy and Zajonc's (1993) finding that affective priming led to assimilation when primes were presented outside of conscious awareness but not when primes were presented visibly: "One possible reason for such an effect might be that visibly presented priming stimuli are noticed as obviously irrelevant to perceptions of the targets. Therefore, this 'blatant priming' might instigate an avoidance of the perceived effects of the emotional primes." In fact, the typical explanation of the findings of the Murphy-Zajonc studies is in terms of the extent to which their participants were aware of the influence of the emotion faces rather than in terms of the distinctness of the information these faces activated (Bargh, 1997, p. 25; Chaiken, Wood, & Eagly, 1996, p. 719; Schwarz & Clore, 1996, p. 440). In

the study presented earlier, we avoided the ambiguity surrounding the interpretation of contrast effects after optimal or supraliminal exposure (Is it correction contrast? Is it comparison contrast?) by examining the impact of early-diffuse and late-distinct affect *within* a suboptimal priming paradigm.

### The Problem of Comparing Apples and Oranges

A second explanation of the lack of comparison contrast findings in previous studies of affect priming effects may be that for primed information to result in contrastive comparison effects, distinctness is not the only criterion. A distinct prime will yield comparison contrast, given that there is categorical overlap between the prime and target stimuli. Stimuli that belong to the same category (two persons, two apples) more readily invite comparison processes than stimuli that belong to dissimilar categories (persons and animals, apples and oranges). In recent empirical tests of this similarity criterion, my colleagues and I found that primed friendly or hostile *animals* (e.g., "puppy" versus "shark") are not used as a comparison standard when judging an ambiguous (friendly/hostile) human target stimulus, whereas primed friendly or hostile *persons* (e.g., "Gandhi" versus "Hitler") do result in contrastive comparison effects (see further Stapel & Koomen, 2001a; see also Bless et al., this volume; McClure et al., this volume).

In previous studies of affect priming, the categorical overlap between priming and target stimuli was typically quite low. For example, Murphy and Zajonc (1993) examined the impact of priming specific emotion faces on the perception of Chinese ideographs. Because a human face is unlikely to be used as a comparison standard when constructing a judgment of a Chinese ideograph, it is perhaps not surprising that Murphy and Zajonc (1993) did not find contrast.

Following earlier studies investigating the impact of supraliminally primed stimuli (Stapel & Koomen, 2000), it could be argued that subliminal exposure to an emotion face is most likely to yield contrast when such a facial expression is perceived as distinct (i.e., prime exposure is sufficiently long) *and* when prime and target stimuli belong to the same category: The prime is a face and the target is a face, not a Chinese ideograph. Therefore, we (Stapel et al., 2002) performed a study on the impact of subliminally primed (positive versus negative) emotion faces on judgments of a Chinese ideograph (no prime-target overlap), using the same very/moderately short priming paradigm we used in the studies described earlier (for details, see Stapel et al., 2002). The findings were as expected: The pattern of the famous Murphy-Zajonc studies was replicated. Similar to the Murphy-Zajonc studies, in the moderately short exposure conditions, affect priming had no impact on evaluative judgments of the

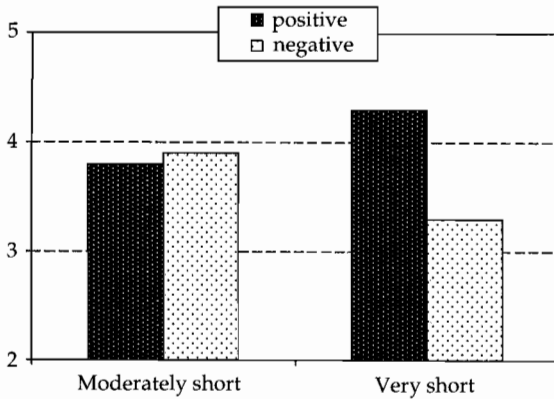


Figure 11.7. Mean sad-happy (1-7) ratings of a Chinese ideograph as a function of prime exposure (moderately short, extremely short) and prime valence (positive, negative) using female faces as priming stimuli.

Chinese ideograph. In the extremely short conditions, however, an assimilation effect was found. The ideograph was evaluated more positively when positive emotion faces were flashed than when negative faces were flashed (Figure 11.7).

This replication of the Murphy-Zajonc findings points to the importance of the categorical relation between priming and target stimuli, particularly when prime exposure is sufficiently long for affective as well as nonaffective features to be activated. Furthermore, the importance of prime-target overlap attests to the importance of using *socially* meaningful stimuli when investigating the impact of primed affect on *social* perception. Although it may be convenient to use meaningless nonsense stimuli in experimental affect priming studies, the similarity criterion implies that the findings of such studies are not as easily generalized to social psychological phenomena, as is often assumed (Bargh, 1997; Glaser & Banaji, 1999; Robinson, 1996; Zajonc, 1998).

When seen in this light, the Chinese ideograph study attests to the importance of prime-target relations when explaining the impact of suboptimal affect priming stimuli on judgment. The impact of what is primed is dependent not only on what is primed (diffuse affect, distinct affect) but also on what is measured, because the extent to which there is prime-target overlap (or not) is a crucial determinant of priming effects. As our Chinese ideograph study suggests, primed emotion faces will be used differently in constructing judgments of unfamiliar words, geometric shapes, or Chinese ideographs (Zajonc, 2000) than in forming an impression of a neutral facial expression. It is stating the obvious, but even when it concerns the effects of subliminally primed information, a Chinese ideograph is not a human face.

## EVALUATIVE PRIMING VERSUS AFFECTIVE PRIMING

One criticism that is sometimes voiced against the kinds of affect-priming studies reported earlier is that they are more relevant to the nonaffective priming literature than to studies of affect, mood, or emotion effects. In other words, for a study showing the automatic impact of affect-laden primes (such as emotion faces) to be defined as a study of the impact of affective reactions, the influence of these primes on actual affective experiences should be demonstrated. As Schwarz and Clore (1996, p. 440) conclude after reviewing the affect-priming literature to date, "In the absence of experienced feelings, affective priming studies may indeed be better conceptualized as reflecting automatic evaluation processes (...), which have been observed with materials unlikely to elicit any feelings (e.g., Bargh et al., 1989), rather than feeling-based inferences."

To assess whether the priming paradigm used in the studies reported in this chapter may influence not only evaluations of a neutral target stimulus but also participants' conscious affective experiences, we again reran our first study, but now replaced the face evaluation task with a mood measure. After the vigilance task, we instructed participants to indicate their immediate affective feelings on a scale ranging from 1 (negative) to 7 (positive) on "how positive or negative your mood is at this moment." The findings of this study showed that the affect-priming methodology we employed influences people's conscious mood judgments (Figure 11.8). In the extremely as well as the moderately short conditions, priming positive emotion faces resulted in more positive affective experiences than priming negative emotion faces. This gives extra credence to the claim that the priming methodology, as employed in this paradigm, indeed elicits "felt"

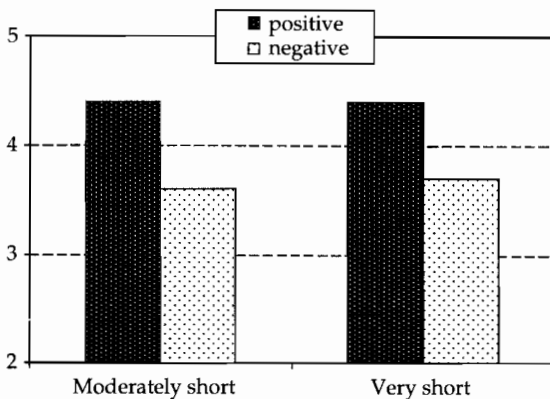


Figure 11.8. Mean negative-positive mood judgments (1-7) as a function of prime exposure (moderately short, extremely short) and prime valence (positive, negative) using male faces as priming stimuli.

rather than "unfelt" affective experiences and is thus relevant to the affective priming as well as to the automatic evaluation literature (cf. Schwarz & Clore, 1996). In other words, our (Stapel et al., 2002) affect-priming method should not be portrayed as solely activating "unfelt evaluations or meaning appraisals."

This demonstration that subliminal exposure to affect-laden stimuli may affect conscious judgments of affective experiences is important for at least two reasons. First, it suggests that whether an affect-laden stimulus activates diffuse or distinct affect does not influence the intensity or valence of felt affective experiences. Thus, although the perceived distinctness of activated affect-laden information is important for the occurrence of assimilation versus contrast when judging a specific neutral target stimulus (see earlier), whether elicited affect is diffuse or distinct does not change the affective feeling it elicits. In other words, affect's distinctness is important for its impact on how we judge stimuli but not for how we feel (cf. Schwarz & Clore, 1996).

Second, the demonstration that subliminal exposure to affect-laden stimuli may affect conscious judgments of affective experiences is important because, in previous affect-priming studies (e.g., Edwards, 1990; Krosnick, Betz, Jussim, & Lynn, 1992; Winkielman, Zajonc, & Schwarz, 1997), no such effects were found. I think that this discrepancy between the effect-on-mood study and previous investigations may be explained as follows: Mood measures should be less easily affected when using a priming methodology in which primes are presented and each priming trial is followed immediately by a target that needs to be responded to. In such a paradigm, the activation potential of single priming trials may be nullified by the target presentation and judgment that immediately follow (Edwards, 1990; Krosnick et al., 1992; Murphy & Zajonc, 1993; Winkielman, Zajonc, & Schwarz, 1997). Mood measures may be affected more easily when a methodology similar to the unrelated task paradigm is used, as in the studies described here. In such a paradigm, priming and target stimuli are presented in separate tasks. In the first task, primes (and masks) are flashed but *not* evaluated. Next, in an ostensibly unrelated task, the target stimuli are presented and evaluated (Chartrand & Bargh, 1996; Erdley & D'Agostino, 1988; Stapel & Koomen, 2001b).

## CONCLUSIONS AND CONJECTURES

Environmental stimuli processed outside of awareness can have important consequences for a person's understanding of his or her world. That is what this age of automaticity research keeps reminding us of (Bargh & Ferguson, 2001). Emotions, attitudes, stereotypes, prejudices, dispositional inferences, self-views, and social comparisons: Each of these may be activated and may operate outside of conscious awareness (for reviews, see

Bargh, 1997). It is not entirely clear, however, what are the contents of automatic perception and, perhaps more important, how these contents may shape subsequent cognition and behavior. That is, *what do we see when we see without awareness?* And what features determine the consequences of this type of seeing?

In this chapter, I have tried to defend and corroborate the claim that when we see without awareness, we first see diffuse affect. However, these early affective reactions may not become cognitively appraised and thus may not become attached to a distinct stimulus (such as a facial expression). The studies described here thus support the theory of affective primacy (Zajonc, 1980, 2000) and corroborate earlier tests of this theory (Edwards, 1990; Murphy & Zajonc, 1993; Niedenthal, 1990; Winkielman et al., 1997). More important, the findings of the Stapel et al. (2002) studies also provide empirical support for an aspect of the theory of affective primacy that to date has received little or no attention.

The theory of affective primacy suggests that because early affective reactions to a priming stimulus are by definition cognitively unappraised, the kind of information these reactions activate is diffuse (undirected, free-floating). The longer exposure time to an affect-laden stimulus becomes, the more affect will become enriched with cognitive appraisals, and the more distinct and specific the information becomes that is activated.

One of the novel aspects of the studies presented in this chapter is that they demonstrate that the distinction between early/diffuse and late/distinct affect has important implications for the impact of these reactions on subsequent judgments. In fact, our findings suggest that the impact of unaware exposure to a picture of a happy or sad person may be diametrically opposite, depending on whether exposure of this (parafoveally primed) picture was extremely short (30 ms) or moderately short (100 ms). What we see when we see without awareness may thus depend in an important sense on the time we are exposed to what we see.

Together, these findings are in line with the *interpretation/comparison* model of knowledge accessibility effects (Stapel & Koomen, 2001a, 2001b). One of this model's main hypotheses is that whereas diffuse information is more likely to be used as an interpretation frame during the encoding of a stimulus and results in assimilation, distinct information is more likely to be used as a comparison standard and results in contrast (see Stapel & Koomen, 2001a). To date, empirical support for the interpretation/comparison model has been based mainly on studies of the effects of *supraliminally* presented information on subsequent judgment and behavior. Furthermore, the hypothesis that diffuse information should yield assimilative interpretation effects, whereas distinct information may yield contrastive comparison effects, was tested mainly by varying the priming stimuli (e.g., diffuse-trait versus distinct-person information), thus

introducing a variety of alternative explanations (person information is more vivid, memorable, and extreme than trait information). The early-diffuse-assimilation versus late-distinct-contrast logic of the studies discussed here reveals that one can distinguish early-diffuse and late-distinct reactions to the same affect-laden stimulus. This also allowed us to test the distinctness hypothesis, not by varying the types of priming stimuli participants were exposed to but by manipulating the exposure duration of such stimuli.

As I noted before, Murphy and Zajonc (1993) found that affect primes led to assimilation effects only when prime exposure was extremely short. This has led some to conclude that it is impossible for affect-driven assimilation to obtain when prime exposure is not extremely short (Zajonc, 1998). What the results discussed here clearly suggest is that assimilation may occur independent of prime exposure, given that priming stimuli have mainly nonspecific, affective features. Nonaffective features increase the likelihood that a distinct representation is activated when prime exposure is sufficiently long. If an affect-laden stimulus is pure affect, and thus diffuse and nonspecific by nature, then longer prime exposure times are unlikely to make this stimulus distinct.

Furthermore, it is important to note that because, in the Stapel et al. (2002) studies, a subliminal rather than a supraliminal priming paradigm was used to test the early-diffuse/late-distinct hypothesis, models that explain the impact of affect priming in terms of the extent to which individuals are aware (of the source) of the primed information are difficult to apply to the present findings. Such models are typically used to understand previous affect priming studies (Bargh, 1997; Chaiken et al., 1996; Schwarz & Clore, 1996; Zajonc, 2000). However, it is difficult to use constructs as conscious recall, source recognition, misattribution, or correction to explain the impact of suboptimal priming (cf. Martin, 1986; Murphy & Zajonc, 1993; Schwarz & Bless, 1992; Schwarz & Clore, 1996), explanations that have been suggested to understand previous affect priming studies. The empirical findings discussed here thus indicate that the cognitive appraisal of primed information should not be equated with becoming aware of its (potentially contaminating) influence on cognition and judgment, as some have suggested (Chaiken et al., 1996; Murphy & Zajonc, 1993; Schwarz & Clore, 1996; Zajonc, 1998). The Stapel et al. (2002) findings are also difficult to reconcile with perspectives that concur that differences between assimilation and contrast effects arise because assimilation is governed by a relatively "automatic," "affective," and "unintentional" processing mode, whereas contrast effects are governed by an "effortful," "intentional," and "conscious" processing mode (Ford & Thompson, 2000, pp. 332–333; Smith & DeCoster, 2000, pp. 112–113). Both assimilation and contrast can occur without awareness, even when it concerns the processing of affect-laden stimuli (see also Fiedler, 2000; Glaser & Banaji, 1999).

## CODA: A FRESH NEW LOOK AT HOT COGNITION

The empirical work and theoretical arguments presented here were inspired by the functionalist argument that affective as well as descriptive processing will often (if not always) be needed to respond flexibly and adaptively to affect-laden stimuli. I hope that this functionalist perspective on the interplay between affect and cognition will provide a new look at the cognitive principles underlying people's reactions to affect-laden stimuli above and beyond the paradigm-dependent investigations discussed in this chapter. In my opinion, this approach to understanding the specifics of affective processing may be a useful step forward (or sideward) in a research tradition that started with the New Look.

The New Look, a set of closely related programs of psychological research in the later 1940s and 1950s, was represented by a number of researchers who argued that the emotional meaning of a stimulus could be responded to before the stimulus was consciously perceived (Stapel & Koomen, 1997). At the time, the ideas of the New Look in perception were thought to be intriguing and clearly important, but theoretical and empirical problems prevented the work conducted during the New Look from having a significant impact on psychology.

The New Look of the 1950s was lost in the subsequent *cognitive revolution*, which embraced the metaphor of the person as computer-like and emphasized the rational, systematic, or logically permissible computations that constitute cognitive processing. During the heyday of the cognitive era in psychology, affect and emotion were regarded as epiphenomena that inflate the variance in virtually every dependent measure, ranging from simple motor response to complex learning, and were therefore to be carefully controlled or otherwise to be partialled out of the resulting data (for potent examples, see Niedenthal & Kitayama, 1994). This enthusiasm for explaining seemingly emotional effects as a somewhat convoluted or otherwise trivial consequence or concomitant of systematic cognitive information processing was especially evident in social psychology. It was fashionable during the cognitive revolution to attribute evidently affect-driven effects such as self-serving biases to cognitive factors (e.g., Miller & Ross, 1975). Although this *Zeitgeist* produced a number of fruitful insights and important empirical findings (Nisbett & Ross, 1980), it also effectively masked potentially powerful contributions of affect and emotion to the psychology of everyday life.

Fortunately, times have changed. Affect and emotion have come back to the forefront of psychological inquiry. And, analyses of the interplay between affect and cognition are especially in vogue in many subbranches of psychology (Forgas, 2001; Forgas & East, this volume). Most if not all these analyses of the affect-cognition interface investigate the ways in which

affect shapes cognition. Their emphasis is on how moods, feelings, and emotions influence our thought, judgments, and actions.

In a sense, then, the current perspective – with its focus on the role of cognition in shaping affective processing and effects – presents a fresh (perhaps even a new) look at the interplay between affect and cognition. Similar to previous studies of the affect–cognition interface, the present perspective is concerned with the antecedents and consequences of *hot cognition* (cf. Abelson, 1963). Thus, its focus is on those mental processes that are driven by moods, feelings, and emotions, preferences, and attitudes. However, whereas previous hot cognition research was concerned primarily with demonstrating how affect influences memory, judgment, decisions, and behavior (Forgas, 2001; Forgas & East, this volume), the research discussed in this chapter emphasized the ways in which affective processing is shaped by cognition rather than how cognitive processing is shaped by affect. The emphasis was not on assessing how *warmth* (affect) influences *cold* phenomena (memory, judgment), as were previous studies of hot cognition. Rather, the focus was on the role of *cold* (i.e., nonaffective) features in *hot* (i.e., the effects of affect) mental phenomena. Hopefully, the reader of this chapter is now convinced that this focus on the impact of cold features on hot phenomena was worth the effort.

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