Research Article

THE AUTOMATIC EVALUATION OF NOVEL STIMULI

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Abstract—*From classic theory and research in psychology, we distill a broad theoretical statement that evaluative responding can be immediate, unintentional, implicit, stimulus based, and linked directly to approach and avoidance motives. This statement suggests that evaluative responses should be elicited by novel, nonrepresentational stimuli (e.g., abstract art, "foreign" words). We tested this hypothesis through combining the best features of relevant automatic-affect research paradigms. We first obtained explicit evaluative ratings of novel stimuli. From these, we selected normatively positive and negative stimuli to use as primes in a sequential priming paradigm. Two experiments using this paradigm demonstrated that briefly presented novel prime stimuli were evaluated automatically, as they facilitated responses to subsequently presented target stimuli of the same valence just as much as did pictures or names of real objects. A final experiment revealed that exposure to novel stimuli produces muscular predispositions to approach or avoid them.*

Going back at least as far as Lewin (1935) and his seminal writings on the "field of forces" that steer behavior, prominent theorists have emphasized the primacy of evaluative responding—that is, the categorization of stimuli as positive or negative. Osgood, Suci, and Tannenbaum (1957) demonstrated that the evaluative dimension of meaning captures a large majority of semantic meaning variance. Perhaps most famously, Zajonc (1980) argued that evaluative or affective processing is both primary and independent of "cold" cognition. He proposed the existence of *preferenda*—those features of objects that directly trigger affective reactions and are qualitatively distinct from the *discriminanda* used for stimulus recognition.

This historical evaluative stance extended beyond the immediate psychological response to include an appropriate behavioral predisposition toward the stimulus as well. Lewin (1935) argued that a direct relation exists between evaluation and approach/avoidance behavioral tendencies. Osgood (1953) similarly argued that the purpose of the evaluative component of meaning is to allow the immediate preparation of appropriate behavioral responses. Subsequent studies by Osgood's student Solarz (1960), and more recently Chen and Bargh (1999), confirmed the direct link between evaluation and appropriate behavioral predispositions.

This classic stance toward the evaluative function coheres with early and modern neurophysiological theorizing. Schneirla's (1959) influential comparative analysis of learning mechanisms revealed that all organisms at times manifest immediate approach and withdrawal responses to stimuli. Lang, Bradley, and Cuthbert (1990) outlined a model proposing, among other things, that stimulus valence is a basic category that the brain uses to organize information, with a given stimulus activating either an approach ("appetitive reflex") or an avoidance ("defensive reflex") response. In support of this hypothesis, Ito and Cacioppo (2000) found that photographs of negative scenes elicited larger late positive brain activation potentials (LPPs; a measure of the alerting response) than did positive pictures, even when the participant's explicit task was other than to evaluate the photographs. The authors concluded that this implicit negativity bias has "adaptive utility . . . by allowing organisms to avoid harm even when they are not explicitly sensitized to do so" (p. 674).

From these traditional and more recent perspectives, clear defining attributes of evaluative responding emerge. We can distill the following broad theoretical statement concerning its nature: Evaluative responding can be immediate, unintentional, implicit (i.e., occurring without awareness), stimulus based, and linked directly to approach and avoidance behavioral tendencies. As a stimulus-based process, automatic (i.e., immediate, unintentional, and implicit) evaluative responding should be elicited even by a novel stimulus. Yet despite how fundamental this theoretical statement is to numerous research domains, it has never received a direct and unequivocal experimental test.

Although a considerable amount of research bears on the issue, none of the individual paradigms has included all of the design features necessary to conclude unambiguously that stimuli can be evaluated as positive or negative, immediately and without intent, on the basis of their inherent features (i.e., as opposed to the immediate and unintended retrieval from memory of a consciously formed evaluation). In what follows, we identify and discuss three distinct, relevant research traditions. We then report three experiments that we argue do constitute a direct and compelling test of the historic hypothesis.

MERE-EXPOSURE RESEARCH

In mere-exposure research, participants have been exposed to "Turkish" words, irregular polygons, or Chinese ideographs (Monahan, Murphy, & Zajonc, 2000; Zajonc, 1968) that are unfamiliar and nonrepresentational to the participants, and therefore referred to by the researchers (and routinely by the field more generally; e.g., Dorfman, 1999) as "novel." The more frequently people are exposed to these stimuli (even in the absence of conscious awareness of previous exposure; e.g., Kunst-Wilson & Zajonc, 1980), the more they tend to like them. This research has particular relevance to our focal theoretical statement because much of it deals with affective reactions to novel stimuli. However, in mere-exposure research participants make liking judgments explicitly upon being requested to do so by the experimenter, not implicitly without the intention of making them.

Furthermore, according to the mere-exposure researchers themselves, the effect is not an immediate evaluation of the particular stimulus itself, but rather a consequence of the experienced repetition of the stimulus (see Zajonc, 1998, p. 618). To demonstrate this point, Monahan et al. (2000; see also Winkielman & Cacioppo, in press) showed that participants subliminally and repeatedly exposed to a few exemplars of one type of novel stimuli (e.g., polygons) subsequently evaluated members of an entirely different type of novel stimuli (e.g., Chinese ideographs) more positively than did participants in an experimental condition identical except in that participants were exposed to

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numerous examples of the first type of stimulus only one time each. The diffuse and nonspecific nature of the positive affective reaction to mere frequency of exposure enabled it to become attached even to previously unpresented stimuli. The authors concluded that “the process whereby stimuli repeatedly encountered gain in positive affect relies on a general state of reduced alertness and tension perhaps deriving from an attenuation of the orienting reflex” (p. 464). In other words, it is the frequency of exposure to the stimulus, not its particular features, that drives the effect.

AUTOMATIC ATTITUDE ACTIVATION

Adapting the sequential semantic priming paradigm of Neely (1977), Fazio, Sanbonmatsu, Powell, and Kardes (1986) presented participants with prime-target pairs that, on a given trial, were either of the same or of opposite valence, but were otherwise semantically unrelated (e.g., *birthday-phony*, *tuna-honest*). Participants were instructed to indicate as quickly as possible whether the target word was positive or negative in meaning. Because the stimulus onset asynchrony (SOA) between the prime and target in this paradigm is too brief (ca. 250 ms) to permit an intentional, strategic response to the target based on the nature of the prime, any effect of the prime on responses to the target implicates an automatic response to the prime. This experiment and many subsequent experiments (e.g., Bargh, Chaiken, Govender, & Pratto, 1992) have shown that responses to the target are faster on trials in which the prime and target are of the same valence, rather than opposite valence. This is evidence that the evaluation of the prime is being activated automatically.

The fact of automatic evaluation of the prime stimulus does not explain how this evaluation then affects responses to the target. One proposed explanation is that the separate evaluations of the prime and of the target compete as to which will determine the response to the target (Klauer, Rossnagel, & Musch, 1997). By this account, when the prime and target valences differ, the incorrect response suggested by the prime must be inhibited, lengthening response latency to the target; conversely, when the prime and target valences are the same, responses to the target are facilitated. However, response competition cannot easily account for automatic evaluation effects obtained using tasks other than evaluation of the target (e.g., Bargh, Chaiken, Raymond, & Hymes, 1996; Chen & Bargh, 1999; Giner-Sorolla, Garcia, & Bargh, 1999). In the pronunciation or naming task, for instance, the evaluation activated by the prime is not a possible competing response to the naming of the target. An alternative “spreading evaluation” account proposed by Bargh et al. (1996) does predict effects on nonevaluative tasks, as it holds that activation of a prime of a given valence for a short time causes the activation of all other concepts sharing that valence, resulting in facilitation of any response to a same-valence target.

Both of these accounts explicitly assume that a preexisting evaluative response, stored in memory, is activated by the prime. Indeed, a major theoretical account of automatic attitude activation (Fazio, 1986, 1995) holds that not all stimuli are evaluated automatically, only those with strong associations in memory between the attitude object and the evaluation. However, automatic evaluation effects have also been obtained for prime stimuli characterized by quite weak associative connections (Bargh et al., 1992, 1996; Fazio et al., 1986, Experiment 3), suggesting that most, if not all, environmental stimuli are evaluated automatically. Therefore, an easily retrievable evaluation associated with the prime concept in memory may not be a necessary condition for immediate, on-line evaluation.

In contrast to the mere-exposure research, then, the automatic-attitude paradigm has the advantage of using an implicit measure of evaluation. However, prime stimuli in all automatic-attitude experiments to date have been familiar stimuli for which people have at some point, presumably, formed and stored evaluations. This research therefore does not speak to the possibility of stimulus-based evaluation because the effects can be due to the retrieval from memory of previous, conscious evaluations of the stimuli.

AFFECTIVE PRIMING

Like the automatic-attitude research, affective priming studies employ a sequential priming paradigm. In this work (e.g., Murphy & Zajonc, 1993; Niedenthal, 1990), the valence of subliminal primes (such as emotional expressions) has been shown to influence the intentional, explicit evaluations of supraliminal target stimuli. Novel targets (e.g., irregular polygons, Chinese ideographs) are evaluated more positively following subliminal presentation of a happy face compared with an angry face. Although these studies demonstrate an immediate and unintended evaluation of the subliminally presented priming stimuli, the primes are very familiar stimuli: facial expressions. Moreover, even the intentional evaluations of the novel target stimuli are not driven by their own features (the novel targets are preselected, in fact, to be evaluatively neutral), but by the clearly evaluative features of the facial-expression primes.

Abrams and Greenwald (2000) used “novel” prime stimuli to demonstrate affective priming for suboptimally presented primes. However, the valence of these primes was first established through an evaluative conditioning procedure. For example, after participants repeatedly classified a set of words including *<u>sm</u>ut* and *b<u>ile</u>* as unpleasant (vs. pleasant) in meaning, the word *smile* (comprising the features *sm* and *ile* of the prior negative words) functioned as a negative prime in the subsequent affective priming task. According to Abrams and Greenwald, the subliminal nature of the priming task caused the conglomerate prime to be processed not as a whole, but at the level of its component features. Because this effect relies on repeated intentional evaluation as well as recent experience with the primes, it is not a case of unintended evaluation based on stimulus features per se.

SUMMARY OF STRENGTHS AND SHORTCOMINGS OF EXISTING EVIDENCE

The preceding review reveals that none of the relevant extant research paradigms contain all of the design features needed to support an unambiguous conclusion about the automatic evaluation of stimuli based on their preferenda, or own particular features. Although mere-exposure research has focused on novel stimuli, it has employed explicit, conscious measures of evaluation, and the affective reactions obtained are not driven by stimulus features but by repeated stimulus presentation. Automatic-attitude research does use an implicit measure of immediate stimulus evaluation but does not use novel stimuli. And the affective priming literature has similarly focused on immediate evaluative reactions to known, not novel, stimuli, such as emotionally expressive faces, or else to stimuli explicitly and repeatedly conditioned to temporarily provoke a given evaluative reaction.

In short, no single paradigm has unambiguously tested the existence of automatic, stimulus-based evaluation, a process implicated by numerous classic theoretical statements. No single study has assessed whether novel stimuli can be evaluated immediately, unintentionally, and implicitly. For such a test, an implicit measure of initial evaluative responding must be combined with the use of novel stimuli.

OVERVIEW OF EXPERIMENTS

For the experiments we report here, we first obtained explicit normative evaluative ratings for two traditional (i.e., used in mere-exposure research) varieties of novel stimuli—auditorily presented pseudo-Turkish words and nonrepresentational visual images. On the basis of these ratings, we selected positive and negative novel stimuli for use in the experiments. Experiments 1 (pseudo-Turkish words) and 2 (images) employed these novel stimuli as primes, along with familiar, nonnovel primes, within the implicit evaluation paradigm common to research on automatic attitude activation. Participants were not given the explicit goal to evaluate the target stimuli, and the SOA between prime and target was too brief to support any strategic response based on the prime. (The decision to use brief supraliminal instead of subliminal presentation of the primes was based on the findings of Abrams & Greenwald, 2000, which showed that under some conditions the evaluation of a subliminally presented prime stimulus is not based on the presented object as a whole.) Experiment 3 tested for the final defining quality of automatic, stimulus-based evaluation—a direct effect of the novel stimulus on approach/avoidance behavioral predispositions.

NORMATIVE STUDY

Stimuli

We generated a variety of novel auditory and visual stimuli. These stimuli lacked explicit conceptual meaning, had not been subjected to prior intentional evaluation, and were combinations of features that had never been heard or seen before (i.e., they were novel in the same way and sense as the stimuli used traditionally in mere-exposure research).

Auditory stimuli

Phonetic qualities of language have been found to convey superficial evaluative meaning, independent of semantic meaning. Specifically, front-articulated sounds (e.g., *talir*) tend to be evaluated more positively, across many cultures, than are back-articulated sounds (e.g., *gumok*), even among infants (Miron, 1961). We created novel auditory stimuli by attaching two front- or back-articulated sounds and recording these utterances with neutral intonation. Stimuli were edited to have 250-ms durations. The nonnovel auditory stimuli were two-syllable English words used in prior automaticity studies (e.g., *cancer* and *music*; see Bargh et al., 1992).

Visual stimuli

Evaluative categorization of abstract art also shows high consensus (Takahashi, 1995). Potential visual stimuli were computer-generated drawings or computer-modified renditions of nonrepresentational art by artists such as Kandinsky and Klee. To make the latter entirely unrecognizable, images were converted to black and white and distorted through inversion, rearrangement, or partial enlargement. The nonnovel stimuli were pictures representing familiar positive and negative attitude objects; some were used in prior attitude-automaticity research (e.g., images of a snake or butterfly; see Giner-Sorolla et al., 1999), and others were created for the purpose of this experiment.

Explicit Evaluations

Stimulus valence was assessed through both a computerized forced-choice valence-identification task and a paper-and-pencil continuous evaluation rating. Seventy-eight students performed the computerized task (36 assessed auditory stimuli, 42 assessed visual stimuli), responding as quickly as possible to each stimulus by pressing either the “good” or the “bad” button on a response box. Forty-two additional students responded to the paper-and-pencil measure (20 evaluated auditory stimuli, 22 evaluated visual stimuli). These participants assessed stimulus valence on 11-point Likert scales ranging from -5 (*very negative*) to $+5$ (*very positive*).

Results and Discussion

On the basis of the normative ratings, we selected five primes for each of the four Stimulus Modality $\times$ Stimulus Valence conditions. We selected those novel stimuli that had the greatest consensus as to their valence. Table 1 lists the selected stimuli, along with their ratings; illustrations of the novel visual stimuli are in Figure 1. As Table 1 shows, evaluations of novel stimuli were less extreme ($M = 2.27$) than evaluations of familiar stimuli ($M = 3.77$).[1]

EXPERIMENT 1: AUTOMATIC EVALUATION OF NOVEL AUDITORY STIMULI

In this experiment, on each trial participants pronounced a target word that was immediately preceded by an auditory stimulus. The auditory primes were either English nouns or novel pseudo-Turkish words. We expected participants to pronounce targets more quickly when they were preceded by same-valence primes (whether novel stimuli or English words) than when they were preceded by opposite-valence primes. This facilitation would require the automatic evaluation of the novel (and familiar) primes.

Method

Forty-six students participated. All had learned English prior to age 5. Participants learned that on each trial, they would hear an English or “foreign” word that would serve as a “signal” for the appearance of a printed target word on the computer screen shortly thereafter, so that they could pronounce the target word as quickly as possible. On each trial, an auditory prime was presented, followed 300 ms after its onset by a target noun that remained on screen until the spoken response was made into the microphone. Pronunciation latency was recorded. Two seconds intervened between trials. The auditory stimuli listed in Table 1 served as primes, and 20 weakly valenced positive or negative nouns (e.g., *dress*, *debt*; from Bargh et al., 1996, Experiment 3) served as targets. Unlike in prior automatic-attitude studies, each participant was exposed just once to each prime (and target). The order of stimulus presentation was randomized across participants.

Results and Discussion

Following Bargh et al. (1996), we excluded response latencies under 250 ms (0.3%) or over 1,000 ms (0.1%). The shorter latencies typically are caused by extraneous noises, the longer latencies by inaudible initial responses.

1. These means were computed using absolute values of extremity ratings.

Table 1. *Prime stimuli for the auditory and visual prime experiments*

Stimulus	Dichotomous evaluation	Extremity rating
Novel auditory primes		
Leleh	.67	2.8 (1.0)
Meepeh	.61	2.8 (1.2)
Paná	.75	2.3 (1.2)
Talir	.75	1.8 (1.5)
Wesi	.81	2.0 (1.0)
Gumok	.03	−2.7 (1.7)
Joogkuch	.06	−2.3 (2.0)
Kunchuck	.03	−2.6 (1.8)
Shkingko	.22	−2.4 (1.9)
Xus-hood	.31	−1.5 (1.5)
Nonnovel auditory primes		
Baby	.94	2.8 (0.6)
Circus	.94	2.9 (0.9)
Eagle	.89	2.7 (0.9)
Music	1.00	3.6 (0.5)
Sunshine	1.00	3.8 (0.5)
Cancer	.03	−3.9 (0.4)
Cockroach	.06	−2.8 (0.2)
Exam	.17	−3.8 (0.7)
Garbage	.03	−2.2 (0.9)
Hornet	.22	−2.1 (2.0)
Novel image primes		
Image 1	.86	3.4 (2.5)
Image 2	.83	3.0 (2.2)
Image 3	.79	1.6 (3.1)
Image 4	.74	2.9 (2.1)
Image 5	.74	2.3 (2.7)
Image 6	.26	−2.0 (2.5)
Image 7	.14	−2.7 (2.3)
Image 8	.14	−1.2 (2.6)
Image 9	.12	−1.1 (3.2)
Image 10	.07	−1.9 (2.0)
Nonnovel image primes		
Butterfly	.93	3.9 (0.5)
Cake	.95	4.7 (0.5)
Ducky	.98	4.9 (0.2)
Flower	.98	4.8 (0.3)
Grapes	.93	4.3 (0.5)
Grave	.02	−4.9 (0.2)
Hypodermic needle	.05	−4.1 (0.5)
Idol	.02	−4.3 (0.5)
Snake	.02	−4.7 (0.3)
Wheelchair	.10	−4.2 (0.7)

Note. For dichotomous evaluation, 0 = *bad* and 1 = *good*. Extremity ratings are mean ratings on the 11-point Likert scale that ranged from −5 (*very negative*) to +5 (*very positive*); standard deviations are in parentheses.

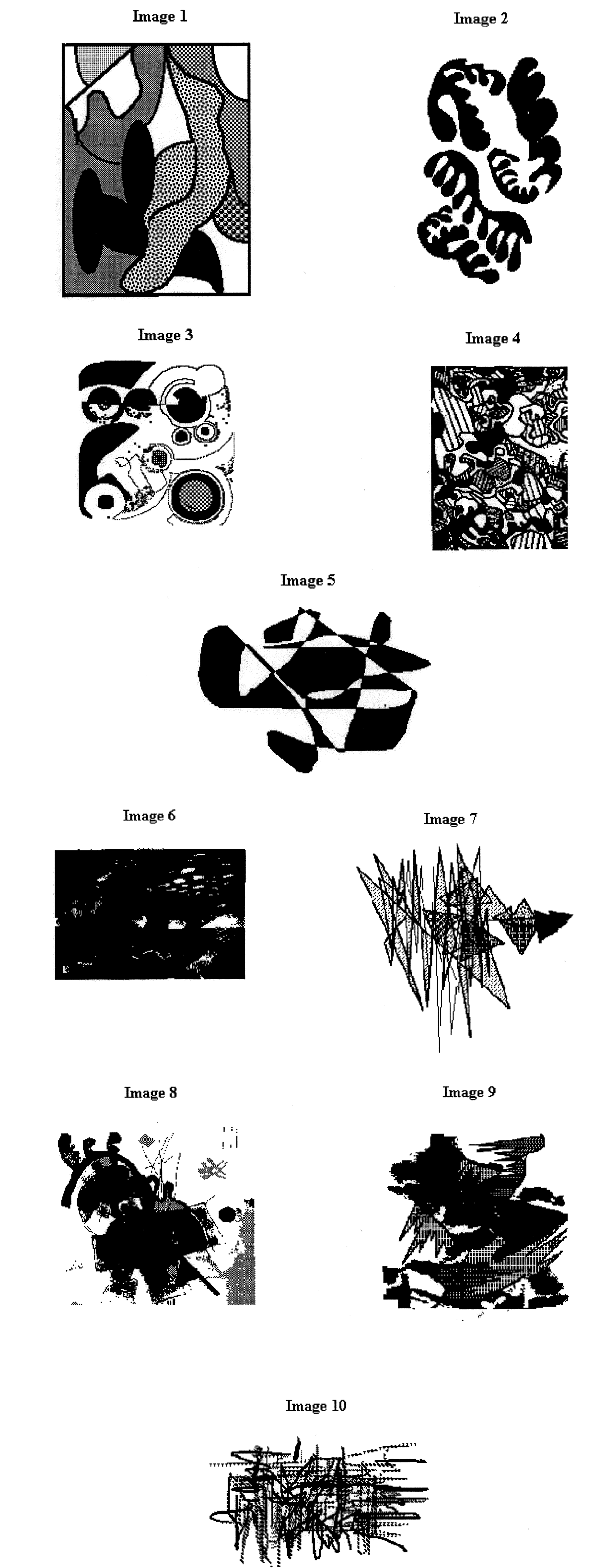

Fig. 1. The positive and negative novel images used in the study.

Latencies were log-transformed to reduce the skewed nature of the latency distribution. Mean latencies were calculated for the eight cells of the design, formed by complete crossing of the within-subjects factors of prime novelty (English vs. foreign word), prime valence (positive vs. negative), and target valence (positive vs. negative). A 2 × 2 × 2 repeated measures analysis of variance (ANOVA) yielded a significant interaction of prime valence and target valence, $F(1, 45) = 53.11$, $p < .001$. As predicted, response latencies for matched-valence pairs were faster than response latencies for nonmatched-valence pairs, for both novel and nonnovel stimuli (see Fig. 2). Although the three-way interaction approached significance ($p = .062$), the simple Prime Valence × Target Valence interaction was reliable for both the novel stimuli, $F(1, 45) = 10.51$, $p = .002$, and the nonnovel stimuli, $F(1, 45) = 45.71$, $p < .001$. As in Experiment 3 of Bargh et al. (1996), a main effect of target valence also emerged, $F(1, 45) = 22.96$, $p < .001$; participants pronounced positive target nouns faster than negative target nouns.

These results are the first demonstration of purely stimulus-based automatic evaluation. Novel prime stimuli were unintentionally evaluated within 300 ms, in the absence of any evaluative contextual cues. These novel primes were less evaluatively extreme than our nonnovel primes, and participants simply pronounced modestly positive and negative target words, without a goal to evaluate anything. Nonetheless, the signature pattern of automatic evaluation was observed for novel prime stimuli—facilitation of target processing for same- versus cross-valence prime-target combinations.

EXPERIMENT 2: AUTOMATIC EVALUATION OF NOVEL VISUAL STIMULI

In this experiment, participants pronounced target words that were immediately preceded by familiar or novel visual primes. We expected participants to be able to pronounce targets more quickly when preceded by same-valence rather than opposite-valence primes, whether novel or familiar.

Method

Forty-six students participated. Experiment 2 followed the same procedure as Experiment 1, but with the novel visual stimuli in Figure 1 substituted for the novel auditory stimuli. In each trial, a prime image was displayed for 250 ms. After a blank-screen interstimulus interval of 50 ms, the target noun appeared; it remained on screen until the spoken response.

Results and Discussion

Response latencies under 250 ms (0.2%) or over 1,000 ms (2.1%) were excluded. The 2 × 2 × 2 repeated measures ANOVA on mean log-transformed latencies again yielded the predicted interaction of prime valence and target valence, $F(1, 45) = 35.53$, $p < .001$. The pattern of the interaction was consistent with the occurrence of automatic evaluation for both the novel and the nonnovel primes (see Fig. 3). The three-way interaction did not reach statistical significance ($p = .082$). The simple Prime Valence × Target Valence interaction was reliable for both the novel stimuli, $F(1, 45) = 28.06$, $p < .001$, and the nonnovel stimuli, $F(1, 45) = 10.24$, $p < .003$. As in Experiment 1, a main effect of target valence emerged, $F(1, 45) = 24.97$, $p < .001$, with participants responding more quickly to good than to bad targets. Thus, Experiment 2 replicates and extends Experiment 1 by demonstrating automatic evaluation of novel stimuli in a different sensory modality.

EXPERIMENT 3: APPROACHING AND AVOIDING NOVEL STIMULI

Solarz (1960) tested the hypothesis that evaluation is directly tied to approach and avoidance behavioral tendencies. Some of his participants were instructed to evaluate each of a series of named stimuli by pulling a lever toward them to indicate "good" (i.e., an approach response; see Priester, Cacioppo, & Petty, 1996) and by pushing the lever away from them to indicate "bad" (an avoidance response). Other participants were given the opposite instructions. Those whose behavioral response was congruent with target valence (i.e., pull for good, push for bad) were faster to respond overall than were those in the opposite condition. This was the first demonstration of a direct link be-

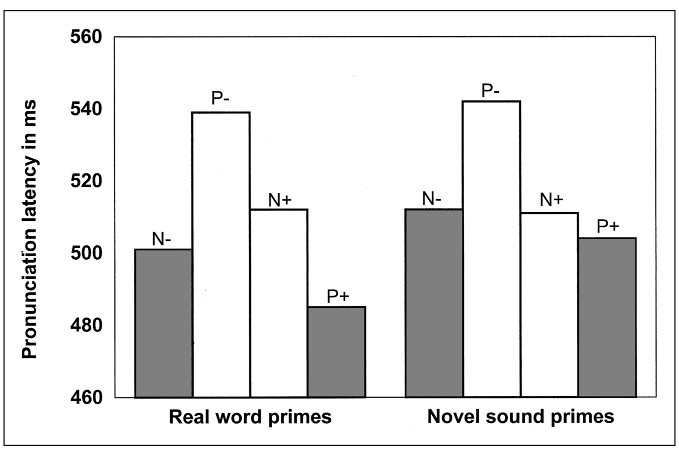

Fig. 2. Automatic evaluation of novel and nonnovel auditory stimuli in a pronunciation task (Experiment 1). The graph shows mean untransformed target pronunciation latencies (in milliseconds) by prime novelty, prime valence (N = negative, P = positive), and target valence (− = negative, + = positive). Shaded bars represent conditions in which the prime and target valences were congruent. Mean latencies from left to right were 501, 539, 512, 485, 512, 542, 511, and 504 ms.

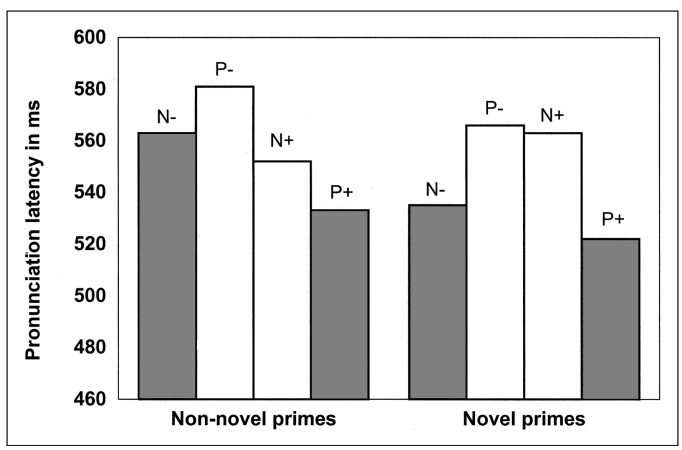

Fig. 3. Automatic evaluation of novel and nonnovel visual stimuli in a pronunciation task (Experiment 2). The graph shows mean untransformed target pronunciation latencies (in milliseconds) by prime novelty, prime valence (N = negative, P = positive), and target valence (− = negative, + = positive). Shaded bars represent conditions in which the prime and target valences were congruent. Mean latencies from left to right were 563, 581, 552, 533, 535, 566, 563, and 522 ms.

tween evaluation and approach/avoidance behavioral dispositions. Recently, Chen and Bargh (1999) showed that this effect does not require the conscious goal to evaluate the targets; the same effect was observed when the task involved only a simple reaction to each target. In Experiment 3, we assessed whether automatic evaluations of novel stimuli have similar immediate effects on behavioral predispositions.

Method

Participants ($N = 102$) were seated in front of a Macintosh computer with a 2-ft-long Plexiglas lever placed on a stand in front of their dominant hand. Those in the approach condition were instructed to pull the lever toward them as quickly as possible whenever a target appeared on the screen. Those in the avoidance condition were instructed to push the lever away from them when a target appeared on the screen. After participants practiced using the lever, the experimental trials began. Each of the novel images shown in Figure 1 appeared in the center of the screen and remained on screen until the participant responded by moving the lever. Direction of lever movement and response latency were recorded for each trial. A random delay of 2 to 7 s between images decreased the predictability of target presentation. Order of the images was random.

Results and Discussion

Reaction times less than 250 ms (1.3%) or greater than 750 ms (1.2%) were deleted as outliers. The 2 (image valence: positive vs. negative) × 2 (lever direction: push vs. pull) mixed ANOVA on the mean log-transformed latencies yielded only the predicted interaction, $F(1, 101) = 4.38$, $p < .04$. As illustrated in Figure 4, participants in the approach (pull) condition were faster responding to positive than to negative novel stimuli, whereas participants in the avoidance (push) condition were faster responding to negative than to positive novel stimuli. Just as has been found for familiar stimuli, then, the automatic evaluation of novel stimuli has direct and immediate consequences for approach and avoidance behavioral tendencies.

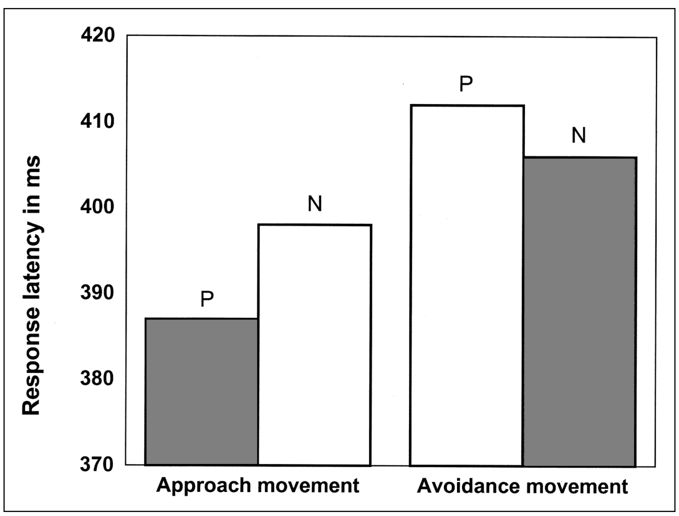

Fig. 4. Automatic activation of behavioral predispositions following exposure to novel visual stimuli (Experiment 3). The graph shows mean untransformed target response latencies (in milliseconds) by the direction of lever movement and target valence (N = negative, P = positive). Shaded bars represent conditions in which the target and movement valences were congruent. Mean latencies from left to right were 387, 398, 412, and 406 ms.

GENERAL DISCUSSION

The results of our three experiments show that novel stimuli produce the same effects as do known stimuli, on two different tasks designed to implicitly capture immediate and unintentional evaluative responding. This constitutes definitive evidence that evaluative responding to environmental stimuli can be immediate, unintentional, implicit, and stimulus based. These responses were directly linked to appropriate and adaptive behavioral predispositions toward the stimuli.

The classic theories described at the outset of this article articulate clearly the notion that evaluative processing is a fundamental dimension that the human mind uses to impose meaning on the surrounding environment. Evaluation differs importantly from the two other major dimensions of semantic meaning—activity and potency (Osgood et al., 1957)—as primes that match versus mismatch targets on these other dimensions produce no such facilitation or inhibition effects (see Bargh, 1997, p. 24). The current data, in showing that evaluative responding is elicited even by novel stimuli, thus strongly support the position that evaluation is both unique and ubiquitous.

Moreover, the present findings challenge the assumption that the automatic evaluation effect necessarily involves the activation of a previously stored evaluation. Our previous work (e.g., Bargh et al., 1996; Chen & Bargh, 1999) showed that both strong and weak attitude objects elicited the automatic evaluation effect. The present research, by showing that even novel and nonrepresentational stimuli elicit automatic evaluation, further supports the idea that this effect does not require strongly accessible attitude representations, but instead may be driven by on-line evaluation processes.

Two potential limitations of these data deserve mention. First, with respect to the novelty of the experimental stimuli, one might argue that nothing is truly novel, for all things are combinations of things that have been perceived in the past. Of course, one could make an equivalent argument that everything is novel because there is nothing that is exactly the same as anything else. The stimuli in these experiments are novel in the identical sense as those in mere-exposure research—they are nonconceptual, original combinations of features.

Second, whereas the present experiments do support the notion that automatic evaluation can be entirely stimulus driven (as Zajonc, 1980, argued), they do not elucidate the precise mechanism by which novel stimuli are evaluated. That the mechanism is not yet fully explicated does not, however, make the observed phenomenon any less valid or important. For example, as Monahan et al. (2000) noted, after nearly a quarter-century of research, investigators are only now beginning to understand the mechanism underlying mere-exposure effects. Certainly, the mechanism by which novel stimuli are automatically evaluated is another prime topic for further research.

We believe that the immediate evaluative responses elicited by our novel stimuli represent adaptive default responses in the absence of already-stored affective responses (see Bargh, 1997). These automatic evaluations of novel stimuli are most likely overwritten or modified by deliberative judgments, passive conditioning influences, or both as further experience warrants.

In conclusion, the present experiments suggest that all experience is continually evaluated as either positive or negative, whether one ponders one's feelings about it or not. Ambady, Bernieri, and Richeson (2000) have argued that the implications of such an unconditional evaluative screening process are considerable for subsequent judgments, social interaction, and other psychological processes. In our view as well, the speed and apparent ubiquity of the automatic evaluative process render it one of the most fundamental—and perhaps the most immediate—of the mind's reactions to the world.

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