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Reversing the affective congruency effect: The role of target word frequency of occurrence ☆

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Abstract

In this research the outcome of an affective priming experiment is shown to critically depend on the frequency of occurrence of the *target* words used. Low frequency target words (5.7 occurrences per million words) resulted in an affective congruency effect, i.e., faster responses following affectively congruent than incongruent primes. High frequency target words (32.6 occurrences per million) resulted in a reverse priming effect, i.e., faster responses following incongruent than congruent primes. The size of the congruency effect was larger than the size of the reverse priming effect, thus masking its emergence when word frequency was not taken into account. We propose that target word frequency has its influence via an accessibility-related mechanism having to do with differences in observed changes in affect between prime and target.

Keywords: Automatic evaluation; Reverse priming; Affective priming; Accessibility; Target effects

Reversing the affective congruency effect: The role of target word frequency of occurrence

A growing body of research indicates that people evaluate stimuli they encounter automatically (e.g., Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, 1986; Greenwald, Draine, & Abrams, 1996). In an early experimental demonstration, Fazio, Sanbonmatsu, Powell, and Kardes (1986) asked participants to memorize attitude objects (e.g., sunshine, illness) that were presented as primes and to judge whether subsequently presented target adjectives (e.g., delicious) had positive or negative connotations. They found an affective congruency effect, in which responses to the targets were faster when the target was evaluatively congruent with the prime (e.g., prime = sunshine; target = delicious) than when it was incongruent with the prime (e.g., prime = illness; target = delicious). This finding stimulated a flourishing literature (for reviews see the contributions in Klauer & Musch, 2003) and has been replicated with a variety of different primes, including line-drawings (Giner-Sorolla, Garcia, & Bargh, 1999), photographs of the self, significant others, and disliked persons (Banse, 2001), positive or negative odors (Hermans, Baeyens, & Eelen, 1998), in addition to the more commonly used positive or negative words (e.g., Chaiken & Bargh, 1993). The effect has also been obtained under conditions that preclude conscious control, such as those that use subliminal prime presentations (e.g., Greenwald, Klinger, & Liu, 1989).

The affective congruency effect was initially explained by a *spreading activation* mechanism. Drawing on

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network models of semantic priming (Meyer & Schvaneveldt, 1971; Neely, 1976, 1991), Fazio et al. (1986) suggested that when a prime is presented, affect associated with the prime becomes activated and spreads through the network of affectively related concepts. This facilitates subsequent processing of evaluatively congruent information. However, without modification, this account has difficulty explaining a number of recent findings (e.g., task-dependence of priming effects, list-context effects) and its applicability across different affective priming paradigms is disputed (for a review see Klauer & Musch, 2003).

As an alternative, some researchers have proposed a *response competition* mechanism (Hermans, De Houwer, & Eelen, 1996; Wentura, 1999; also referred to as the Stroop mechanism, see Klauer & Musch, 2003). According to this approach, the observed response time differences are not primarily driven by a facilitative influence of congruent primes, but by an inhibitive influence of incongruent primes. Specifically, when the prime and target are evaluatively incongruent, the affective response to the prime conflicts with the affective response to the target and needs to be suppressed to allow an accurate response to the target. This results in longer response latencies. In contrast, evaluatively congruent prime–target sequences present no informational conflict and allow for a faster response.

The role of the target

To date, affective priming research has mostly focused on how characteristics of the prime influence participant's responses to the target, whereas the role of target characteristics has received little attention. If we do not simply view targets as passive recipients of the prime's influence, however, we must consider how information associated with the target may affect the extent and manner in which primes exert their influence. As a first step, we ask: Are there target characteristics that may have the effect of "overwhelming" the influence of the prime?

Two target characteristics may be good candidates: accessibility and evaluative extremity. Accessibility refers to the ease and likelihood that a particular piece of information will become activated in memory, and it increases as a function of the frequency and recency with which the information is used (Higgins, 1996). In the context of priming research, extreme attitudes are associated with faster response latencies (Bargh et al., 1992; Fazio & Williams, 1986), and faster response latencies are usually taken as an indicator of high accessibility. Thus, accessibility has customarily been seen as synonymous with associative strength and attitude extremity (e.g., Chaiken & Bargh, 1993; Fazio et al., 1986). However, by focusing on one of the defining features of accessibility—the *ease and likelihood* that a piece of information will be activated in memory—it can be reasoned that factors other than evaluative extremity may also increase accessibility. As noted, one of these is the frequency of concept use (Higgins, 1996), such as the frequency with which particular words are used in a language. Word frequency may be related to accessibility, independent of extremity, as research has shown that response times (e.g., in a word recognition task) are faster to words that occur more frequently than words that occur less frequently (Balota & Chumbley, 1984; see Monsell, 1991, for a review). In the present research we focus on the role of the target's accessibility, operationalized in terms of the target words' frequency of occurrence in English. We later return to a discussion of the role of extremity. For ease of presentation we use the term *accessibility* in presenting the theoretical model, although the present research is limited to word frequency as an operationalization of accessibility.

Target accessibility and the change-in-affect hypothesis

According to the response competition framework (Hermans et al., 1996; Wentura, 1999), the affective response elicited by the prime conflicts with the affective response elicited by an incongruent target and needs to be suppressed to arrive at an accurate response to the target. We conjecture that the informational conflict entailed by the diverging responses to incongruent targets is more pronounced when the target is low rather than high in accessibility. This conjecture is based on the assumption that, *ceteris paribus*, the affect associated with high accessibility targets is activated more rapidly and strongly than the affect associated with low accessibility targets. If so, target accessibility may potentially determine whether affective priming procedures result in the commonly observed affective congruency effect or in a reverse priming effect.

First, suppose that highly accessible targets elicit a rapid affective response. If so, participants exposed to an *incongruent* prime–target pair may experience a fast change in affect when they encounter a highly accessible target. This change in affect is itself informative and may allow participants to quickly identify the valence of the target, resulting in a fast and accurate response. Congruent prime–target sequences, on the other hand, are not associated with a change in affect because the prime and target elicit similar affective reactions. Determining whether one's reaction is due to the prime or to the target may take some time, resulting in a response that is slower than the one afforded by a change in affect. In combination, this conjecture predicts a *reversal* of the affective congruency effect, with faster responses to targets when the preceding prime is incongruent rather than congruent, provided that the target is highly accessible.[1]

Second, suppose that low accessibility targets are less likely to elicit a rapid affective response. If so, separating the response to the prime from the response to an incongruent target may present a more demanding task. Hence, responses should be slower for incongruent than for congruent prime–target sequences, as assumed by response competition models. This should result in the commonly observed affective congruency effect. Accordingly, we predict that the standard affective priming effect will be observed for targets low in accessibility (in our case, low frequency words), whereas a reverse priming effect will be observed for targets high in accessibility (here, high frequency words).

It is interesting to note that differential effects for high and low frequency target words have also been observed in the case of semantic priming. Hines (1993) and Stanovich and West (1983) showed that responses to target words were more facilitated by a semantically related prime if the target words were initially difficult to recognize (low frequency words) than if they were initially easy to recognize (high frequency words). This is proposed to occur because high frequency words are so accessible that sensory information is sufficient for efficient recognition, thus reducing the impact of the prime through higher level processing (Stanovich & West, 1983). Similarly, in our proposed model for affective priming, the affective information from a high frequency target is activated so efficiently that it overrides the influence of the response competition mechanism.

The predicted reverse priming effect is relatively rare and has only been documented by a few other researchers, but in no case has the target's accessibility, by any definition, been used to explain its occurrence (Hermans, 1996; Wentura, 1997; reviewed in Glaser & Banaji, 1999; Klauer, Roßnagel, & Musch, 1997; Wentura, 2000; Wentura & Rothermund, 2003). We return to these studies below.

Present research

We operationalized target accessibility by choosing target words that have either high or low frequency of occurrence in English texts. This operationalization captures the definition of accessibility and takes advantage of the observation that frequency of use influences the ease and likelihood that a piece of information will be activated in memory (for a review see, Higgins, 1996). The operationalization is also consistent with research showing that high frequency words are recognized faster than low frequency words in lexical decision tasks (Balota & Chumbley, 1984; see Monsell, 1991, for a review). The high frequency words chosen as targets for the present study are considerably more frequent (occurring, on average, 32.6 times per million words according to the norms of Kucera & Francis, 1967) than the low frequency words (occurring 5.7 times per million words). The target words used by Fazio et al. (1986) and Bargh et al. (1992) fall in between these extremes, with 11.5 and 12.3 occurrences per million words, respectively, and are closer to our low than to our high frequency targets.[2]

In the current study, we predict that the usually observed affective congruency effect will be obtained *only* for low frequency targets. Our prediction for low frequency targets follows the logic of response competition models (Hermans et al., 1996; Wentura, 1999). In contrast, we predict that a *reverse priming* effect will be obtained for high frequency targets because these targets are followed by rapid affective responses that create a fast change in affect for incongruent prime–target pairs.

Method

Design and participants

Sixty-eight University of Michigan students participated in the experiment for course credit. In 108 experimental trials participants judged the valence of targets that appeared after primes. The primes were positive words, negative words, or letter strings, and the targets were positive or negative words that were high or low in frequency of occurrence. Thus, the design of the experiment was a 2 (prime valence: positive, negative) × 2 (target valence: positive, negative) × 2 (target word frequency: high, low) within subject factorial.

Stimuli

The primes were 12 positive and 12 negative words, and the baseline primes were 12 four-letter strings (e.g., BBBB). The 18 positive and 18 negative target words were divided into the high or low frequency groups (see Table 1). These words represent a convenience sample

[1] The proposed mechanism shares some surface resemblance to contrast effects in judgment when the target to be judged is highly accessible and very distinct from the prime (e.g., Stapel & Koomen, 1997; Stapel, Martin, & Schwarz, 1998). However, one key difference between the proposed change of affect mechanism and the mechanism explaining contrast effects in these papers is that the change of affect mechanism relies simply on "feelings" (the change of affect) being used as "information"; it does not involve more elaborate cognitive processes such as the correction for prime-induced biases in judgment. The change of affect mechanism is favored here because the processes involved in affective priming are more likely to be based on fast and simple "gut" reactions instead of elaborate correction processes.

[2] We excluded two outliers with exceptionally high frequency (beautiful, 127 per million; excellent, 68 per million) from our summary of the words used by Bargh et al. (1992). Including these outliers, the average frequency is 18.5 per million.

Table 1
Target words by valence and frequency

Positive	Negative
High frequency	
baby	bombs
birthday	cavities
cake	crime
dancing	disease
flowers	divorce
gift	funeral
gold	hatred
hawaii	rats
holiday	virus
Low frequency	
butterfly	cockroach
chocolate	garbage
ice cream	germs
kitten	hangover
pizza	mosquito
silk	rattlesnake
stereo	toothache
strawberries	weeds
sunshine	worms

that allowed us to control for target favorability, word length, and word extremity. Based on the Kucera and Francis (1967) word frequency norms, the positive and negative words occurred equally frequently, $F < 1$, and high frequency words ($M = 32.6$ per million, median = 26.5 per million) occurred more frequently than low frequency words ($M = 5.7$ per million, median = 4.5 per million), $F(1,35) = 6507$, $p < .001$. To match the targets for favorability, 15 participants rated the targets on a seven-point scale with "least favorable" and "most favorable" as endpoints. Seven "bubbles" were placed equidistant from each other to form the seven-point scale. High and low frequency words were equally favorable, $F < 1$, and positive words ($M = 5.31$) were rated more favorably than negative words ($M = 1.91$), $F(1,13) = 323.93$, $p < .001$.

The 36 targets appeared once within each of three blocks of trials, with the restriction that 12 targets be paired with positive primes, 12 with negative primes, and 12 with baseline primes. The order was randomized by the experimental control program for each participant.

Procedure

Participants were asked to evaluate quickly and accurately targets presented to them on a computer screen by pressing the "good" or "bad" key on the keyboard. They were also asked to remember "memory words" (primes) that flashed briefly on the screen before the targets, as done by other researchers (Fazio et al., 1986). Twenty practice trials and one practice recall session for the "memory words" were run before the experimental trials. The prime words appeared in black on a white background in Arial font approximately .75 inches in height and were presented in the middle of the screen for 200 ms, with a 100 ms blank screen before each target appeared (SOA of 300 ms). The target remained on the screen until the participant pressed a response key, followed by a 3-s intertrial interval. At the end of the experiment, participants were debriefed and thanked.

Results

Participants committed few errors (2.95%) in judging the valence of the target words; the response latencies from these trials were excluded from the analysis. Also, 8% of the responses were more than twice the standard deviation above each participant's mean response latency and were excluded from the analysis. The mean response latency cut-off for outliers was 2600 ms, comparable to Bargh et al. (1992). A second analysis done without excluding outliers yielded the same pattern of results. A third analysis done with a standardized cut-off at 2600 ms for all participants also yielded the same pattern of results.

Data from affective priming tasks can be analyzed either directly as response latencies or as difference scores (subtracting the response latency from each critical condition, e.g., high frequency positive target with congruent prime from the respective baseline latency, e.g., high frequency positive target with baseline prime). There is an active debate on the merits of reporting raw response latencies versus difference scores. On a theoretical level, the use of difference scores may allow one to discern whether the responses to experimental primes were 'facilitated' or 'inhibited' over the neutral prime condition. However, Wentura (1999) proposed a number of problems with the assumption that the letter string prime is a genuinely "neutral" condition: letter string primes might attract less attention due to their simplicity, or they might attract more attention due to their relative infrequency and novelty. In the current study, we have performed parallel analyses using response latencies, the reciprocal of the response latencies, and difference scores and found the same pattern of results. We report the analysis of the response latencies for the sake of clarity.

The average response latencies were calculated for each subject for each condition (across multiple trials and within conditions) and then were submitted to a 2 (prime valence: positive, negative) × 2 (target valence: positive, negative) × 2 (frequency: high, low) within participant ANOVA. The analysis revealed a significant main effect of prime, $F(1,67) = 4.52$, $p = .037$, $\eta^2 = .063$, indicating that the responses were faster after a positive than negative prime. A main effect of target frequency further indicated that responses were faster to high frequency targets than to low frequency targets, $F(1,67) = 11.79$, $p = .001$, $\eta^2 = .150$.

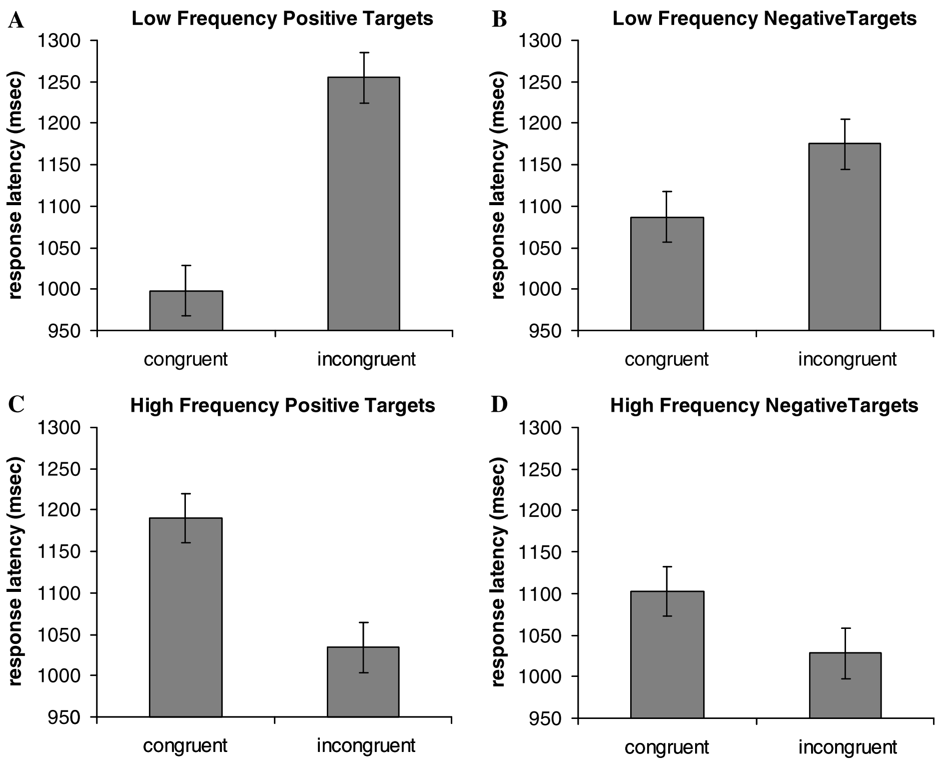

Fig. 1. The response latencies for the high and low frequency targets as a function of prime–target congruency.

Of greater interest, a substantial three-way interaction of prime valence × target valence × frequency was obtained, $F(1,67) = 138.4$, $p < .001$, $\eta^2 = .674$, indicating that the responses to high and low frequency targets were differentially affected by the congruency in valence between prime and target. The response latencies are presented in Figs. 1A–D.

As predicted, an affective congruency effect emerged for *low frequency targets* (low accessibility), $F(1,67) = 141.08$, $p < .001$, $\eta^2 = .678$, for the simple interaction of prime valence and target valence. Further diagnoses showed that the responses were faster in the congruent condition than the incongruent condition for both positive targets, $F(1,67) = 126.74$, $p < .001$, $\eta^2 = .654$, and negative targets, $F(1,67) = 15.09$, $p < .001$, $\eta^2 = .184$. This replicates the usually obtained results.

In contrast, a parallel analysis of the *high frequency targets* showed the predicted reverse priming effect, $F(1,67) = 46.21$, $p < .001$, $\eta^2 = .408$, for the simple interaction of prime valence and target valence. As expected, the responses were faster in the incongruent condition than the congruent condition both for positive targets, $F(1,67) = 58.87$, $p < .001$, $\eta^2 = .468$, and negative targets, $F(1,67) = 10.54$, $p = .002$, $\eta^2 = .136$.

As the effect sizes of these simple interactions indicate, the affective congruency effect observed for low frequency targets is larger than the reverse priming effect observed for high frequency targets. Accordingly, the ANOVA also showed an overall interaction of valence × prime $F(1,67) = 8.43$, $p = .005$, $\eta^2 = .112$, suggesting an overall affective congruency effect. This two-way interaction, however, is qualified by the highly significant triple interaction of valence × prime × target frequency, as discussed above. Note that this observation has important methodological implications. Had we not considered the role of target frequency but had instead combined the responses to high and low frequency targets, the overall trend would have shown an affective congruency effect. This may explain why affective congruency effects are the dominant finding in this literature.

Of less theoretical interest, a significant two-way interaction of target frequency × target valence, $F(1,67) = 4.59$, $p = .036$, $\eta^2 = .064$, indicated that for low frequency targets, the response latencies were unaffected by the target valence, whereas for high frequency targets, the responses were slower when the targets were positive rather than negative. A target frequency × prime valence interaction, $F(1,67) = 27.81$, $p < .001$, $\eta^2 = .293$, also indicated that for low frequency targets, the responses were slower when the primes were negative than when the primes were positive, whereas for high frequency targets, the responses were slower when the primes were positive rather than negative.

Discussion

In sum, we obtained an affective congruency effect when the target words were low in frequency of occurrence according to the word frequency norms of Kucera and Francis (1967). In contrast, we obtained a reverse priming effects when the target words were high in frequency of occurrence. We conjecture that the differences in frequency of occurrence may reflect differences in chronic accessibility of these target words.

The present results are consistent with our proposed model, in which the accessibility of the target is posited to play a crucial role in determining whether the affective congruency or reverse priming effect occurs. Further studies that operationalize accessibility in different ways, such as by manipulating temporary accessibility or by making use of existing differences in people's chronic accessibility for different concepts, will provide stronger support for the proposed model. Until then, these findings do present interesting methodological implications and raise new theoretical questions.

Methodological implications

On the methodological side, our findings highlight the importance of target characteristics in affective priming research. To date, target characteristics have received very limited attention because the target stimuli usually serve as a mere vehicle for assessing participants' responses to the prime. Importantly, the affective congruency effect observed for low frequency targets was more pronounced than the reverse priming effect observed for high frequency targets, resulting in an overall affective congruency effect. Hence, we suggest that the dominant congruency effect may mask reverse priming effects (also see Wentura, 2000), with the possibility that reverse priming effects may have been observed for some targets in earlier studies but were missed because target word frequency was not taken into account. As already noted, the frequency of the target words used in the studies of Fazio et al. (1986) and Bargh et al. (1992) was about 11–12 occurrences per one million words, falling in between the frequency of our low (5.7 per million) and high (32.6 per million) frequency words. Hence, very high frequencies may be needed to obtain reverse priming effects, whereas affective congruency effects may dominate at low to moderate frequencies. Secondary analyses of available studies may shed some light on these issues.

Theoretical implications

Reverse priming effects have been observed in other studies (e.g., Hermans, 1996; and Wentura, 1997; reviewed in Glaser & Banaji, 1999; Klauer et al., 1997; Wentura, 2000; Wentura & Rothermund, 2003). For example, Glaser and Banaji (1999) manipulated the extremity of the primes and targets and observed that only moderate primes resulted in the commonly obtained congruency effect. To their surprise, extreme primes resulted in a reverse priming effect as participants were faster to respond to targets that were evaluatively incongruent rather than congruent with the primes.

Although there has been no single account that can explain all reverse priming effects, the *accuracy motivation* account has received most attention. Glaser and Banaji (1999) proposed that perceivers may unconsciously recognize the potential bias resulting from extreme primes and hence instigate automatic correction processes. As is commonly the case for correction processes (for a review see, Wilson & Brekke, 1994), people may overcorrect, resulting in a reverse priming effect. Wentura (2000) replicated the reverse priming effect under accuracy motivation conditions and offered a more refined version of the mechanism. In his framework, people who have an accuracy goal (versus speed goal) attempt to implicitly distinguish the sources of the evaluative information (i.e., is the valenced information coming from the prime or the target?), so that their response is based solely on the appropriate source (i.e., the target). Given conditions that are favorable to distinguishing between the sources (see Wentura, 2000; Wentura & Rothermund, 2003), people with an accuracy goal will respond faster to incongruent than congruent prime–target sequences because it is easier to distinguish the sources when the prime word is incongruent with the target word.

One way to integrate the mechanism proposed in the current paper and the work on accuracy motivation (e.g., Wentura, 2000) is to suggest that when participants are motivated to be accurate, the greater attention given to the target facilitates the activation of the target's affect, making it more distinct. Hence, when the prime–target sequence is incongruent, a change in affect may become pronounced for participants with an accuracy goal. This change in affect is itself informative and leads participants to quickly identify the valence of the target, resulting in a fast and accurate response when prime–target pairing is incongruent. This account is compatible with reverse priming effects in evaluation tasks that have manipulated accuracy goals (e.g., Wentura, 2000).

This line of reasoning can also be used to understand Glaser and Banaji's (1999) findings. In their studies, participants were asked to pronounce the target word rather than to identify its valence. At first glance, the change in affect mechanism might appear irrelevant to the goal of identifying and pronouncing the target word. However, as proposed by Wentura and Rothermund (2003), to accurately respond to the target (pronunciation), the perceiver still needs to successfully distinguish the source of any concurrently activated evaluative information. Thus, the change in affect mechanism may be at work even in pronunciation tasks because it aids in the identification of the valence of the target. Following this reasoning, our framework may be made compatible with Glaser and Banaji's findings in two different ways. First, it is possible that extreme primes trigger an accuracy motive, which leads perceivers to pay more attention to the target, and as a result they experience a more pronounced change of affect. Second, it is possible that more extreme primes are associated with more pronounced changes in affect when the prime–target sequence is incongruent. If so, the Glaser and Banaji (1999) studies may present the flip side of our present experiment: In our study, differential changes in affect were presumably elicited by differentially accessible targets; in their studies, differential changes in affect might have been elicited by differentially extreme primes. In either case, rapid changes in affect may facilitate fast responses to incongruent primes, resulting in a reverse priming effect.

It is important to note that reverse priming is an elusive effect: For example, in studying the possibility of an automatic correction process (Glaser & Banaji, 1999), Glaser (2003) manipulated participants' accuracy motivation in a follow-up experiment but could not replicate the reverse priming effect. Similarly, Wentura (2000) found reverse priming in Study 1, but did not obtain it in what was supposed to be a conceptual replication with modified presentation parameters, stimuli, and instructions (Study 2). Moreover, while we found a reverse priming effect for high frequency English target words, Musch, Elze, and Klauer (1998) did not find reverse priming with German target words of high frequency (42 occurrences per million in the Mannheim corpus). It is conceivable that the emergence of reverse priming effects is contingent on the "perfect" balance of prime characteristics, target characteristics, and perceivers' goals, in addition to methodological factors.

In general, though, our findings suggest that the response competition mechanism (Hermans et al., 1996; Wentura, 1999) may only apply to low accessibility targets. This conclusion is compatible with the limited available research on target characteristics in affective priming. For example, De Houwer, Hermans, and Spruyt (2001) observed affective congruency effects when they presented the targets in a degraded fashion (e.g., %U%G%L%Y%), but not when they presented them in an undegraded fashion (e.g., UGLY). Similarly, Musch and Klauer (2001) presented primes and targets simultaneously at different locations on the screen. They only obtained an affective congruency effect when participants were uncertain as to where the targets would appear, but not otherwise. These manipulations presumably decreased the efficiency with which the targets could be processed, rendering them comparable to low accessibility targets. As the processing efficiency potential of the target increases, either because of clearly presented target features (De Houwer et al., 2001), locational certainty (Musch & Klauer, 2001), or high accessibility (current study), the efficient activation of distinct target affect may attenuate the difficulties associated with separating the response to the target from the response to the prime. Under these conditions, the responses to the prime may not require suppression, eliminating the otherwise observed affective congruency effect.

Nevertheless, the specific mechanism underlying our findings remains an open issue. Drawing on the general logic of the affect-as-information framework (Schwarz, 1990; Schwarz & Clore, 1996), we conjectured that exposure to an incongruent prime–target sequence may elicit a rapid change in affect when the target can be efficiently processed. This change, in turn, may allow participants to quickly identify the valence of the prime-incongruent target. Because congruent prime–target sequences do not involve a change in affect, separating one's response to the prime from the response to the target is more demanding. Hence, responses to prime-congruent targets are slower than responses to prime-incongruent targets, resulting in the observed reverse priming effect. Unfortunately, the misattribution manipulations typically used for testing affect-as-information predictions (e.g., Schwarz & Clore, 1983) are not applicable to the fast and low-level affective responses elicited in affective priming experiments (for a discussion see Winkielman, Zajonc, & Schwarz, 1997). Accordingly, a direct test of the change-in-affect hypothesis awaits experimental ingenuity.

Despite numerous open questions, the present research highlights an important contingency in affective priming research: the familiar affective congruency effect is less unconditional than assumed and most likely to be obtained for low accessibility targets and under conditions that impede the efficiency of target processing (cf. De Houwer et al., 2001; Musch & Klauer, 2001). In contrast, highly accessible targets are likely to show reverse priming effects. We propose that the latter can be traced to a change-in-affect mechanism, which may also account for reverse priming effects elicited by extreme primes (Glaser & Banaji, 1999). These possibilities, and the details of the underlying mechanisms, await further research.

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