

On the automatic activation of associated evaluations: An overview

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A review of the literature concerning the phenomenon known as automatic attitude activation is presented. The robustness of the affective priming effect across many different procedural variations, the mediating mechanisms thought to underlie the effect, and the moderating role of associative strength are discussed. The relevance and importance of automatic attitude activation to many fundamental cognitive and social processes also is highlighted. Finally, an overview of the articles included in this Special Issue of *Cognition and Emotion*, their essential contributions, and their relation to the earlier literature is presented.

This Special Issue is devoted to furthering our understanding of a phenomenon known as automatic attitude activation. Essentially, presentation of an attitude object has been shown to automatically activate from memory the evaluation that an individual associates with the object. The editors Jan De Houwer and Dirk Hermans have compiled a collection of interesting articles in which the various contributing authors report investigations relevant to this phenomenon. In this introductory article, I will provide a brief overview of the articles in the special issue, as well as the literature on automatic attitude activation. In so doing, I hope to provide a context for the Special Issue and, even more importantly, an appreciation for the significance of the phenomenon.

The affective priming effect

Much of the research on attitude activation has employed a priming paradigm that is itself a variant of classic priming research concerned with spreading activation processes. This classic work focused on lexical decisions, or more

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specifically, on the latency with which such word/nonword judgements were made and the extent to which they were facilitated by the prior presentation of a prime. The findings of numerous experiments indicated that lexical decisions for concepts associated with the prime were facilitated by exposure to the prime (e.g., Meyer & Schvaneveldt, 1971; Neely, 1976, 1977). Thus, presentation of “doctor” as a prime facilitated identification of “nurse” as a word. The findings suggested that concepts associated with the prime are automatically activated from memory on its presentation (Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977) and, hence, facilitate responding to semantically related target words.

Motivated by their model of attitudes as object-evaluation associations in memory, Fazio, Sanbonmatsu, Powell, and Kardes (1986) reasoned that a similar priming effect should be apparent for attitudes. Presentation of the attitude object as a prime should activate any associated evaluations and, hence, facilitate a related judgement. The paradigm that Fazio et al. (1986) developed, and that has been employed in much of the subsequent research, involved the participants’ performance on an adjective connotation task. The target word presented on each trial was an evaluative adjective and the participants were instructed to indicate whether the word meant “good” or “bad” as quickly as possible. The focus was on the latency with which this judgement was made and, in particular, the extent to which it was facilitated by the presentation of an attitude object as a prime.

In three experiments, Fazio et al. (1986) found evidence of automatic attitude activation. Under certain conditions, responding was faster on trials for which the participants’ evaluations of the primed attitude objects were congruent with the connotation of the targets than on trials for which they were incongruent. To provide an example, assume that the attitude object “cockroach” is evaluated negatively by an individual. Presentation of “cockroach” as the prime appears to automatically activate the negative evaluation. If the target adjective that is subsequently presented is also negative (e.g., “disgusting”), then the individual is able to indicate the connotation of the target adjective relatively quickly, more so than if a positive adjective (e.g., “appealing”) serves as the target word. A reverse pattern of facilitation is observed for primed objects that are associated with a positive evaluation. Thus, a significant interaction between the valence of the prime and the valence of the target is the hallmark of the automatic activation effect.

It is important to keep in mind that the priming procedure employed by Fazio et al. (1986) did not require participants to consciously evaluate the primes. From the perspective of the participants, the primes were being presented as “memory words” for the purpose of increasing the complexity of the adjective connotation task. Participants were instructed to remember and recite the memory word aloud at the end of the trial, after having pressed the “good” or “bad” key to indicate the connotation of the target adject-

tive. Thus, participants were not asked to consider their attitudes toward the primes during the priming task. Nor was it to the participants' advantage to do so, for their major task assignment was to respond to the target adjective. Moreover, positively valued and negatively valued primes were equally likely to be followed by the presentation of a positive or a negative target. Thus, any attempts to predict the valence of the upcoming target on the basis of the prime would be futile.¹ Despite the irrelevance of the prime to the immediate task concerns, the prime influenced the ease with which participants could indicate the connotation of the target adjectives. Thus, the key nature of the task suggests that primes exerted their influence through an automatic process.

More importantly, the experiments revealed the automatic activation of attitudes only when the time interval between presentation of the prime and target was relatively brief—a stimulus onset asynchrony (SOA) of 300 ms. No such effect was apparent at an SOA of 1000 ms. Yet, if the results had been due to a more strategic, controlled, and effortful process, one would have expected that allotting the participants more time to actively retrieve their attitudes toward the primes would have, if anything, enhanced the facilitation effect. Instead, the findings imply that the evaluation associated with the prime received some activation automatically as a result of the prime's presentation, which facilitated responding to evaluatively congruent targets that were presented very soon thereafter. However, the level of activation must have either dissipated quickly, or been actively suppressed due to its presumed irrelevance to the primary task of judging the target adjective. Similar effects of setting the SOA at 300 versus 1000 ms have been observed in subsequent research (e.g., De Houwer, Hermans, & Eelen, 1998; Hermans, De Houwer, & Eelen, 1994). That is, the evaluative congruency of the prime and target mattered only at the shorter SOA.

The affective priming effect has been observed in numerous subsequent experiments. It has proven to be a robust and replicable phenomenon apparent in experiments using a variety of priming stimuli, target stimuli, and specific task requirements. The effect has been found when the words serving as primes are presented subliminally (e.g., Greenwald, Draine, & Abrams, 1996; Greenwald, Klinger, & Liu, 1989; Wittenbrink, Judd, & Park, 1997), further attesting to its characterisation as an automatic process. Moreover, evidence of automatic attitude activation has been demonstrated in later experiments, not only with the names of familiar attitude objects serving as primes (e.g., Bargh, Chaiken, Govender, & Pratto, 1992), but also with so-called "Turkish words" whose translation had been learned in an earlier phase of the experiment (De Houwer et

¹ See Klauer, Roßnagel, and Musch (1997) for research concerning the effects of varying the proportion of evaluatively congruent primes and targets.

al., 1998), with black-and-white line drawings of objects (Giner-Sorolla, Garcia, & Bargh, 1999), and with high-resolution colour images of the objects (e.g., Fazio, 1993; Fazio, Jackson, Dunton, & Williams, 1995; Hermans et al., 1994). The effect even has been observed across stimulus modalities. In an intriguing experiment conducted by Hermans, Baeyens, and Eelen (1998), positive or negative odours that had been idiosyncratically selected for each participant served as primes. The odours facilitated responses to visually presented target words that were affectively congruent.

The affective priming effect also has been observed in experiments using a variety of target stimuli. Much of the research has employed evaluative adjectives as targets (e.g., Bargh et al., 1992; Fazio et al., 1986, 1995). However, other research has employed nouns (i.e., the names of attitude objects) as targets, requiring participants to evaluate the object (e.g., Greenwald et al., 1989, 1996; Hermans et al., 1998). In a similar fashion, Hermans et al. (1994) employed pleasant and unpleasant colour photographs as target stimuli.

Automatic attitude activation also has been found regardless of whether participants are instructed to recite the prime aloud as a "memory word" at the end of each trial (as in Fazio et al., 1986), study the photos presented as primes so as to be able to perform a later detection task (as in Fazio et al., 1995), or provided no specific task to perform with respect to the primes (e.g., Bargh et al., 1992). Although the effect typically emerges on the latencies with which participants indicate their evaluations of the target words, Greenwald and his colleagues have developed a response window procedure that is sensitive to the error rates for evaluatively congruent versus incongruent trials (e.g., Greenwald et al., 1996). Participants are required to respond within a short window of time that begins soon after the presentation of the target. By necessitating fast responding, the procedure substantially increases error rates. However, relatively fewer errors are committed on evaluatively congruent trials.

The affective priming effect also has been found with tasks other than judging the valence of a target. For example, traditional lexical decision tasks have proven sensitive to affective priming (e.g., Hill & Kemp-Wheeler, 1989; Kemp-Wheeler & Hill, 1992; Wittenbrink et al., 1997; but, see Klinger, Burton, & Pitts, 2000). In addition, Sanbonmatsu, Osborne, and Fazio (1986) obtained the effect with a word identification task instead of the adjective connotation task. In this experiment, the target adjective initially was masked by a block of dots which gradually disappeared until the word became legible; participants pressed a key as soon as they were able to identify the word and then recited it aloud. Evaluatively congruent primes produced faster identification than evaluatively incongruent ones did. Finally, the affective priming effect also has been observed with what is referred to as a "naming" or "pronunciation" task in which participants are asked to ignore the prime word and read the target word (typically undegraded)

aloud as quickly as possible (e.g., Bargh, Chaiken, Raymond, & Hymes, 1996; Hermans et al., 1994).²

Mechanisms mediating the affective priming effect

Fazio et al. (1986) were vague about the specific mechanism responsible for the affective priming effect, alluding only to the spreading of activation in memory from the primed object to the associated evaluation (see p. 231). The activation level of the associated evaluation was presumed to be temporarily enhanced by the presentation of the prime. As a result, less additional activation would be required for the activation of the target adjective to reach the threshold necessary for it to be identified sufficiently that its connotation can be judged.

Unfortunately, the vagueness of this account has led some researchers to the interpretation that Fazio et al. (1986) were suggesting an associative network model in which all positive concepts (be they positive adjectives, positively valued traits, or positively valued objects) were interconnected, as were all negative concepts (see Hermans, De Houwer, & Eelen, this issue; Klauer et al., 1997; Wentura, 1999). For example, Wentura (1999) stated: "Fazio et al. (1986) explained their affective congruency effect as resulting from a spread of activation from the prime to all other concepts with shared valence" (p. 67). This is not a view that Fazio et al. (1986) endorsed. Nor is it required by the logic of their experimental paradigm, for the phenomenon of interest concerned the spread of activation only from the primed object (e.g., "cockroach") to its associated evaluation (e.g., "negative"), not to other concepts or objects that might be of the same valence. As I shall argue shortly, this issue is relevant to the question of mediating mechanism.

Subsequent research has focused much more explicitly on the mechanisms that might be involved in the relatively faster responding affectively congruent prime-target pairs. In particular, several researchers have raised the possibility of an alternative to the spreading activation mechanism, one that involves response competition and/or facilitation (e.g., Hermans, De Houwer, & Eelen, 1996; Klauer, 1998; Klauer et al., 1997; Klinger et al., 2000; Wentura, 1999). The

²However, various researchers have reported difficulty replicating the affective priming effect with the pronunciation task (De Houwer et al., 1998; De Houwer & Hermans, 1999; Klauer, 1998; Klauer & Musch, 1998). Moreover, recent research by Glaser and Banaji (1999) has revealed a "reverse priming effect" to occur under certain conditions with the pronunciation task. Evaluatively extreme primes resulted in faster pronunciation of evaluatively incongruent targets than of congruent targets, suggestive of an automatic tendency to correct for the biasing influence of the distracting prime that participants were to ignore. Contrary to Bargh et al. (1996), primes that were less polarised with respect to their valence produced null effects. Clearly, the various processes that influence pronunciation latencies are not yet well understood. Nevertheless, the Glaser and Banaji findings do indicate that the evaluations associated with the more extreme primes must have been activated automatically from memory (i.e., prior to the automatic correction process that Glaser and Banaji view as responsible for the reverse priming effect).

essence of the idea is that the attitude activated as a consequence of the prime “readies” the individual to respond in a certain way. If the subsequently presented target is congruent with the prime, responding is facilitated because the response pathway already has received some initiation. On the other hand, if the target is evaluatively incongruent, then the response suggested by the evaluation associated with the prime must be inhibited in order to respond accurately to the target. Thus, the evaluation activated by the prime and that activated by the target either may complement one another and, hence, facilitate responding, or they may conflict with one another and, hence, interfere with responding. This latter possibility corresponds with views regarding the consequences of presenting the word “red” in green ink in the classic Stroop task, prompting researchers to note the parallel between the Stroop effect and the affective priming effect (Klauer, 1998; Klauer et al., 1997; Wentura, 1999).

Importantly, both accounts involve the same initial step. The evaluation associated with the primed object is activated automatically once the prime is presented. Such activation then facilitates the encoding of affectively congruent targets, according to the spreading activation account, or readies an initial response tendency, according to the response competition account. Thus, the difference between the two accounts lies in what follows automatic attitude activation.

Wentura (1999) has provided evidence attesting to the viability of the response competition mechanism. On the basis of literature regarding negative priming, Wentura reasoned that it should be possible to observe evidence that the evaluation associated with a prime is suppressed when the target’s valence is incongruent. Any such suppression should slow responding on the subsequent trial in cases where the target valence matches the evaluation that was suppressed on the previous trial. For example, the response competition view maintains that “bad” is suppressed when the prime “death” is followed by the target “wise”. Although activated by “death”, responding “bad” needs to be suppressed in order to accurately respond that “wise” is “good”. If the next trial involves a negatively valenced target (e.g., “lonely”), then the previous suppression of “bad” will hinder accurately indicating that lonely is “bad”. Wentura (1999) found evidence of such negative priming, thus confirming that response competition is relevant to the evaluative decision task.

Findings obtained recently by Klinger et al. (2000) also are consistent with the response competition account. Using the response window procedure mentioned earlier, these researchers examined subliminal priming in a task that required participants to evaluate target nouns very quickly. Error rates were higher for trials in which the prime and target were evaluatively incongruent (e.g., “rat/bunny”). However, this affective priming effect did not occur when the participants’ task was to indicate whether the target noun was animate or inanimate. In that case, the congruency between the animacy of the prime and the target mattered, but not affective congruency. Thus, congruency with the

required response seems to determine the effect of a prime, at least within the response window procedure.

Although I believe that response competition plays a substantial mediating role in the evaluative decision task, I am not convinced that the spreading activation mechanism is irrelevant. In fact, I suspect that both mechanisms contribute to the effects observed in the typical priming paradigm involving the adjective connotation task. As their target words, Fazio et al. (1986) employed adjectives that were purely evaluative in nature, that is, virtually synonymous with *good* (e.g., appealing, delightful, pleasant, enjoyable) or *bad* (e.g., repulsive, disgusting, horrible, offensive). Moreover, the adjectives had little descriptive content and, hence, were potentially applicable to any attitude object. Such adjectives seem very likely to receive some activation as a consequence of their virtually synonymous meaning with the general evaluation that is activated in response to an affectively congruent prime. Hence, they are likely to be encoded more easily following such priming. As a result of the negativity that it automatically activates, the prime "cockroach" is likely to increase the activation level of the target word "disgusting". Indeed, the Sanbonmatsu et al. (1986) findings that were mentioned earlier support such a view. Recall that these researchers employed a degraded word identification task, instead of the adjective connotation task. The target words, which were evaluative adjectives, were more quickly recognised when they were preceded by evaluatively congruent primes. The pronunciation task findings (Bargh et al., 1996; Hermans et al., 1994) also are consistent with the spreading activation account (but, see footnote 2).

As noted earlier, however, other research involving evaluative decision latencies has employed target words that are less directly associated with the primed objects. Adjectives that are clearly irrelevant to the attitude objects (e.g., personality traits such as "wise" or "lonely" paired with physical objects) and even nouns have served as targets. I suspect that the effects in these experiments stem largely from the response competition mechanism.

Obviously, further research is necessary before any firm conclusions can be drawn about the roles of spreading activation and response competition in the evaluative decision paradigm. Such work will need to pay closer attention to the nature of the target words that are employed and to their relation to the primed objects. Because they do not involve the possibility of response competition, degraded word identification and pronunciation tasks may prove fruitful in attempting to discern the manner, and extent to which, spreading activation is involved.

The moderating role of associative strength

One issue regarding the affective priming effect that has proven controversial is the potential moderating role of associative strength. As noted earlier, the Fazio

et al. (1986) research was based on a model of attitudes as object-evaluation associations in memory. In addition to demonstrating the automaticity of attitude activation, the experiments were aimed at testing the hypothesis that the strength of the object-evaluation association determines the accessibility of the attitude from memory and, hence, the likelihood that the associated evaluation will be activated automatically upon the individual's exposure to the attitude object. For this reason, the experimental designs included a factor involving primes that could be characterised as having strong versus weak evaluative associations. In the first two experiments, this was accomplished by the selection of primes on an idiosyncratic basis for each and every participant. The very first phase of the experiment involved a task in which participants were asked to make a good/bad judgement for each of a large number of objects as quickly and accurately as possible. The latencies of these responses served as the operational measure of associative strength and, hence, as the basis for idiosyncratic prime selection. Objects for which the participant expressed an attitude most quickly were selected for use as the strong primes, and those for which attitude expression was slowest were selected as weak primes. This strength variable was found to moderate the affective effect. Automatic attitude activation, as indicated by relatively faster responses on evaluatively congruent prime-target trials, was more evident for the strong primes than for the weak primes. In fact, only the strong primes revealed the effect.³

Fazio et al.'s third experiment involved a manipulation of associative strength. The primes, which were selected on the basis of normative data, involved objects for which there existed near unanimity about their being positive or negative. A subset of such objects, those for which earlier participants had exhibited the slowest attitude expression latencies, eventually served as the primes. Half of these objects were included in an attitude rehearsal task that participants performed prior to the priming phase of the experiment. Participants expressed their attitudes toward each of these objects multiple times during the course of the task, which was intended to enhance the strength of the object-evaluation association. The remaining objects were presented equally often, but participants simply judged whether these were one-syllable words. Like the idiosyncratic prime selection variable of the earlier experiments, this experimental manipulation of associative strength moderated the automatic activation effect. Although a statistically reliable effect was apparent for the primes assigned to the control task, those for which attitudes had been rehearsed displayed a significantly larger effect. Thus, Fazio et al. (1986) concluded that

³Subsequent research typically has employed as primes (a) objects toward which individuals express attitudes relatively quickly or (b) objects toward which individuals possess relatively extreme evaluations. Prime selection has been based on either participants' idiosyncratic responses or normative data. Thus, most subsequent research has involved only primes that can be characterised as having relatively strong object-evaluation associations.

the likelihood of automatic attitude activation depends on the strength of the object-evaluation association.

However, this conclusion was challenged by Bargh et al. (1992). They reported a series of experiments in which they observed automatic attitude activation even among primes other than those characterised by relatively strong object-evaluation associations, much like the control condition of Fazio et al.'s third experiment. The ensuing debate involved issues regarding the ability to predict the affective priming effect from normatively based versus idiosyncratically based latency measures of associative strength (Chaiken & Bargh, 1993; Fazio, 1993). In my opinion, the published exchange successfully accomplished two things. First, both parties appear to have agreed that, regardless of whether reliable effects are or are not apparent among "weak" primes, the magnitude of any such effect varies as a function of associative strength. Second, the exchange succeeded in clarifying Chaiken and Bargh's (1993) objection to the conclusions drawn by Fazio et al. (1986). Essentially, they (see also Bargh et al., 1996) argued that the moderating effect of associative strength is itself moderated by the extent to which attitudes toward the primes have been considered recently. Both the prime selection phase of Fazio et al.'s (1986) first two experiments and the attitude rehearsal manipulation of their final experiment involved the participants' consideration of attitudes immediately prior to their performance of the priming task. Chaiken and Bargh (1993) suggested that such recent thought temporarily enhances the chronic activation level of evaluations strongly associated with the attitude object more so than it does for the evaluations more weakly associated with the attitude object.

This reasoning prompted Chaiken and Bargh (1993) to conduct an experiment in which a two-day delay was or was not imposed between the initial prime selection phase in which participants reported their attitudes toward a large number of objects and the priming task. The data from the no delay condition replicated the effect observed Fazio et al. (1986)—automatic attitude activation (prime valence \times target valence) moderated by attitude strength. In contrast, the attitude activation effect was unmoderated by associative strength in the delay condition. The expected four-way interaction, prime valence \times target valence \times associative strength \times delay, attained a marginal level of statistical significance, $p = .11$. Bargh et al. (1996) extended the argument about the features of the original attitude activation paradigm by proposing that the very nature of adjective connotation task, indicating whether the target adjective means "good" or "bad", encourages participants to think in terms of evaluation. It was for this reason that they conducted experiments involving the extent to which strong versus weak primes (selected on the basis of normative data) produced evaluatively congruent facilitation in a pronunciation task. Although such facilitation was observed, it was not moderated by associative strength.

As before (Fazio, 1993), I continue to find the Chaiken and Bargh (1993) data puzzling, for both conceptual and empirical reasons. Conceptually, it is not at all

clear why recent consideration of one's attitude or an evaluative context should enhance the effects of attitudes involving strongly associated evaluations more than those involving weak associations. The opposite prediction seems just as, if not more, reasonable on any *a priori* basis. Objects that are weakly associated with an evaluation are ones that individuals typically find difficulty to evaluate. Wouldn't one expect resolution of this difficulty to be more impactful than the simple and quick expression of an evaluative judgement that characterises responses to objects involving strongly associated evaluations? Having decided that "X" is good should promote the development of an association between the expressed valence and the object, and the even temporary enhancement of associative strength should be all the greater for initially weak attitudes than for initially strong ones. Thus, in my view, consideration and expression of a summary evaluation would appear to have a greater effect on what are originally weaker object-evaluation associations. Consistent with this reasoning, Powell and Fazio (1984) found that initial attitude expressions decreased response latencies to an attitudinal inquiry more than did subsequent expressions.

At an empirical level, it is important to recognise that effects of associative strengths have been observed in other research in which a time delay separated an initial experimental phase devoted to the measurement or manipulation of associative strength and the dependent variable. For example, Fazio (1993) summarises an investigation in which the magnitude of the affective priming effect produced by high-resolution colour images of such attitude objects as snakes, puppies, and hot fudge sundae was predicted by individuals' latencies of response to evaluate the attitude objects as assessed three months earlier. Conceptually parallel effects have been observed in research examining the consequences of the strength of object-evaluation associations for attention and categorisation. Moreover, this research did not involve tasks that placed participants in the evaluative set about which Bargh et al. (1996) were concerned. In work on visual attention, Roskos-Ewoldsen and Fazio (1992) found that objects toward which individuals possessed strongly associated evaluations were more likely to automatically attract attention when presented in the visual field than objects characterised by weaker associations. Importantly, the effect was observed regardless of whether the measurement of associative strength via latency of response to an attitudinal inquiry occurred before or after the attention task. In research examining the categorisation of objects that could be construed in multiple ways (e.g., "Pete Rose" as a "baseball player" or a "gambler"), Smith, Fazio, and Cejka (1996) found that having participants rehearse their attitudes toward one of the two potential categorisations increased the likelihood that the stimulus object would later be categorised accordingly. This effect was observed even when a one-week delay was imposed between the attitude rehearsal manipulation and the categorisation task.

In my view, such effects of the strength of object-evaluation associations are to be expected. Associative strength has been shown to be influential in a large

number of cognitive psychology experiments concerned with semantic priming—experiments using both lexical decision and naming tasks (e.g., de Groot, Thomassen, & Hudson, 1982; Lorch, 1982; Ratcliff & McCoon, 1981). Associative strength also has proven influential in much social psychological research concerned with associations other than attitudinal ones (see Fazio, Williams, & Powell, 2000, for a review). For example, the strength of the association between the category “charities” and specific members of the category has been found to influence donation decisions when donors must generate the potential donees for themselves (Posavac, Sanbonmatsu, & Fazio, 1997). In research concerning the strength of self-associations, Hickfeldt, Levine, Morgan, and Sprague (1999) found that the latency with which respondents identified themselves as liberal versus conservative related to the extent to which participants displayed a consistent ideology in the opinions that they expressed regarding a variety of social and political issues. Recent research concerning the direct effects of stereotype activation on behaviour has found that the extent to which activation of the construct “elderly” diminishes memory performance depends on how strongly participants’ associate the category “elderly” with the attribute “forgetfulness” (Dijksterhuis, Aarts, Bargh, & van Knippenberg, in press).

The strength of evaluative associations should be similarly influential. People’s general interests and knowledge are bound to affect the extent to which they form attitudes toward novel objects. For example, some people are very unaware of national politics, whereas others follow the political scene closely. The latter are much more likely to develop an evaluative association regarding a newly emerging figure on the national political scene. Likewise, some people are avid basketball fans with highly rehearsed attitudes toward teams, players, and coaches; such individuals also quickly and easily form judgements about new players and coaches. Others have no evaluation of such basketball-related attitude objects available in memory, will have little reason to make evaluative judgements of such entities, and will find doing so difficult if and when the need arises. Conceptually, such differences in associative strength would appear to determine the likelihood that a given evaluation is automatically activated when a given political figure or athlete is presented as a prime.

In addition to the findings already mentioned, some tentative evidence regarding the importance of associative strength is provided by electrophysiological research. Cacioppo and his colleagues have demonstrated that when individuals are categorising stimuli evaluatively, a contextual “oddball” (i.e., a positively valued item in a set of negative context items or a negatively valued item in a set of positive context items ones) evokes a larger late positive potential (LPP) of the event-related brain potential (e.g., Cacioppo, Crites, Bernston, & Coles, 1993; Cacioppo, Crites, Gardner, & Bernston, 1994). In recent research, Ito and Cacioppo (in press) examined sets of emotionally evocative pictorial stimuli (e.g., a couple embracing, a chocolate bar, mourners,

at a graveside, and a littered beach) in which the target and context items varied as a function of both positive versus negative evaluation and the presence or absence of people. Of particular interest were the sets involving an evaluative oddball in a condition in which participants were instructed to categorise the stimuli in terms of the presence or absence of people. It is in this case that any evaluative responses to the stimuli are automatic and implicit in nature. Larger LPPs to the evaluative oddballs were observed, even when evaluative categorisation was implicit. Interestingly, such implicit evaluative categorisation effects had not been observed in an earlier experiment that employed the names of foods varying in valence and in status as a vegetable or nonvegetable (Crites & Cacioppo, 1996), suggesting that the effect may be moderated by the extent to which the stimuli themselves are attitude-evoking.

Obviously, more research is necessary, especially work employing the pronunciation task, to achieve a better understanding of the conditions under which strong and weak primes will produce evaluatively congruent facilitation. What may be conceptually most important about the pronunciation paradigm is not so much the absence of an evaluative context, but the fact that any facilitation must involve the spreading activation mechanism discussed earlier and not the response competition mechanism. These two processes may not be equally sensitive in their ability to reveal the automatic activation of strongly versus weakly associated evaluations.

It may prove fruitful to consider modifications to the pronunciation task that might enhance its sensitivity. One possibility that merits investigation is to employ more visually degraded targets. Both the absence of moderating effects of associative strength and the reported failures to replicate the affective priming effect with the pronunciation task (see footnote 2) may stem from the ease of the task and, hence the presence of a ceiling effect on facilitation. Degrading the target words in one way or another may increase the difficulty of the task and provide more opportunity for facilitation effects to emerge. A number of cognitive psychology experiments have directly manipulated stimulus degradation and found this degradation factor to interact with associative strength or relatedness in determining naming latency (e.g., Becker & Killion, 1977; Besner & Smith, 1992; Massaro, Jones, Lipscomb, & Scholz, 1978; Sperber, McCauley, Ragain, & Weil, 1979; Stanovich & West, 1979, 1983). Larger priming effects (i.e., larger effects of associative strength of one kind or another), were observed with more degraded presentations. Some evidence of the relevance of visual degradation to the affective priming effect is provided by De Houwer, Hermans and Spruyt (2000), who recently found a stronger priming effect for evaluatively extreme objects when the target adjectives were degraded than when they were not. In fact, the effect was reliable only in the degraded condition. In a similar fashion, differences between primes that vary in the strength of their evaluative associations may be more apparent in the pronunciation task when the target stimuli are degraded.

It may also prove useful to attend more closely to how the purpose of the primes is described to the participants in the pronunciation paradigm. Typically, participants have not been provided with any justification as to why the primes are being presented and have simply been instructed to ignore them. The “reverse priming effect” observed by Glaser and Banaji (1999), in which evaluatively extreme primes facilitated pronunciation of evaluatively incongruent targets, suggests that this situation can instigate an automatic tendency to correct for the influence of the prime. Such automatic correction processes may have operated to varying degrees in the original Bargh et al. (1996) experiments, the various replication failures (De Houwer et al., 1998; Hermans, 1996; Klauer, 1998; Klauer & Musch, 1998), and the Glaser and Banaji (1999) research as a function of the extent to which the experimental instructions emphasised ignoring the primes and/or provided some justification for their presence. The more participants suspect that the experiment is testing the extent to which they are capable of overcoming any biasing influence of the primes, the more the automatic correction process underlying the “reverse priming effect” may counteract any evaluatively congruent facilitation. It may be interesting to present the primes as “memory words” that need to be recited at the end of each trial (as in the Fazio et al., 1986, experiments) or as stimuli that need to be studied for later recognition in a dual task context (as in the Fazio et al., 1995, work). Providing the participants with a reason for the primes’ presence and a task to engage in with respect to the primes may obviate any automatic correction process and increase the likelihood of observing evaluatively congruent facilitation, especially for objects with strongly associated evaluations.

Why automatic attitude activation matters

Unresolved issues regarding the mechanism that mediates the affective priming effect and the moderating role of associative strength should not depreciate the central importance of the phenomena. At a higher order level of analysis, automatic attitude activation is itself a mediating mechanism that plays a role in many significant cognitive and social processes. The extent to which an individual’s attitude is capable of automatic activation determines both the power that the attitude exerts on the individual’s information processing, judgements, and behaviour and the functional value of possessing the attitude (see Fazio, 1995, 2000, for reviews).

As mentioned earlier, attitude accessibility affects such fundamental processes as attention and categorisation. The research conducted by Roskos-Ewoldsen and Fazio (1992) has demonstrated that attitude accessibility influences visual attention. Objects toward which the participants possessed relatively accessible attitudes, which were termed *attitude-evoking objects*, automatically and inescapably attracted attention. For example, these attitude-evoking objects were: (a) more likely to have been noticed after very brief

exposures of each display (experiments 1 and 2), (b) more likely to have been noticed incidentally during a task in which attending to these items was neither required nor optimal (experiment 3) and, (c) more likely to interfere with performance in a visual search task when presented as distractors (experiment 4). It appears that attitudes can be activated from memory at a very early stage in the processing of visual information and that, once activated, such evaluative information directs further attention to the visual stimulus. As a result, attitude-evoking objects are at an advantage in terms of their being consciously noticed and reported. What we “see” appears to be influenced by our possession of accessible attitudes.

Smith et al. (1996) demonstrated a similar effect of attitude accessibility on the categorisation of objects that could be construed in multiple ways. For example, “Pete Rose” was more likely to be categorised as a “baseball player” than as a “gambler” when participants had earlier rehearsed their attitudes toward baseball players; the reverse was true when attitudes toward gamblers had been rehearsed. The findings led Smith et al. (1996) to suggest that the potential categorisations of a target object receive varying degrees of activation on presentation of the object name. However, those categories that automatically evoke attitudes are at an advantage. They attract attention and, other factors being equal, more strongly influence how the target is categorised at that moment in time.

Similarly, Fazio and Dunton (1997) investigated the extent to which perceivers categorised target persons by race. The photographed targets varied in race, gender, and occupation and, hence, could be categorised in multiple ways. In one session, participants were asked to make similarity judgements of all possible pairs of stimulus persons. Automatically activated racial attitudes were assessed a week earlier in a session devoted to a variant of the affective priming paradigm (see Fazio et al., 1995). Faces of Black and White undergraduates served as primes in the standard adjective connotation task. The amount of facilitation on positive versus negative adjectives when those adjectives were preceded by Black faces versus White faces was examined. For each individual participant, the effect size of this interaction between race of photo and valence of adjective served as an estimate of the individual’s automatically activated racial attitude. Because the measure is based on evaluations that are automatically activated from memory, the resulting attitude estimates have the advantage of providing an indication of how attitude-evoking race is for any given individual, as well as the valence of this attitude. For some individuals, positivity is automatically evoked in response to the Black faces; for others, negativity is automatically evoked. For other people, neither occurs. Fazio and Dunton (1997) found a curvilinear, U-shaped, relation between the attitude estimates derived from the priming procedure and categorisation by race. Just as in the research on visual attention, those individuals for whom race was attitude-evoking appear to have had their attention automatically drawn to the target’s

skin colour. As a result, they used race more heavily as a basis for judging similarity.

These various findings illustrate an important influence of accessible attitudes on attention and categorisation—an influence that is itself mediated by the attitude's automatic activation from memory. As a result of their automatic activation early in the processing of information, attitudes orient visual attention and determine how objects are construed. Such effects of accessible attitudes certainly have functional value. The attitudes alert us to the presence of objects that have the potential for hedonic consequences and promote hedonically meaningful categorisations of such objects. We are likely to notice those objects that can provide reward or satisfaction, those that we have personally defined as likeable and can benefit from approaching. Likewise, we are likely to notice those objects toward which we have developed strongly associated negative evaluations, ones that we wish to avoid if at all possible. Recognising its hedonic significance, the individual is now prepared to either approach or avoid the object, whichever is more appropriate given the valence of the activated attitude.

Further evidence regarding the functional value of accessible attitudes as tools for object appraisal is provided by research concerned with the ease of decision making. These experiments employed measures of autonomic reactivity to assess effort expenditure during decision making (Blascovich et al., 1993; Fazio, Blascovich, & Driscoll, 1992). Participants displayed less cardiovascular reactivity when they were deciding between alternatives toward which they already possessed more accessible attitudes. Automatic activation of their attitudes toward the alternatives obviated any need to construct evaluations of the alternatives on the spot, which apparently made the decision task less demanding. Hence, fewer resources were required to cope with the demands of the task.

Attitude activation is a central component in the process by which attitudes guide behaviour. According to the MODE model (Fazio & Towles-Schwen, 1999), automatically activated attitudes can guide behaviour in a relatively spontaneous manner, that is, without the individual's active consideration of the attitude and without the individual's necessary awareness of the influence of the attitude. Instead, the automatically activated attitude will influence how the person construes the object in the immediate situation, and this spontaneous appraisal will affect the person's behavioural response. A prerequisite for this spontaneous attitude-behaviour process, however, is that the attitude be capable of automatic activation.

Recent research employing the priming procedure as a means of assessing automatically activated racial attitudes has revealed relationships between such attitudes and relatively nondeliberative behaviours. For example, Fazio et al. (1995) found that the evaluations automatically activated in response to Black faces were predictive of a Black experimenter's ratings of the friendliness and interest that participants exhibited during a subsequent interaction with her.

Using a conceptually similar priming-based measure of racial attitudes, Dovidio, Kawakami, Johnson, Johnson, and Howard (1997) examined the relation between racial attitudes and nonverbal behaviour that the participants exhibited while interacting with a Black and a White interviewer. The more participants' response latencies during the priming task reflected automatically activated negativity toward Blacks, the more frequently they blinked and the less eye contact they maintained with the Black relative to the White interviewer.

In accord with the MODE model, similar effects of automatically activated racial attitudes have been observed for more deliberative behaviours, but these effects have been moderated by the extent to which individuals report being motivated to control prejudiced reactions. Among individuals with little such motivation, estimates of racial attitudes based on the priming procedure have proven predictive of responses to the Modern Racism Scale and appraisals of the "typical Black male undergraduate" (Dunton & Fazio, 1997). Individuals more motivated to control prejudice displayed evidence of correcting for the influence of any automatically activated negativity toward Blacks.

Instead of directly measuring automatically activated attitudes, other research has measured or manipulated the accessibility of attitudes and found attitude accessibility to moderate the extent to which self-reported attitudes relate to subsequent judgements and behaviour. A variety of field and laboratory research has revealed that such attitude-behaviour consistency is greater for more accessible attitudes (Bassili, 1995, 1996; Fazio, Chen, McDonel, & Sherman, 1982; Fazio, Powell, & Williams, 1989; Fazio & Williams, 1986). In addition, the more accessible the attitude, the more likely it is that new information about the attitude object will be judged in a manner that is congruent with the attitude (Fazio & Williams, 1986; Houston & Fazio, 1989; Schuette & Fazio, 1995). Thus, automatic attitude activation plays a key role in determining the extent which attitudes influence judgements and behaviour.

More extensive reviews of the literature regarding the functional value of accessible attitudes and their effects on information processing, judgement and behaviour can be found elsewhere (see Fazio, 1995, 2000; Fazio & Towles-Schwen, 1999.) The point of this brief overview is simply to illustrate that the automatic activation of any evaluations associated with an attitude object plays a critical role in a number of important phenomena. Attention, categorisation, the ease of decision making, and ultimately, judgements and behaviours themselves are all affected by automatic attitude activation. Attitude development constitutes one of the major means by which individuals can structure the multitude of objects, people, and issues that they encounter daily. By forming attitudes, individuals structure their social world into classes of objects that merit either approach or avoidance behaviour (see Allport, 1935; Katz, 1960; Smith, Bruner, & White, 1956). To the extent that these attitudes are readily accessible from memory and, hence, capable of automatic activation from memory when the object is encountered, they provide all the more effective tools for object

appraisal and free the individual from some of the impinging demands and stresses of the social environment. Moreover, such automatic attitude activation fosters individuals' approaching objects that have been personally defined as hedonically positive and avoiding those that have been defined as producing negative outcomes. Ultimately, it is for these reasons that concerted effort to understand the specific processes involved in automatic attitude activation and the variables that moderate its occurrence should prove valuable.

This Special Issue

The articles in this Special Issue of *Cognition and Emotion* provide important contributions to our understanding of automatic attitude activation. They relate to many of the issues that I have highlighted in this overview of the literature. In this closing section, I will review some of the essential contributions provided by each article, relating them, whenever possible, to the earlier discussion.

Hermans, De Houwer, and Eelen report three experiments concerned with the temporal characteristics of the affective priming effect. The research relates to previous work that has investigated the duration of the SOA between presentation of the prime and the target. Unlike earlier experiments, however, Hermans et al. examined this variable in a more parametric fashion than has been done in the past, using more SOA levels and, in particular shorter SOAs than typically have been employed. For example, they included an SOA of 0, which involves simultaneous presentation of the prime and target, as well as an SOA of -150 , which necessitates presentation of the target prior to the prime. Like past research, Hermans et al. found no evidence of an affective priming effect at longer SOAs; nor was the effect apparent at the SOA of -150 . With SOA of 0 and 150, however, participants did indicate the connotation of target adjectives that were evaluatively congruent with the primes more quickly than they did for targets that were evaluatively incongruent. The second experiment displayed similar effects with the pronunciation task. The priming effect was evident at an SOA of 150, but not at an SOA of 1000. These are the first findings to demonstrate the moderating effect of SOA on affective priming in the pronunciation task.

Interestingly, the Hermans et al. studies revealed maximal effects at the SOA of 150, rather than the more typically employed SOA of 300 ms, suggesting that many past experiments might have involved an SOA at which the automatically activated attitude already had begun to dissipate. Of course, the optimally effective SOA may vary as a function of the nature of the prime (words vs. photos), what participants are asked to do with the prime (e.g., remember it for recitation at the end of the trial, study it for a later recognition task, or ignore it), and the extent to which the target is visually degraded. Nevertheless, the findings suggest that priming experiments might benefit from shortening the SOA.

Hermans et al.'s final experiment also offers a novel contribution relevant to the issue of the moderating role of associative strength. Using the adjective connotation task, they observed a relation between the affective priming effect and participants' scores on the Jarvis and Petty (1996) Need to Evaluate Scale. This individual difference measure concerns chronic tendencies to engage in evaluative responding. Jarvis and Petty (1996) documented that individuals with a higher "need to evaluate" were more likely to report having attitudes (i.e., less likely to select a "no opinion" option) toward a variety of social and political issues and also were more likely to provide evaluative thoughts in a free response listing about unfamiliar paintings or about a typical day in their lives. From a large group of students who had been administered the NES in an earlier mass survey, Hermans et al. selected and recruited participants with extremely high or extremely low scores. Whereas the high NES participants displayed the typical affective priming effect, the Low NES did not; in fact, the two groups differed reliably. To my knowledge, this is the first demonstration of a moderating effect of the NES individual difference measure. The finding suggests that there is meaningful variability in the extent to which people experience automatic attitude activation as a function of their chronic tendencies to evaluate objects and form attitudes.

The article by Rothermund, Wentura, and Bak addresses an intriguing question regarding the extent to which attention is automatically directed toward objects that assume differential value as a consequence of the participants' current goals. The experimenters developed a clever paradigm in which two different letters, when presented as target stimuli, signified either an opportunity to gain points if the letter was named quickly (a "chance") or a threat of loss if the letter was named too slowly (a "danger"). Two other letters were neutral in value in that no points could be gained or lost when they were presented as targets. On any given trial, two of the four letters—the chance, the danger, or the two neutral letters—were presented. One letter was displayed in the target light-grey colour; it was this letter that the participant needed to name. Naming latencies for both the chance and the danger stimuli, when they were presented as targets, were faster than for neutral targets. However, a marginally significant asymmetry also was observed; chance targets tended to be named faster than danger targets.

The trials on which chance or danger stimuli were presented, not as targets, but as distractors, are of even greater interest to Rothermund et al. If attention is automatically drawn to stimuli that signal opportunity or threat, then their presence as distractors should interfere with (i.e., slow) the participants' naming of the target letter. Such interference was observed for both chance and danger distractors. In this case, however, the asymmetry was highly reliable. Chance stimuli attracted more attention than did danger stimuli. To my knowledge, this is the first demonstration of an asymmetry in automatic attention attraction in favour of positive stimuli over negative stimuli. The effect stands in contrast to

previous findings demonstrating attentional asymmetries in favour of negative stimuli (e.g., Hansen & Hansen, 1988; Pratto & John, 1991) and, hence suggests that the attention-attracting power of positive versus negative stimuli may be context-dependent. In fact, Rothermund et al. found some evidence to this effect. After the introduction of a secondary task that itself concerned the avoidance of a loss, chance stimuli were especially likely to attract more attention than danger stimuli. Thus, when participants were seeking to avoid losses in one task, they were especially sensitive to stimuli that signalled opportunities for gain in the primary task domain. In contrast, when the secondary task concerned potential gains, the asymmetry was eliminated and, in fact, slightly reversed in favour of the danger stimuli.

The article by Musch and Klauer examines affective priming with the more standard evaluative decision task. These researchers emphasise the response competition mechanism discussed earlier and the parallel between affective priming effect in the evaluative decision task and the Stroop effect. Musch and Klauer note that the Stroop effect, despite its automatic basis, has been shown to require that attention be directed to the irrelevant colour word. Narrowing the focus of attention to a single letter in the colour word, for example, attenuates the Stroop effect. Musch and Klauer suggest that the same may be true of the affective priming effect, reasoning which motivated them to manipulate uncertainty about the location of the target word whose valence was to be assessed. Primes and targets (distinguished as such by their font colour) were presented simultaneously (i.e., SOA = 0), in different areas of the screen. In the focused attention condition, a visual cue preceded the word presentation and signaled the location of the target word. In the other condition, the cue always was presented in the center of the screen and, hence, did not narrow attention. As expected, the affective priming effect was reduced, in fact, eliminated, when participants' attention was focused on the location of the target word. Congruency effects also were observed when male and female first names served as the target and distractor words and participants were required to make a decision regarding the gender of the target name.

As Musch and Klauer note, their procedure and findings parallel what has been observed not only with the Stroop task, but also with the flanker task. In recent research that also concerned the latency with which the gender of first names could be decided, Macrae, Bodenhausen, Milne, and Calvini (1999) manipulated the spotlight of attention in a flanker task paradigm. Target words were presented in the centre of the screen and the distracting flankers were simultaneously presented either above or below the target. The visual angle separating the target and flanker was manipulated. Participants were slower to respond to gender-mismatching names than gender-matching ones only with the smaller visual angle. Importantly, Macrae et al. did obtain evidence to indicate that even the more distant flankers were processed. In a subsequent task in which participants were asked to classify items as names of either people or

objects, faster latencies were observed for names that had earlier been presented at either the near or far flanker location. Thus, even the distant flankers were processed, but their location outside the spotlight of attention diminished the likelihood that their gender category would be activated. Together, the Musch and Klauer and the Macrae et al. (1999) findings illustrate the important, and obviously functional, value of selective attention mechanisms. Although they clearly receive some processing, not all visual stimuli automatically activate their associated evaluations or categories. Those within the spotlight of attention are afforded a more complete analysis of their associates.

The two articles in the Special Issue that remain to be discussed both employ paradigms that have been developed only recently to study affective associations. De Houwer, Crombez, Baeyens, and Hermans are concerned with the “affective Simon effect”—an affective variant, introduced by De Houwer and Eelen (1998), of the spatial Simon task. The affective Simon task places participants in a particular quandary. Despite the fact that judging valence is irrelevant to their task, participants are asked to use evaluative response alternatives to signal the occurrence of different events. For instance, in the original De Houwer and Eelen (1998) work, participants were instructed to say “positive” whenever a noun appeared and “negative” whenever an adjective appeared (or vice versa). The stimulus words also were evaluatively laden, however. Thus, although the participants’ task was to make a grammatical discrimination, the valence of the words was itself related to the response alternatives. If instructed to say “positive” to nouns and stimulus such as “butterfly” was presented, both the fact that a butterfly is positively valued and the fact that it is a noun signal the participants to say “positive”. However, if “cockroach” is presented, the signals are crossed; the participants needs to say “positive” because cockroach is a noun, even though cockroach is negatively valued. De Houwer and Elen (1998) found latencies of correct responses to be longer in the latter case of incongruency than in the former case of congruency. In terms of the example, “butterfly” was easier to associate with the response “positive” than was “cockroach”.

In the present research, De Houwer et al. demonstrate the generality of the affective Simon effect. Across their first three experiments, both words and photos were employed as stimuli and a variety of different judgemental tasks were examined. The latter included, not only the grammatical judgement employed in the original demonstration, but also categorisation of the stimulus as an animal or person, discrimination on the basis of the stimulus word appearing in upper versus lower case letters, and categorisation of the object depicted in a stimulus photo as either man-made or natural. In all of these variations, stimuli whose associated evaluation matched the valence of the correct judgemental response (i.e., positively valued stimuli for which “positive” was the correct response and negatively valued stimuli for which “negative” was the correct response) were responded to more quickly than

those stimuli for which the associated evaluation and the correct response did not match.

The final experiment is an especially clever variation in which motor movement was substituted for the response options of saying “positive” or “negative” aloud. Participants were instructed to press one of two keys to make a computer “manikin” on the screen run towards nouns and away from adjectives (or vice versa). Running towards the stimulus is assumed to reflect the approach behaviour associated with positively valued objects and is the conceptual substitute for the verbal response option “positive”. Likewise, running away reflects the escape behaviour typically associated with negatively valued object and constitutes the conceptual analogue to a “negative” verbal response option. Replicating the earlier work, positive stimuli for which the correct response was approach (running towards) and negative stimuli for which the correct response was escape (running away) were responded to more quickly than cases in which the evaluation associated with the stimulus object was incongruent with the required movement.

The article by Swanson, Rudman, and Greenwald also involves a paradigm developed recently to examine affective associations—in this case, the Implicit Association Test (IAT) created by Greenwald, McGhee, and Schwartz (1998). In a manner that is similar to the affective Simon task, the IAT is concerned with the ease with which participants can associate two items. In the affective Simon task, the focus is on the ease with which participants can associate the response option “positive” versus “negative” with the stimulus when the response options are indicative of some dimension other than valence. The IAT focuses on the ease with which participants can associate a response intended to signal a positive (or negative) reaction to the stimulus with a second response regarding some attribute dimension other than evaluation. The critical portion of the IAT involves a combined categorisation task for which a response key has two meanings. For example, in the Swanson et al. research, participants were required to categorise word stimuli as being related to smoking or sweets and as being pleasant or unpleasant. One response key represented both sweets and pleasant, whereas the other key represented both smoking and unpleasant. For a nonsmoker who enjoys sweets, the response mappings are very compatible; sweets are pleasant and smoking is unpleasant. Because any given key has a relatively singular meaning, such a person should be able to respond quite rapidly to the stimuli. However, when the response mappings are reversed, the task proves far more difficult. With smoking and pleasant represented by the same key, and sweets and unpleasant represented by the other key, each key now has dual and, for this individual, incompatible meanings. A comparison of the latencies that the individual exhibits for these two different response mappings provides an indication of the ease with which the individual can associate smoking with pleasant versus sweets with pleasant.

The IAT is intended to serve as an individual difference measure, in the same spirit as recent priming research that has employed lexical decision and evaluative decision latencies to estimate attitudes (e.g., Dovidio et al., 1997; Fazio et al., 1995; Wittenbrink et al., 1997). In the present research, Swanson et al. employ the IAT as an implicit measure of attitudes toward cigarette smoking. Their findings reveal some interesting dissociations between the implicit measure and such direct, explicit measures of attitudes toward smoking as thermometer ratings. For example, although smokers reported more favourable attitudes on the explicit measures, neither of the first two experiments revealed differential IAT scores for smokers and nonsmokers. IAT scores were indicative of negative associations toward smoking even among the smokers. Experiment 3, which employed pictorial stimuli, contrasted scenes that included cigarettes and ashtrays to otherwise identical scenes that did not include these objects. This differs from the contrast between smoking-related items and the items of a distinct category, such as sweets, that was employed in the earlier research. This modification succeeded in enhancing the sensitivity of the IAT to smoking status. Smokers had IAT scores indicative of more favourability toward smoking than did nonsmokers. However, the degree of differentiation was still not as substantial as was true for the thermometer scores.

Interestingly, such dissociation was not observed when vegetarians and omnivores were compared with respect to their scores on implicit and explicit measures of attitudes toward white meat versus nonmeat sources of protein. Swanson et al. suggest that the difference lies in the stigmatised status of smoking and that the relation between implicit and explicit measures is moderated by the degree to which the behaviour is stigmatised. They suggest that smokers' cognitive bolstering of their behaviour is more likely at the conscious, explicit level than at an implicit level.

The future

Clearly, the study of affective associations has enjoyed a substantial boom in recent years. In my view, this special issue represents a significant development in the field's progress. As a result of the intensive research that created the desire for a special issue in the first place and the research reported in the issue itself, we know much more about evaluative associations, their automatic activation from memory, and the various procedures by which such activation can be assessed than could have even been imagined 15–20 years ago. That attitudes can be activated automatically, the very goal of much of the initial research, is now firmly established. We also have learned about various parameters necessary for such activation to be observed. Moreover, such attitude activation can itself have powerful influence on attention, categorisation, judgement, and behaviour. In addition, it is now clear that attitude-evoking stimuli can auto-

matically attract attention, even when they are irrelevant to immediate task concerns, and that asymmetries between positively and negatively valued stimuli in their attention-attraction power can occur.

Despite the obvious progress, many important issues remain to be examined more fully. As noted earlier, further research is needed concerning the potentially multiple mediating mechanisms involved in affective priming. Moreover, more research needs to be conducted with the pronunciation task in order to more fully understand the role of associative strength and the influence of the task that participants are instructed to perform with respect to the prime.

As is evident from the contents of the Special Issue, there has been a proliferation of various techniques by which affective associations can be examined. Not only have various forms of priming tasks been employed (e.g., adjective connotation decisions, evaluative decisions about other objects, and pronunciation), but additional techniques have been developed. The flanker task, the affective Simon task, and the Implicit Association Test have been added to our methodological toolbox. Some of these tasks rely on, and hence, are more suitable for studying, spreading activation mechanisms; others focus on various forms of response competition; and still others are likely to involve both mechanisms. How these various tasks relate to one another and their specific sensitivities clearly will be an important question for future theoretical and empirical work. The issue of interrelations will be especially critical with respect to those tasks that are employed as individual difference measures of attitude.

If the next decade of research is at all comparable to the past decade, considerable progress can be expected in our understanding of the intricacies of evaluative associations. It should prove very exciting.

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REFERENCES

- Allport, G.W. (1935). Attitudes. In C. Murchison (Eds.), *Handbook of social psychology* (pp. 798–844). Worcester, MA: Clark University Press.
- Bargh, J.A., Chaiken, S., Govender, R., & Pratto, F. (1992). The generality of the automatic attitude activation effect. *Journal of Personality and Social Psychology*, *62*, 893–912.
- Bargh, J.A., Chaiken, S., Raymond, P., & Hymes, C. (1996). The automatic evaluation effect: Unconditional automatic attitude activation with a pronunciation task. *Journal of Experimental Social Psychology*, *32*, 104–128.
- Bassili, J.N. (1995). Response latency and the accessibility of voting intentions: What contributes to accessibility and how it affects vote choice. *Personality and Social Psychology Bulletin*, *21*, 686–695.
- Bassili, J.N. (1996). Meta-judgmental versus operative indexes of psychological attributes: The case of measure of attitude strength. *Journal of Personality and Social Psychology*, *71*, 637–653.
- Becker, C.A., & Killion, T.H. (1977). Interaction of visual and cognitive effects in word recognition. *Journal of Experimental Psychology: Human Perception and Performance*, *3*, 389–401.

- Besner, D., & Smith, M.C. (1992). Models of visual word recognition: When obscuring the stimulus yields a clearer view. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *18*, 468–482.
- Blascovich, J., Ernst, J.M., Tomaka, J., Kelsey, R.M., Salomon, K.L., & Fazio, R.H. (1993). Attitude accessibility as a moderator of autonomic reactivity during decision making. *Journal of Personality and Social Psychology*, *64*, 165–176.
- Cacioppo, J.T., Crites, S.L. Jr., Bernston, G.G., & Coles, M.G.H. (1993). If attitudes affect how stimuli are processed, should they not affect the event-related brain potential? *Psychological Science*, *4*, 108–112.
- Cacioppo, J.T., Crites, S.L. Jr., Gardner, W.L., & Bernston, G.G. (1994). Bioelectrical echoes from evaluative categorizations: I. A late positive brain potential that varies as a function of trait negativity and extremity. *Journal of Personality and Social Psychology*, *67*, 115–125.
- Chaiken, S., & Bargh, J.A. (1993). Occurrence versus moderation of the automatic attitude activation effect. *Journal of Personality and Social Psychology*, *64*, 759–765.
- Crites, S.L. Jr., & Cacioppo, J.T. (1996). Electrocortical differentiation of evaluative and nonevaluative categorizations. *Psychological Science*, *7*, 318–321.
- de Groot, A., Thomassen, A., & Hudson, P. (1982). Associative facilitation of word recognition as measured from a neutral prime. *Memory and Cognition*, *10*, 358–370.
- De Houwer, J., & Eelen, P. (1998). An affective variant of the Simon paradigm. *Cognition and Emotion*, *12*, 45–61.
- De Houwer, J., & Hermans, D. (1999, June). *Nine attempts to find affective priming of pronunciation responses: Effects of SOA, degradation, and language*. Paper presented at the Tagung der Fachgruppe Sozialpsychologie, Kassel, Germany.
- De Houwer, J., Hermans, D., & Eelen, P. (1998). Affective and identity priming with episodically associated stimuli. *Cognition and Emotion*, *12*, 145–169.
- De Houwer, J., Hermans, D., & Spruyt, A. (2000). *Affective priming of pronunciation responses: Effects of target degradation in Dutch and English*. Unpublished manuscript, University of Southampton, Southampton, UK.
- Dijksterhuis, A., Aarts, H., Bargh, J.A., & van Knippenberg, A. (in press). On the relation between associative strength and automatic behavior. *Journal of Experimental Social Psychology*.
- Dovidio, J.F., Kawakami, K., Johnson, C., Johnson, B., & Howard, A. (1997). On the nature of prejudice: Automatic and controlled processes. *Journal of Experimental Social Psychology*, *33*, 510–540.
- Dunton, B.C., & Fazio, R.H. (1997). An individual difference measure of motivation to control prejudiced reactions. *Personality and Social Psychology Bulletin*, *23*, 316–326.
- Fazio, R.H. (1993). Variability in the likelihood of automatic attitude activation: Data re-analysis and commentary on Bargh, Chaiken, Gendver, and Pratto (1992). *Journal of Personality and Social Psychology*, *64*, 753–758, 764–765.
- Fazio, R.H. (1995). Attitudes as object-evaluation associations: Determinants, consequences, and correlates of attitude accessibility. In R.E. Petty & J.A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 247–282). Hillsdale, NJ: Erlbaum.
- Fazio, R.H. (2000). Accessible attitudes as tools for object appraisal: Their costs and benefits. In G. Maio & J. Olson (Eds.), *Why we evaluate: Functions of attitudes* (pp. 1–36). Mahwah, NJ: Erlbaum.
- Fazio, R.H., Blascovich, J., & Driscoll, D.M. (1992). On the functional value of attitudes: The influence of accessible attitudes upon the ease and quality of decision making. *Personality and Social Psychology Bulletin*, *18*, 388–401.
- Fazio, R.H., Chen, J., McDonel, E.C., & Sherman, S.J. (1982). Attitude accessibility, attitude-behavior consistency, and the strength of the object-evaluation association. *Journal of Experimental Social Psychology*, *18*, 339–357.

- Fazio, R.H., & Dunton, B.C. (1997). Categorization by race: The impact of automatic and controlled components of racial prejudice. *Journal of Experimental Social Psychology, 33*, 451–470.
- Fazio, R.H., Jackson, J.R., Dunton, B.C., & Williams, C.J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes: A bona fide pipeline? *Journal of Personality and Social Psychology, 69*, 1013–1027.
- Fazio, R.H., Powell, M.C., & Williams, C.J. (1989). The role of attitude accessibility in the attitude-to-behaviour process. *Journal of Consumer Research, 16*, 280–288.
- Fazio, R.H., Sanbonmatsu, D.M., Powell, M.C., & Kardes, F.R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology, 50*, 229–238.
- Fazio, R.H., & Towles-Schwen, T. (1999). The MODE model of attitude-behavior processes. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 97–116). New York: Guilford.
- Fazio, R.H., & Williams, C.J. (1986). Attitude accessibility as a moderator of the attitude-perception and attitude-behavior relations: An investigation of the 1984 presidential election. *Journal of Personality and Social Psychology, 51*, 505–514.
- Fazio, R.H., Williams, C.J., & Powell, M.C. (2000). Measuring associative strength: Category-item associations and their activation from memory. *Political Psychology, 21*, 7–25.
- Giner-Sorolla, R., Garcia, M.T., & Bargh, J.A. (1999). The automatic evaluation of pictures. *Social Cognition, 17*, 76–96.
- Glaser, J., & Banaji, M.R. (1999). When fair is foul and foul is fair: Reverse priming in automatic evaluation. *Journal of Personality and Social Psychology, 77*, 669–687.
- Greenwald, A.G., Draine, S.C., Abrams, R.L. (1996). Three cognitive markers of unconscious semantic activation. *Science, 273*, 1699–1702.
- Greenwald, A.G., Klinger, M.R., & Liu, T.J. (1989). Unconscious processing of dichoptically masked words. *Memory and Cognition, 17*, 35–47.
- Greenwald, A.G., McGhee, D., & Schwartz, J.L.K. (1998). Measuring individual differences in implicit cognition: The implicit association task. *Journal of Personality and Social Psychology, 74*, 1469–1480.
- Hansen, C.F., & Hansen, R.D. (1988). Finding the face in the crowd: An anger superiority effect. *Journal of Personality and Social Psychology, 54*, 917–924.
- Hermans, D. (1996). *Automatische stimulevaluatie. Een experimentele analyse van de voorwaarden voor evaluatieve stimulusdiscriminatie aan de hand van het affectieve-primingparadigma*. [Automatic stimulus evaluation. An experimental analysis of the preconditions for evaluative stimulus discrimination using an affective priming paradigm]. Unpublished doctoral dissertation. University of Leuven, Belgium.
- Hermans, D., De Houwer, J., & Eelen, P. (1994). The affective priming effect: Automatic activation of evaluative information in memory. *Cognition and Emotion, 8*, 515–533.
- Hermans, D., De Houwer, J., & Eelen, P. (1996). Evaluative decision latencies mediated by induced affective states. *Behaviour Research and Therapy, 34*, 483–488.
- Hermans, D., Baeyens, F., & Eelen, P. (1998). Odours as affective-processing context for word evaluation: A case of cross-modal affective priming. *Cognition and Emotion, 12*, 601–613.
- Hill, A.B., & Kemp-Wheeler, S.M. (1989). The influence of context on lexical decision time for emotional and non-emotional words. *Current Psychology: Research and Reviews, 8*, 219–227.
- Houston, D.A., & Fazio, R.H. (1989). Biased processing as a function of attitude accessibility: Making objective judgments subjectively. *Social Cognition, 7*, 51–66.
- Huckfeldt, R., Levine, J., Morgan, W., & Sprague, J. (1999). Accessibility and the political utility of partisan and ideological orientations. *American Journal of Political Science, 43*, 888–911.
- Ito, T.A., & Cacioppo, J.T. (in press). Electrophysiological evidence of implicit and explicit categorization processes. *Journal of Experimental Social Psychology*.

- Jarvis, W.B.G., & Petty, R.E. (1996). The need to evaluate. *Journal of Personality and Social Psychology, 70*, 172–194.
- Katz, D. (1960). The functional approach to the study of attitudes. *Public Opinion Quarterly, 24*, 163–204.
- Kemp-Wheeler, S.M., & Hill, A.B. (1992). Semantic and emotional priming below objective detection threshold. *Cognition and Emotion, 6*, 113–128.
- Klauer, K.C. (1998). Affecting priming. *European Review of Social Psychology, 8*, 63–107.
- Klauer, K.C., & Musch, J. (1998, May). *Evidence for no affective priming in the naming task*. Paper presented at the meeting of the American Psychological Society, Washington, DC.
- Klauer, K.C., Roßnagel, C., & Musch, J. (1997). List-context effects in evaluative priming. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23*, 246–255.
- Klinger, M.R., Burton, P.C., & Pitts, G.S. (2000). Mechanisms of unconscious priming I: Response competition, not spreading activation. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 26*, 441–455.
- Lorch, R.F. Jr. (1982). Priming and search processes in semantic memory: A test of three models of spreading activation. *Journal of Verbal Learning and Verbal Behavior, 21*, 468–492.
- Macrae, C.N., Bodenhausen, G.V., Milne, A.B., & Calvini, G. (1999). Seeing more than we can know: Visual attention and category activation. *Journal of Experimental Social Psychology, 35*, 590–602.
- Massaro, D.W., Jones, R.D., Lipscomb, D., & Scholz, R. (1978). Role of prior knowledge on naming and lexical decisions with good and poor stimulus information. *Journal of Experimental Psychology: Human Learning and Memory, 4*, 498–512.
- Meyer, D.E., & Schvaneveldt, R.W. (1971). Facilitation in recognizing pairs of words. *Journal of Experimental Psychology, 90*, 227–234.
- Neely, J.H. (1976). Semantic priming and retrieval from lexical memory: Evidence for facilitatory and inhibitory processes. *Memory and Cognition, 4*, 648–654.
- Neely, J.H. (1977). Semantic priming and retrieval from lexical memory: Roles of inhibitionless spreading activation and limited-capacity attention. *Journal of Experimental Psychology: General, 106*, 225–254.
- Posavac, S.S., Sanbonmatsu, D.M., & Fazio, R.H. (1997). Considering the best choice: Effects of salience and accessibility of alternatives on attitude-decision consistency. *Journal of Personality and Social Psychology, 72*, 253–261.
- Powell, M.C., & Fazio, R.H. (1984). Attitude accessibility as a function of repeated attitudinal expression. *Personality and Social Psychology Bulletin, 10*, 139–148.
- Pratto, F., & John, O.P. (1991). Automatic vigilance: The attention-grabbing power of negative social information. *Journal of Personality and Social Psychology, 61*, 380–391.
- Ratcliff, R., & McKoon, G. (1981). Does activation really spread? *Psychological Review, 88*, 454–462.
- Roskos-Ewoldsen, D.R., & Fazio, R.H. (1992). On the orienting value of attitudes. Attitude accessibility as a determinant of an object's attraction of visual attention. *Journal of Personality and Social Psychology, 63*, 198–211.
- Sanbonmatsu, D.M., Osborne, R.E., & Fazio, R.H. (1986, May). *The measurement of automatic attitude activation*. Paper presented at the meeting of the Midwestern Psychological Association, Chicago.
- Schneider, W., & Shiffrin, R.M. (1977). Controlled and automatic human information processing: I. Detection, search, and attention. *Psychological Review, 84*, 1–66.
- Schuetter, R.A., & Fazio, R.H. (1995). Attitude accessibility and motivation as determinants of biased processing: A test of the MODE model. *Personality and Social Psychology Bulletin, 21*, 704–710.
- Shiffrin, R.M. & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending, and a general theory. *Psychological Review, 84*, 127–190.

- Smith, E.R., Fazio, R.H., & Cejka, M.A. (1996). Accessible attitudes influence categorization of multiply categorizable objects. *Journal of Personality and Social Psychology, 71*, 888–898.
- Smith, M.B., Bruner, J.S., & White, R.W. (1956). *Opinions and personality*. New York: Wiley.
- Sperber, R.D., McCauley, C., Ragain, R.D., & Weil, C.M. (1979). Semantic priming effects on picture and word processing. *Memory and Cognition, 7*, 339–345.
- Stanovich, K.E., & West, R.F. (1979). Mechanisms of sentence context effects in reading: Automatic activation and conscious attention. *Memory and Cognition, 7*, 77–85.
- Stanovich, K.E., & West, R.F. (1983). On priming by a sentence context. *Journal of Experimental Psychology: General, 112*, 1–36.
- Wentura, D. (1999). Activation and inhibition of affective information: Evidence for negative priming in the evaluation task. *Cognition and Emotion, 13*, 65–91.
- Wittenbrink, B., Judd, C.M., & Park, B. (1997). Evidence for racial prejudice at the implicit level and its relationship with questionnaire measures. *Journal of Personality and Social Psychology, 72*, 262–274.