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The Automaticity of Affect for Political Leaders, Groups, and Issues: An Experimental Test of the Hot Cognition Hypothesis

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We report the results of three experimental tests of the “hot cognition” hypothesis, which posits that all sociopolitical concepts that have been evaluated in the past are affectively charged and that this affective charge is automatically activated within milliseconds on mere exposure to the concept, appreciably faster than conscious appraisal of the object.

We find support for the automaticity of affect toward political leaders, groups, and issues; specifically:

- *Most Ss show significantly faster reaction times to affectively congruent political concepts and significantly slower response times to affectively incongruent concepts;*
- *These facilitation and inhibition effects, which hold for a cross-section of political leaders, groups, and issues, are strongest for those with the strongest prior attitudes, with sophisticates showing the strongest effect on “harder” political issues.*
- *Even semantically unrelated affective concepts (e.g., “sunshine,” “cancer”) have a strong effect on the evaluation of political leaders, groups, and issues.*

We conclude with a discussion of the “so what?” question—the conceptual, substantive, and normative implications of hot cognition for political judgments, evaluations, and choice. One clear expectation, given that affect appears to be activated automatically on mere exposure to sociopolitical concepts, is that most citizens, but especially those sophisticates with strong political attitudes, will be biased information processors.

KEY WORDS: hot cognition, implicit attitudes, motivated reasoning, automaticity, affect

In this paper we report the results of three experimental studies testing a central postulate of our dual-process model of motivated political reasoning (Lodge & Taber, 2000; Taber & Lodge, 2001; Taber, Lodge, & Glather, 2001). This theory of motivated reasoning starts with the *hot cognition hypothesis* (Abelson, 1963), the claim that all sociopolitical concepts are affect laden (Bargh, 1994, 1997; Fazio & Williams, 1986; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Fiske, 1982; Lodge & Stroh, 1993; Lodge, McGraw, & Stroh, 1993; McGraw, Lodge, & Stroh, 1990; Morris, Squires, Taber, & Lodge, 2003). All political leaders, groups, issues, symbols, and ideas thought about and evaluated in the past become affectively charged—positively or negatively—and this affect is linked directly to the concept in long-term memory. This evaluative tally, moreover, comes automatically and inescapably to mind upon presentation of the associated object, thereby signaling its affective coloration (what Clore & Isbell [2001] call the “how-do-I-feel heuristic?” and what Sniderman, Brody, & Tetlock [1991] call the “likability heuristic”). At the moment one realizes that the letters B-U-S-H in a news headline refer to the President and not to a plant, one’s affect toward “W” Bush comes to mind along with his strongest cognitive associations.

Our theory of motivated reasoning couples together affect and cognition in long-term memory and brings them automatically to mind in the judgment process. Feelings become information. Affect imbues the judgment process from start to finish—from the encoding of information, its retrieval and comprehension, to its expression as a preference or choice. Should this theory of the automaticity of affect prove to be a reasonable approximation of how people routinely think about political objects, it would have important substantive and normative implications. One clear expectation—given that affect permeates all thinking and reasoning—is that most citizens most of the time will be biased reasoners, finding it difficult to evaluate new, attitude-relevant information in an evenhanded way (Redlawsk, 2002). This is what we have found in a series of experiments designed to explore the impact of motivated reasoning on political information processing (McGraw, Lodge, & Jones, 2002; McGraw, Fischle, Stenner, & Lodge, 1996; Taber & Lodge, 2001). People appear unable to break free of their prior sentiments when evaluating arguments on political issues, even when they are motivated to be impartial. They are apt to see congruent arguments as inherently stronger than those which are attitudinally incongruent; they spend time and cognitive resources counterarguing the points that challenge their priors; they seek to insulate themselves from challenging information by actively searching out congruent information. As a consequence of this motivated search and reasoning, their attitudes are prone to polarize in the face of a balanced set of pro and con information (Harton & Latané, 1997; Lord, Ross, & Lepper, 1979; Taber & Lodge, 2001), with all of these effects strongest for sophisticated citizens with the strongest political attitudes.

While there is strong experimental support for the automaticity of a wide range of social attitudes, at least toward people and groups (Bargh, 1997;

Greenwald et al., 2002; Wegner & Bargh, 1998), there have been no convincing tests of the hot cognition hypothesis in the political domain, and none at all for issues. Moreover, some scholars suggest that the evaluations of groups, and even more so issues, may not be processed in the same way as those for people (see Bassili & Roy, 1998; Levine, 2001; McGraw & Steenbergen, 1995). Citizens may store and rely on more and different types of considerations when evaluating groups (Hamilton & Sherman, 1996) or issues (Zaller & Feldman, 1992). When evaluating issues, citizens are said to see two or more sides to policy disputes, and their awareness of the pros and cons may prevent them from forming a summary judgment. If so, when called on to report an evaluation of the group or issue, they cannot depend on a simple affective linkage in memory, but will sample a fuller set of considerations that have been stored in memory about the object and then and there construct an evaluation from an integration of these considerations (Tourangeau, Rips, & Rasinski, 2000; Zaller & Feldman, 1992).

The studies reported here directly test the hot cognition question: are attitudes toward political leaders, groups, and issues evoked automatically or do they require a more effortful—and time-consuming—process of evaluative integration? We leave for the Conclusion the “so what?” question: when and for what citizens will the primacy of affect influence judgment, evaluation, and choice?

The Underlying Model of Hot Cognition

Before turning to our experimental tests, let us briefly review the cognitive architecture underlying our dual-process theory of political information processing (Lodge & Stroh, 1993; Lodge & Taber, 2000; Taber, 2003). A cornerstone of any model of political reasoning is the citizen’s preexisting knowledge and predilections. These long-term factors, functionally speaking, require a vast *long-term memory* (LTM) for storing facts, beliefs, and predispositions, and a *mechanism* for “moving” one’s knowledge about leaders, parties, and issues from LTM into *working memory* (WM) where it can be attended to (Barsalou, 1992; Rumelhart & Ortony, 1977; Sanford, 1986; Simon, 1957). Attention is very limited, perhaps to the magic number 7 ± 2 bits or chunks of information, hence the need for heuristics, habits, and other simplifying mechanisms for thinking and reasoning (Baumeister, Muraven, & Tice, 2000; Cialdini, 2001).

LTM is organized associatively, and it is useful to think of knowledge structures metaphorically in LTM as configurations of *nodes* linked to one another in a network of associations (Anderson, 1983) or if you prefer as neurons “bundled” together by weighted connections (Read & Miller, 1998; Smith, 1998). Were we able to tap a citizen’s complete political knowledge structure, there might be tens of thousands of conceptual nodes (among them one for George W. Bush) with a complex network of associations (perhaps his demographics, stands on issues, perceived traits, and maybe an inferential abstraction or two—e.g., that he is conservative). Links represent beliefs, the strength of which will vary. Moreover,

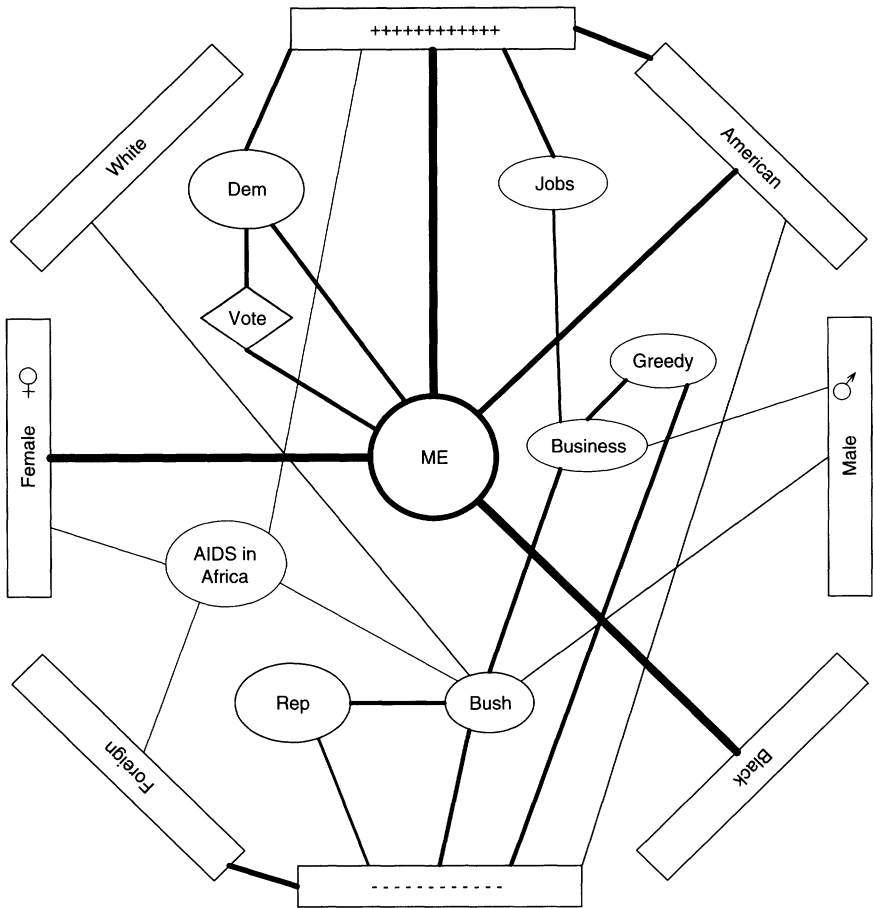


Figure 1. Node-Link Architecture of Long Term Memory.

memory objects vary in *accessibility*—the ease with which a stored concept lying dormant in LTM can be retrieved into WM.

Figure 1 depicts a simple example of the architecture of one woman’s political knowledge (for a somewhat similar framework, see Greenwald et al., 2002). Note first that the self is the strongest node in the network and that identity (here, female, black) and self-esteem are the strongest links in the network. Positive and negative affect and basic identity nodes are distinguished in this representation because of their centrality in human information processing. As with more standard semantic network models, beliefs are represented as links among basic memory objects (e.g., “I am a Democrat,” “President Bush has ties to big business”). Attitudes appear as links between basic memory objects and positive

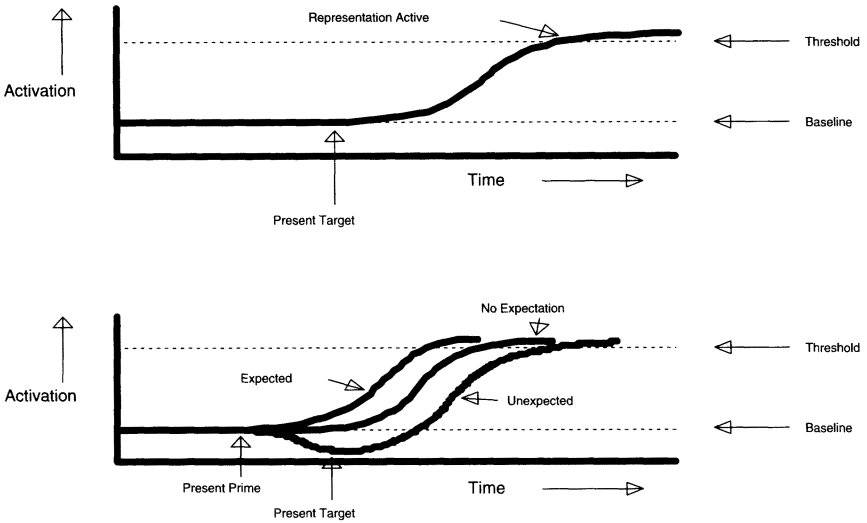


Figure 2. Activation of a Concept in LTM.

and/or negative affect. Ambivalence can be represented by allowing links to both positivity and negativity, as with “American” in Figure 1. The impact of context or priming on evaluations may also be depicted: see, for example, that if “jobs” is primed, “business” will be seen in a positive light, while in the context of “greed” “business” is evaluated negatively. This model, taking its lead from Fazio and his colleagues (Fazio, 1995; Fazio & Williams, 1986), brings affect center stage (Fiske, 1981; Marcus, Newman, & McKuen, 2001; Sears, 2001; Sears, Huddy, & Schaffer, 1986). All objects in LTM representing sociopolitical concepts are affect laden, with affect varying along three dimensions: positivity, negativity, and strength.

But how is information moved from LTM into WM? *Spreading activation* provides the mechanism. A node in LTM switches from being dormant to a state of readiness with the potential to be moved into WM when it is activated, either as a direct object of thought or because it is closely linked to an object of thought. The top panel of Figure 2 (adapted from Barsalou, 1992) depicts the activation process, with the Y-axis representing the level of activation of a given node in LTM and the X-axis representing time in milliseconds. The rise time from dormant-state to activation threshold is almost instantaneous (100–200 milliseconds). Though not depicted in Figure 2, activation also decays quite rapidly so that a given node will drop back to baseline in about a second if there is no further source of activation. Imagine a person reading about President Bush in a news-

paper headline. Without perceptible effort, the concept BUSH becomes activated and activation spreads along the network of links to related concepts, thereby priming strong semantic associations of BUSH (he is a REPUBLICAN) as well as beliefs (he is pro-business). For a few hundred milliseconds, these associated concepts remain in a heightened state of arousal, with any additional activation likely to push them over threshold and into WM.

It may be useful to think of priming through spreading activation as producing *preconscious* expectations. The bottom panel of Figure 2 shows the activation of associations under different priming conditions. Consider again the activation of the concept BUSH from a newspaper headline. Concepts associated with BUSH in LTM also receive activation, thereby raising their potential so that any subsequent processing which passes activation to these energized concepts will likely drive them over threshold. If a primed association (perhaps Bush's Republican label or his stand on gun control) is "expected," it takes substantially less processing to activate and has a better chance of getting into WM, of being processed faster, and thereby of "framing" the perception, recognition, and interpretation of subsequent information.

Conversely, spreading activation can *inhibit* the processing of *unexpected* categories (the bottom course in Panel b of Figure 2). When a concept is encountered unexpectedly, more bottom-up processing is necessary before it may pass threshold and enter WM. If the word "walnut" were processed initially, this would inhibit the recognition of semantically unrelated concepts (such as REPUBLICAN), which would thereby require more time and effort to process. Finally, the middle course in Panel b is a control or "baseline" condition in which no "expectations" are created by a prime. The nonword BBB, for example, which conveys no semantic expectations, would neither facilitate nor inhibit the recognition and categorization of subsequent concepts.

Simple though it be—essentially an affect-enabled ACT^{star} model (Anderson, 1983)—such node-link models with affective links can account for important characteristics of human information processing (Boynton & Lodge, 1994). Moving in step with contemporary thinking (Bargh, Chaiken, Golder, & Pratto, 1992; Fazio, 1995; Petty & Krosnick, 1995), we see attitudes as associations in memory between an object and an evaluation, with the term "object" being defined very broadly to include the representation in memory of people, places, ideas, symbols, things, and events. In the case of univalent attitudes, the summary evaluation is uni-dimensional, a single link from object to affect (or perhaps reciprocal links to positivity and negativity as with BUSH in Figure 1), representing a distillation of judgments made online as stimulus information is processed. The associative strength between an object (e.g., politician) and its evaluation (bad) is conceived as varying along a continuum from nil, an object with little or no affective association (from this perspective a "nonattitude"; Converse, 1970; Fazio & Williams, 1986) to objects with strong associative strength. Whereas nonattitudes require piecemeal, bottom-up construction, and weak attitudes require effortful

retrieval, the stronger the association between an object in memory and its affective evaluation the less time and effort needed to bring the attitude to mind, with objects carrying strong affective links being activated automatically on exposure (see Bargh et al., 1992; Bassilli & Roy, 1998; Fazio, 1992).

An Experimental Test of the Hot Cognition Postulate

To turn the notion of hot cognition from premise to hypothesis, let us set forth the experimental paradigm for empirically testing the postulate that affect is directly linked to its conceptual node and “travels” with it into WM spontaneously on mere exposure of the concept. The attitude priming paradigm, developed by Fazio and his colleagues (1986), is a spin off of the classic lexical decision paradigm (Collins & Loftus, 1975; Collins & Quillian, 1969) where, for example, an experimental subject (S) sees a “prime” word (e.g., “FLOWERS”) flashed on a computer screen for 200 milliseconds, followed 100 milliseconds later—when as shown in Figure 2 *the concept’s activation is at peak*—by a second string of letters (say “Clinton” or “rose” or “rospar”) which remains onscreen until the S makes a response, typically by pressing one button “as fast as possible without making too many errors” if the target is a legal English word, the other button if it is not. This is a nonreactive task; the subject is *not* asked directly whether the target is associated with the prime, whether a rose is a flower (indeed, though this is not usually a subliminal task, the prime is onscreen so briefly that the S may be only dimly aware of it), but rather whether the letters r-o-s-e form a word in English. An inference as to whether the target and prime are linked in the observer’s LTM is made on the basis of their reaction times in performing the (word/not-a-word) task. These and similar cognitive priming paradigms produce robust effects: facilitation (faster response times) to cognitively associated concepts; inhibition to unrelated concepts. What is more, these effects are *automatic*—they cannot be easily suppressed or overridden (Greenwald & Banaji, 1995; Neely, 1977).

But what about affect? Is one’s affect also activated when the concept it is linked to is primed? That is the hot cognition question. As depicted in Figure 3

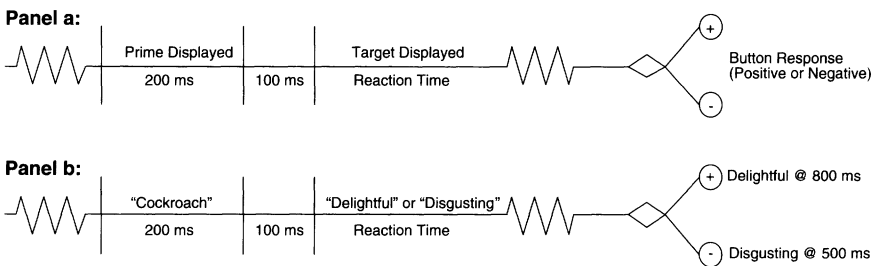


Figure 3. Affective Priming Paradigm.

we expose Ss to a prime word and then present a target word, but in this variant of the paradigm the Ss' task is to press a button labeled "+" or "-" to indicate "as fast as possible without making too many errors" whether the target word has a *positive or negative connotation*. Here again, on each trial the name of an attitude object (e.g., POLITICIAN) is presented for 200 ms on the computer screen, followed by a 100 ms blank-screen interval. Then a target word—chosen for its unambiguous positive or negative connotation—is presented. The subject's task is to indicate by a button press whether the target word is "good" or "bad" in meaning. The latency time from onset of target word to the S's response is recorded. If the valence associated with the prime (e.g., DEMOCRATS) is the same as the valence associated with the target (e.g., CANCER), then response times to classify the target should be faster relative to a neutral baseline (facilitation); if prime and target valences are incongruent, however, response times should be slower (inhibition).

The elapsed time from the onset of the prime to the onset of the target is called the stimulus onset asynchrony (SOA) and is often—as in our experiment—varied to test for the automaticity of responses (note this is a manipulated factor not to be confused with a subject's reaction time). Since conscious expectancies take at least 500 ms to develop (Neely, 1977; Posner & Snyder, 1975), any influence of the prime on response times to the target for SOAs significantly shorter than 500 ms must be "attributed to an automatic, unintended activation of the corresponding attitude" (Bargh et al., 1992, p. 894). At longer SOA—we use 1,000 ms for the long SOA condition in our experiments—these automatic activation effects will decay unless they are *consciously* maintained, which will happen only when subjects anticipate that such expectancies will be useful for subsequent information processing (Neely, 1977). Since conscious expectancies are *not* diagnostic of target valence in the attitude priming paradigm (good and bad targets are equally likely after each prime), we would not expect conscious expectancies to be formed, and it follows that we should not observe facilitation or inhibition effects under long SOA (Fazio, 1990, 1995).

By way of example, in Figure 3b, if COCKROACH were the prime and the target word was "disgusting" we would expect facilitation—a fast response time (here, on the order of 500 ms) to say "disgusting" is a negative word—because the prime and target are *affectively congruent*. Conversely, for all but entomologists, if the target word was "delightful," we would expect inhibition—a slower RT (on average about 800 ms) to say "delightful" is a positive word—because the association is *affectively incongruent*. In terms of our architectural model (Figure 1), when a previously evaluated concept (say REPUBLICAN) is primed it passes activation to its linked evaluative node(s). Then, when an affectively congruent target appears (say "rainbow"), the "shared" evaluative node is already in a heightened state of arousal so the evaluative response is potentiated and thereby made more easily and faster; whereas, the response to an affectively incongruent target (e.g., "cancer") would be unexpected and relatively inhibited. Note again that this is a *nonreactive measure*: the S's task is to say whether the target word is

positive or negative, *not* whether the word is or is not associated with the prime. This attitude-priming paradigm proves to be a strong test for discerning whether affect is activated automatically along with the concept itself.

The logic that we have just described for the attitude priming paradigm would appear to depend on an explicitly evaluative task—that is, experimental subjects are asked whether the target word is positive or negative—and this may limit the generality of the findings to cases where one is intentionally processing affective information. The studies we report are subject to this limitation, but it may be useful to note that others have established the automaticity of social attitudes in the absence of an explicitly evaluative task (De Houwer, Hermans, & Spruyt, 2001; Hermans, De Houwer, & Eelen, 1994), for example using a word pronunciation task to collect responses to the target (Bargh, Chaiken, & Raymond, 1996). Duckworth, Bargh, and Garcia (2002) have even found automatic affective priming for completely novel primes, which are found to evoke an affective response despite the absence of any prior attitude (e.g., unfamiliar abstract art). Despite this potential limitation, however, it is important to emphasize that the procedure we follow provides a genuinely nonreactive measure: Subjects neither intentionally nor consciously process the affective value of the *prime* word, and it is evaluative affect toward the prime rather than the target that interests us.

General Experimental Procedures

Following a pilot study (Lodge & Taber, 2000), three experiments were conducted to test the hot cognition hypothesis in the political domain using the affective priming paradigm. Since these studies are similar in design, differing in the political primes, targets, and treatment of SOA, we will discuss them together.

Procedures. Undergraduate students in introductory political science courses at Stony Brook University received extra credit for their participation: Study 1, $N = 80$; Study 2, $N = 162$; Study 3, $N = 95$. All studies were conducted in our Laboratory for Political Research on Windows-based personal computers using the experimentation software package *EPrime*. Subjects completed the task singly in separate experimental rooms.

The experiments proceeded in stages: First, subjects received instruction and practice using a button response on a computer keyboard to indicate “as quickly as possible without making too many errors” whether the second of two words that appeared on the computer screen was “positive/good” or “negative/bad.” The first word (the PRIME) always appeared in upper case and remained in the center of the screen for a brief interval of 200 ms, followed either by a 100 ms blank screen, for a short SOA of 300 ms, or by an 800 ms interstimulus interval, for a long SOA of 1,000 ms. The second word (the target) then appeared center-screen in lower case and remained until the S’s button press. Trials were separated by a two-second pause from the response key press to the onset of the next prime. Primes and targets are listed in Table 1.

Table 1. Primes and Targets

Primes											
Study 1											
Persons	Val	Amb	Str	Groups	Val	Amb	Str	Issues	Val	Amb	Str
Clinton	.10	-.15	-.02	Democrat	.19	-.16	.39	Anti Abortion	-.04	-.14	.06
Gore	.01	-.12	.13	Politician	-.10	-.11	.13	Death Penalty	-.54	-.28	.06
Giuliani	-.04	-.19	-.04	Republican	-.11	-.17	.10	Peace	.89	-.45	.19
Hitler	-.93	-.48	.06					Taxes	-.36	-.20	.29
Lincoln	.52	-.28	.15								
Pataki	-.02	-.14	.10								
Average	-.06	-.23	.06	Average	-.01	-.15	.21	Average	-.01	-.27	.15
Study 2											
Bush	-.10	.00	-.04	Democrats	.26	.00	.21	Guns	-.56	-.21	.24
Gore	.11	.02	.11	Politician	.00	.11	.15	Peace	.86	-.40	.75
Hillary	-.00	-.06	.12	Republicans	.07	.01	.11	Taxes	-.24	.01	.10
Hitler	-.91	-.44	.24								
Lincoln	.59	-.19	.36								
Rudy	-.03	-.05	.09								
Average	-.06	-.11	.15	Average	.11	.04	.16	Average	.02	-.20	.36

Study 3

	.37	-.09	.22	.40	-.13	.25	.08	-.07	.19
Colin Powell	.18	-.06	.23	.59	-.20	.54	.29	-.17	.47
George W. Bush	.52	-.20	.43	-.07	-.10	.08	-.02	-.05	.30
Giuliani	.14	-.09	.16	.29	-.04	.23	.71	-.25	.59
Hillary	-.87	-.40	.07	.42	-.14	.22	.44	-.11	.40
Hitler	.43	-.10	.26	.26	-.06	.13	.41	-.16	.47
Kennedy	.53	-.15	.30	-.12	-.00	.07	.20	-.07	.21
Lincoln	-.06	.01	-.03	-.04	.03	.18	-.18	-.07	.21
Mark Green	.34	-.04	.20	.17	.02	.14	.03	-.07	.09
Mike Bloomberg	-.91	-.43	.12	-.80	-.46	.10	.03	.04	.16
Osama bin Laden	.34	-.03	.21						
Pataki	.09	-.14	.20	.11	-.11	.19	.22	-.10	.32
Average									

Note. Valence, Ambivalence, and Strength are all coded on the interval (-1, 1), with 0 neutral.

Targets

	Study 1			Study 2			Study 3		
appealing		magnificent			miracle			death	joy
awful		marvelous			love			demon	laughter
beautiful		miserable			joy			gift	pain
delightful		painful			death			grief	rabies
horrible		repulsive			laughter			hug	rainbow
					rape				

As noted earlier, manipulation of the stimulus onset asynchrony (SOA) allows us to assess the automaticity of response within the attitude-priming paradigm (Fazio, 1990, 2001). What is important to note is that automatic facilitation and inhibition effects are predicted *only* for the reaction time responses to targets under the short SOA condition, when subjects do not have time to consciously establish expectancies. Referring back to Figure 2 depicting the activation cycle, recall that the 300 ms prime-to-target interval delivers the target word at or near peak activation, when automatic inhibition or facilitation effects should be strongest. After a long SOA of 1,000 ms, by contrast, we would expect little or no priming effect—any conscious expectancies that could be triggered by the prime after 500 ms would not be diagnostic of target valence in our studies.

Following the attitude-priming tasks, a computer-based survey was administered to collect explicitly: each S's dichotomous (good-bad) ratings of the target words; each S's rating of the positivity of the prime words in a Likert format and separately their negativity ratings of the prime words to allow us to measure ambivalence as well as valence of the primes (see Cacioppo, Gardner, & Berntson, 1997); each S's ratings of their strength of attitude toward the prime words; basic demographics; and an open-ended political knowledge test in which, in addition to civics-type questions, we asked for the current or most recent office held by each of the political figures among the primes.

Measures and Data Manipulations. The valence of the prime was measured as the difference between the positive and negative evaluations of each prime for the given subject, dichotomized so that any difference greater than zero is coded 1 (net positive), any difference less than zero is coded 0 (net negative), and any difference equal to zero is set to missing. The 9 pt. prime strength measure was dichotomized around the scale midpoint (coded so that 0 denotes weak and 1 strong). Prime ambivalence was computed using the Griffin formula, which averages the positive and negative ratings and subtracts the absolute value of the difference between positive and negative ratings (Levine, 2001; Meffert, Guge, & Lodge, forthcoming; Thompson, Zanna, & Griffin, 1995), and then split at the scale midpoint (0 denoting low ambivalence, 1 high). Sophistication was measured as the number of correct responses on the political knowledge test (17 possible), subjected to a median split, with 0 coded for unsophisticates, 1 for sophisticates.

By their nature, reaction time data are highly positively skewed, and this skewness can affect group means in the analysis of variance. To correct for positive skewness in our data (Study 1, skewness = 3.59; Study 2 = 3.74; Study 3 = 2.83), we subjected the raw reaction time data to a natural log transformation (Bargh & Chartrand, 2000; Fazio, 1990, 1993). All statistical results reported below are computed on these natural log transformed reaction time data; it is worth noting, however, that the overall pattern of results emerges with or without this transformation. In addition, we eliminated trials involving targets that had been incorrectly rated in the survey (e.g., someone might say that "miserable" was

a good thing, in which case we excluded the trials for that subject in which miserable was the target; .04% of trials across the three studies), and we eliminated trials in which there was an incorrect response to the target on the RT (error rate of 5% across the three studies).

Primes and Targets. In choosing primes for our studies we wanted (a) a sample of concepts that included political objects (persons, groups, and issues), (b) an approximately even split for our subjects between positive and negative primes, and (c) variance in the ambivalence measure. The primes varied across studies (see Table 1). For target words (selected from Bradley & Lang, 1999), the most important criterion was that they had clear and widely accepted evaluative implications, half of them positive and half negative.

Hypotheses and Design. Studies 1 and 2 were two (SOA, long vs. short) \times 2 (prime valence, positive vs. negative) \times 2 (target valence, positive vs. negative) mixed model designs with repeated measures on prime and target valence; Study 3 differed in that SOA was manipulated within subjects.

In each of the studies, we hypothesize that reaction times will be faster for affectively congruent prime-target concepts (pos/pos and neg/neg) than for incongruent pairs (neg/pos and pos/neg). This is the basic hot cognition hypothesis. Critical to the hot cognition postulate is that one's feelings are triggered *automatically* on the mere presentation of the concept; accordingly, the predicted facilitation and inhibition effects should only show up in the short SOA condition when priming activation is at peak. Operationally, our most basic hypothesis is represented by the three-way interaction, SOA \times prime valence \times target valence. Note that we have no expectations about differential effects for negative or positive primes or targets, but only about the affective congruence of prime-target pairs.

These projected analyses will be broken down by sophistication (a between subjects correlate) and attitude strength (within subjects). In general, we predict that political sophisticates and those with strong attitudes would be most likely to have formed online affective links for all of the political objects we use as primes and so we expect stronger results for sophisticates than for unsophisticates and for primes that evoke strong attitudes.

Finally, the basic reason given for the expectation that groups and issues are less likely to be linked to evaluative affect is that attitudes toward these objects are thought to consciously evoke pro and con considerations and consequently be more ambivalent than are attitudes toward persons. Therefore, in addition to comparing hot cognition for the three prime types, we will directly test the underlying contention that implicit attitudes should be weaker for ambivalent primes.

Results

To examine whether evaluatively congruent prime-target pairs elicit faster reaction times than incongruently paired concepts in the short SOA condition but not the long SOA condition, we performed a 2 (SOA) \times 2 (prime valence) \times 2

(target valence) mixed effects analysis of variance with repeated measures on the second and third factors for each experiment (in Experiment 3, SOA was also manipulated within subjects). We are also interested in the degree to which this basic interaction is conditioned on prime type (person, group, or issue), on the sophistication of the respondent, on strength of attitude toward the prime, and on ambivalence toward the prime, all of which entail higher order interaction analyses.

Following a presentation format that we use throughout this paper, results are depicted as bar graphs in sets of four bars, each representing an average raw RT for one of the basic groups defined by the prime by target valence interaction: from left to right, negative primes/negative targets, positive primes/positive targets, positive primes/negative targets, and negative primes/positive targets. (To facilitate interpretation, these bar charts depict raw reaction times, but because of positive skewness, statistical analyses are computed on log normal transformed RTs.) We expect the RTs to the attitudinally congruent concepts to be faster (facilitation) than RTs to attitudinally incongruent pairs (inhibition). The appropriate comparison is between the first and third bars (for negative targets) and between the second and fourth bars (for positive targets).

The Hot Cognition Hypothesis. Looking first at the basic prediction for Study 1 for all political primes, we find strong support for the hypothesized three way interaction of SOA, prime, and target, $F(1, 78) = 14.29, p < .001$, with no significant main effects. This result is captured in Figure 4a, which contrasts the basic expected pattern of facilitation and inhibition effects at short SOA, with no facilitation/inhibition effects at long SOA. Follow up contrasts confirm the apparent pattern in Figure 4a: under short SOA, responses to negative targets are significantly faster when preceded by negative primes, $t(45) = 2.02, p = .025$ (one-tailed), while positive primes elicit faster response times when paired with positive targets, $t(44) = 2.26, p = .02$. As predicted, similar contrasts for long SOA failed to reach significance. (To reduce redundancy, we will limit the remaining figures to the short SOA condition, though we will continue to report the full interactions in text.)

Experiment 1 provides strong support for the hot cognition hypothesis: affect it seems *is* triggered automatically on mere presentation of a political attitude object. Unfortunately, it is possible (though we think implausible) that the priming effect we demonstrate in Study 1 represents a *semantic* rather than *evaluative* association in memory for our subjects. That is, the trait adjectives used in Study 1—e.g., appealing, delightful, repulsive—may be semantically linked with some of the political primes, in which case this semantic association could generate the priming effect we observe. We know that people are prone to make trait inferences spontaneously (Park, 1989; Rahn, Aldridge, & Borgida, 1994; Rapport, Metcalf, & Hartman, 1989; Uleman & Bargh, 1989), based on little direct evidence, so perhaps their affective responses are cognitively mediated, that something the Democrats did led our Ss to infer that that they are “horrible” or

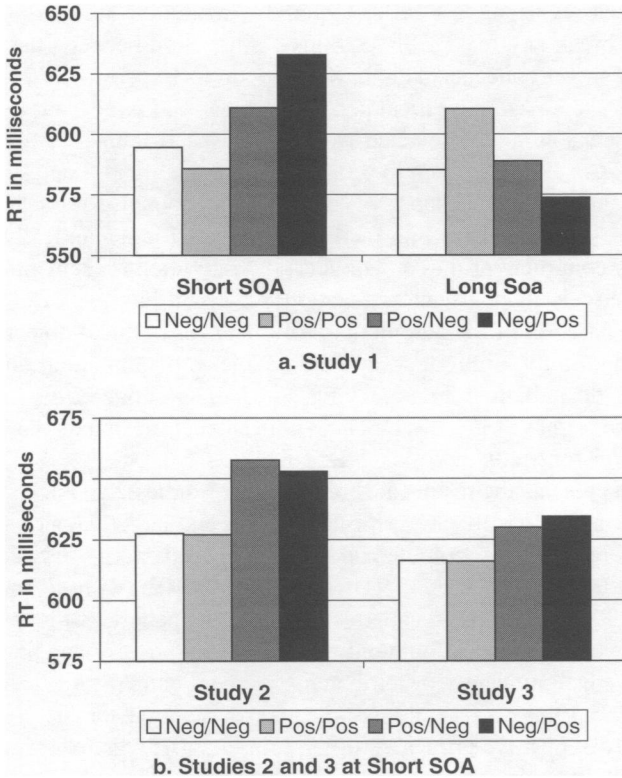


Figure 4. RTs for Political Primes.

“marvelous.” This is in fact the implication of the classic semantic network model—people store their trait inferences with the concept node in LTM. Accordingly, the prime “Giuliani” activates the network of associations linked to him and spreading activation energizes a connection to something he did that had been interpreted as “magnificent” and consequently the target word is now responded to quickly. While it is something of a stretch to see how the trait concepts would be semantically linked to such issues as “peace” and “taxes,” it is conceivable that groups and policies are metonymically “personalized” with trait attributes (Lakoff, 1991, 2001).

We believe that an alternative, *primacy of affect* (Murphy & Zajonc, 1993; Zajonc, 1980) interpretation of these results is more plausible. Perhaps cognitive and affective systems follow separate though likely interdependent pathways in the brain, with feelings following a quick and dirty route (Le Doux, 1996) that “prepares” a behavioral response *before* one’s cognitive associations reach con-

scious awareness. A strong test of this hypothesis within the attitude-priming paradigm would break any reasonable cognitive connection between the attitudinal prime and the target concepts. This is what we do in Experiments 2 and 3—the attitudinal primes are again political persons, groups, and issues, but the affective target words are now nouns selected from Bradley and Lang's (1999) *Affective Norms for English Words*, chosen to be affectively unambiguous and semantically unrelated to the leaders, groups, or issues (e.g., comedy, miracle, rainbow, toothache; see Table 1). If we find facilitation effects for semantically unrelated but affectively congruent primes and targets (and inhibition for semantically unrelated but affectively incongruent associations), we will have an even more convincing demonstration of the automaticity of *affect* for political objects.

In addition, Study 3 introduces a within subjects manipulation on SOA (the same subjects do half their trials at long and half at short SOA) and a much expanded set of primes (see Table 1). The within subjects design on SOA increases statistical power for Study 3.

Figure 4b presents the results at short SOA for Studies 2 and 3. As predicted, the three-way interaction for SOA, prime valence, and target valence was highly significant in both studies (computed on log transformed data): Study 2: $F(1, 160) = 20.26, p < .001$; Study 3: $F(1, 94) = 20.40, p < .001$ (with all main effects insignificant). Planned follow-up contrasts confirm the pattern of Figure 4b: under a short SOA, when responses could only be automatic, positive and negative congruent pairs were significantly faster than incongruent pairs (Study 2: for positive targets, $t(82) = 5.19, p < .001$ [all one-tailed tests]; negative targets, $t(81) = 4.08, p < .001$; Study 3: positive primes, $t(100) = 2.43, p < .01$; negative primes, $t(100) = 4.21, p < .001$). Again, no contrasts were significant at long SOA.

Taken together, support for hot cognition across these three studies is striking. Averaged responses across a wide range of political primes show clear evidence of an automatic link in memory between a broad array of political concepts and positive or negative affect. Moreover, Studies 2 and 3 eliminate any purely semantic interpretation of these facilitation and inhibition effects. But what about our contingent hypotheses predicting the automaticity of affect for political persons, groups, and issues? And will sophisticates be found to be more prone to the effects of automatic affect on political attitudes than unsophisticates?

Prime Types. Because of the relatively small sample size in Study 1, let us focus on Studies 2 and 3. Figures 5a and 5b break our basic interactions down into the three prime types—persons (e.g., Colin Powell, George W. Bush, Giuliani, Hillary), groups (e.g., Democrats, Republicans, African Americans, terrorists), and issues (e.g., Affirmative Action, Death Penalty, Pro-Life, Gun Control; see Table 1 for the full sets).

The hot cognition hypothesis is supported for all the political prime types. Table 2 reports the ANOVA results for the SOA \times prime \times target interactions for studies 2 and 3, broken down by prime type, with all expected three-way interactions significant (issues marginally so for Study 3). Follow up contrasts, also

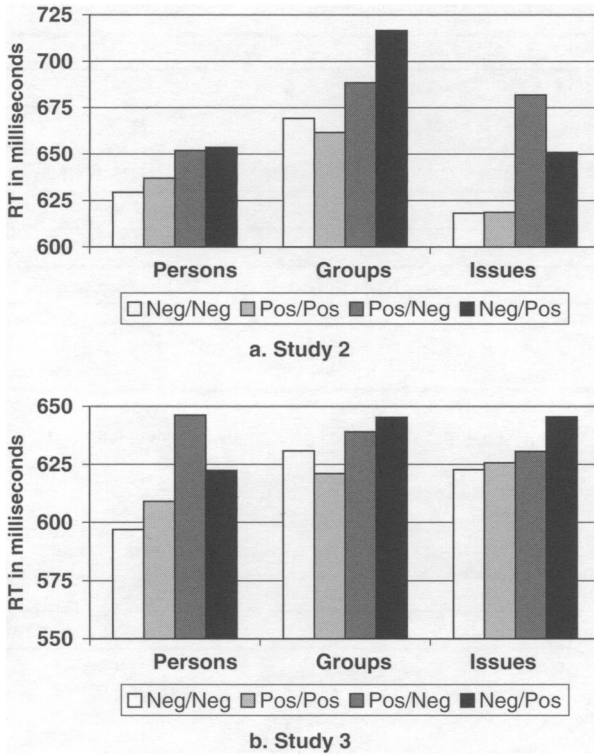


Figure 5. RTs by Prime Type at Short SOA.

reported in Table 2, test the expected pattern of results: at short SOA for both positive and negative targets, congruent primes elicited significantly faster response times than did incongruent primes; whereas at long SOA, there was no significant difference between congruent and incongruent pairs. In short, we find experimental support for the automatic activation of an evaluative tally for a wide range of political persons, groups, and issues.

Sophistication Effects. The hot cognition hypothesis predicts these facilitation and inhibition effects to be contingent on the political sophistication of the respondent. Political sophisticates, we reason, have thought about and repeatedly evaluated most of the political primes in the past, while subjects whose political knowledge falls below the sample median are less likely to have formed affective links in memory, and therefore should not display the pattern of facilitation and inhibition that indicates automatic affect. In short, we would expect a significant four-way interaction among SOA, prime valence, target valence, and sophistication. Studies 2 and 3 provide enough statistical power to test for this four-way

Table 2. ANOVA Results by Prime Type, Studies 2 and 3

SOA by Prime Valence by Target Valence Interaction				
Prime Types	Study 2		Study 3	
Persons	$F(1,154) = 8.28$	$p = .005$	$F(1,91) = 17.47$	$p = .000$
Groups	$F(1,78) = 3.95$	$p = .051$	$F(1,77) = 11.77$	$p = .001$
Issues	$F(1,135) = 11.23$	$p = .001$	$F(1,70) = 2.26$	$p = .137$

Follow Up Contrasts for Congruent vs. Incongruent Prime-Target Pairs at Short SOA				
Prime Types	Study 2		Study 3	
	Positive Targets	Negative Targets	Positive Targets	Negative Targets
Persons	$t(80) = 2.02, p = .023$	$t(80) = 2.20, p = .016$	$t(97) = 2.68, p = .009$	$t(98) = 3.52, p = .001$
Groups	$t(43) = 2.39, p = .011$	$t(43) = 1.29, p = .102$	$t(88) = 2.65, p = .009$	$t(88) = 2.49, p = .015$
Issues	$t(73) = 2.54, p = .006$	$t(73) = 4.59, p = .000$	$t(88) = 1.13, p = .13$	$t(89) = 3.03, p = .003$

Note. These analyses contrast RTs for congruent pairs (e.g., positive-positive) with those for incongruent pairs (e.g., negative-positive) to test the hypothesis that congruent pairs are faster than incongruent pairs.

Table 3. ANOVA Results by Sophistication, Studies 2 and 3

SOA by Prime Valence by Target Valence by Sophistication Interaction				
Prime Types	Study 2		Study 3	
All Primes	$F(1,158) = 1.52$	<i>ns</i>	$F(1,93) = 21.14$	$p = .000$
Persons	$F(1,152) = 0.26$	<i>ns</i>	$F(1,90) = 4.17$	$p = .044$
Groups	$F(1,76) = 0.13$	<i>ns</i>	$F(1,76) = 8.82$	$p = .004$
Issues	$F(1,133) = 3.19$	$p = .076$	$F(1,69) = 5.70$	$p = .020$

Follow Up Contrasts for Congruent vs. Incongruent Prime-Target Pairs at Short SOA, All Primes				
Sophistication	Study 2		Study 3	
	Positive Targets	Negative Targets	Positive Targets	Negative Targets
Sophisticates	$t(46) = 4.81, p = .000$	$t(46) = 3.75, p = .000$	$t(47) = 3.94, p = .000$	$t(47) = 5.35, p = .000$
Unsophisticates	$t(35) = 2.32, p = .013$	$t(34) = 1.80, p = .041$	$t(52) = 0.89, ns$	$t(52) = 1.05, ns$

interaction (study 2 because of a large sample size and study 3 because SOA is manipulated within subjects).

The pattern of sophistication effects depicted in Figure 6, as well as the ANOVA and follow up contrasts reported in Table 3, shows an intriguing difference across studies. Study 2 found facilitation and inhibition effects, indicating hot cognition, regardless of level of sophistication. This counterfinding for the sophistication interaction held for all primes taken together and for person and groups; interestingly, sophistication was an important moderator of hot cognition for issue primes. In Study 3, by contrast, low-knowledge subjects were as predicted less likely than sophisticates to display automatic affect toward the full set of primes and for each prime type taken separately.

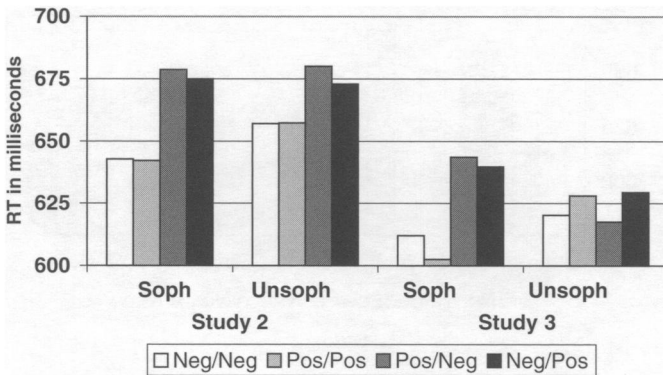


Figure 6. RTs by Sophistication at Short SOA.

This overall pattern lends credence to the theoretical expectations underlying the formation of OL tallies in suggesting that sophisticates, because of their interest in politics, have formed crystallized attitudes to a fuller set of political issues. Note that the person and group primes used in Study 2 are “easier,” more mainstream, and more likely to have been thought about and evaluated in the past by our subjects than are many of the primes in Study 3 (Cobb & Kuklinski, 1997). Virtually all New Yorkers in the aftermath of the 2000 election, regardless of level of sophistication, would have given some thought to George Bush, Al Gore, Hillary Clinton, and Rudy Giuliani. Similarly, most everyone would have formed an attitude about such mainstream groups as Democrats, Republicans, and politicians. Consider now the broader and more difficult sample of primes used in Study 3. In addition to the mainstream political persons, groups, and issues, we purposely included the somewhat obscure (even locally!) New York mayoral candidates, the NAACP and NRA, and a range of issues such as “counterterrorism,” the “death penalty,” and “pro-life” that we (knowing the quality of our undergraduates) can easily imagine many subjects not having thought much about or evaluated in the past. These “harder” primes—and especially the issue primes—seem on their face to have required more thought than unsophisticates were likely to have invested. Moreover, the issues may be more likely to induce ambivalence when they are evaluated, a point to which we now turn (on the other hand, Table 1 shows that averaging across all subjects ambivalence and attitude strength did *not* line up neatly by prime type).

Ambivalence and Attitude Strength. One of the more interesting theoretical arguments made about the automaticity of affect is the contention that ambivalent attitudes may require a different processing mechanism and a different pattern of linkages in LTM than simpler univalent attitudes (Bassili & Roy, 1998; Levine, 2001; McGraw & Steenbergen, 1995). We agree. Recall in Figure 1 we repre-

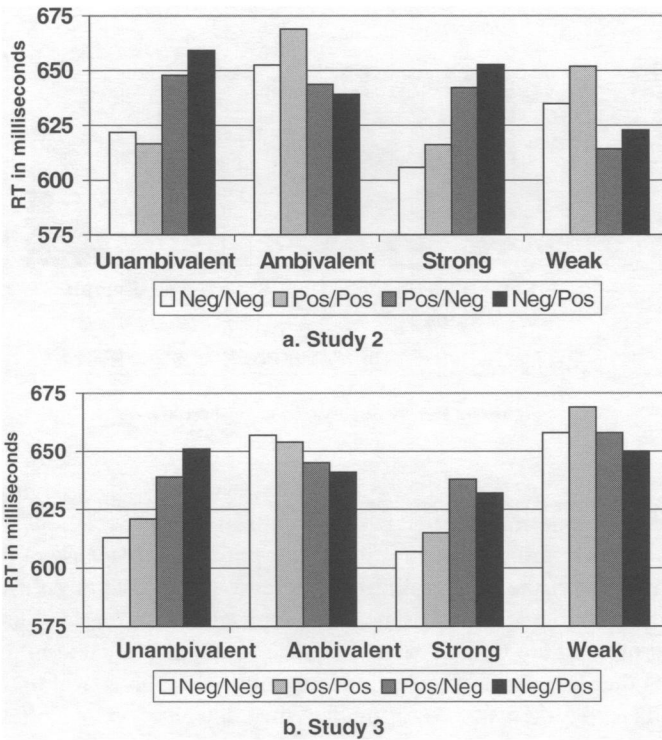


Figure 7. RTs by Prime Ambivalence and Strength at Short SOA.

sented an ambivalent attitude toward Americans as links to *both* positive and negative affect. Priming an ambivalent attitude object should pass activation to both positivity and negativity. Predictably, this dual activation should generate neither strong facilitation nor strong inhibition effects.

Both Studies 2 and 3 confirm the importance of well-formed, accessible, or “crystallized” attitudes. As shown in Figure 7, neither ambivalent nor weak primes elicit significant facilitation/inhibition effects at short SOA that would indicate automatic hot cognition, but we *do find* automatic affect for both unambivalent and strong primes. These descriptive results are confirmed in the ANOVA analyses and contrasts reported in Table 4. In both studies, the four way interactions among SOA, prime valence, target valence, and ambivalence were significant as were the four-way interactions among SOA, prime valence, target valence, and attitude strength. Planned follow-up contrasts showed that unambivalent and strong primes led to the expected pattern of facilitation for affectively consistent targets and inhibition for affectively inconsistent targets, while ambivalent and

Table 4. ANOVA Results by Ambivalence and Attitude Strength, Studies 2 and 3

Interaction	Study 2		Study 3	
SOA × Prime × Target × Ambivalence	$F(1,99) = 6.01$	$p = .016$	$F(1,53) = 7.85$	$p = .007$
SOA × Prime × Target × Strength	$F(1,64) = 5.78$	$p = .019$	$F(1,33) = 11.32$	$p = .002$
Follow Up Contrasts for Congruent vs. Incongruent Prime-Target Pairs at Short SOA				
Primes	Study 2		Study 3	
	Positive Targets	Negative Targets	Positive Targets	Negative Targets
Ambivalent	$t(57) = -1.80, p = .039$	$t(57) = -1.24, p = .110$	$t(89) = -1.12, ns$	$t(89) = -0.96, ns$
Unambivalent	$t(81) = 4.90, p = .000$	$t(81) = 4.86, p = .000$	$t(98) = 9.00, p = .000$	$t(98) = 5.94, p = .000$
Weak	$t(52) = -2.44, p = .009$	$t(51) = -0.74, ns$	$t(91) = -1.89, p = .030$	$t(88) = -0.15, ns$
Strong	$t(60) = 3.56, p = .001$	$t(60) = 4.80, p = .000$	$t(96) = 4.32, p = .000$	$t(74) = 3.52, p = .001$

Note that positive t-values indicate the expected facilitation and inhibition effects, while negative t-values indicate a reverse pattern: faster RTs for inconsistent than for consistent pairs.

weak primes did not show evidence of automatic affect (indeed the pattern was generally reversed, with longer RTs for congruent than incongruent pairs).

Conclusion

In all three experiments we have documented the automaticity of affect across a broad range of political concepts. We find consistent support for the hot cognition hypothesis for political leaders, groups, and issues (especially among those with the strongest attitudes, and for nonambivalent primes, and for sophisticates in the evaluation of “hard” political issues). But why is this important? Of what possible significance can this first split second of information processing be? There are two fundamental implications of this research for political science. First, we believe that the hot cognition postulate promises a partial answer to a puzzle of long concern to political scientists—the problem of rational action by citizens in a democracy (Kinder, 1998; Page & Shapiro, 1992; Sniderman, 1993; Taber, 2003). Second, the primacy and automaticity of affect kick-start the processes that spark motivated biases when citizens encounter attitudinally contrary information (Ditto & Lopez, 1992; Huang & Price, 2001; Lord, Ross, & Lepper, 1979; McGraw et al., 1996; Munro et al., 2002; Sigelman & Sigelman, 1984; Taber & Lodge, 2001).

Our field has not been kind to the democratic citizen. Normative democratic theory imposes heroic expectations about the capacity and motivation of *homo politicus*, while modern empirical research finds many citizens to be *homo-not-so-sapiens*. Surveys consistently find respondents to be distressingly ignorant of and uninterested in things political. How, one might ask, can democracy survive

if large majorities lack the basic wherewithal to behave as rational citizens? Perhaps the most serious theoretical challenge to the ability of citizens to behave as fully rational creatures concerns their limited capacity to process information (Simon, 1981). At minimum, it seems, citizens must be able to form attitudes, impressions, and evaluations and choose among political leaders, groups, and ideas.

Unfortunately, the level of ignorance and apathy found regularly in public opinion surveys (and among our participants on the knowledge test!) calls into question even this basic requirement of rational action. In our view, one of the most exciting—and paradoxical—implications of the hot cognition hypothesis is the notion that people internalize simple summary evaluations, formed spontaneously as part of an online evaluation process, as they encounter political information. Once formed, such running tallies (or more accurately, *links*) provide a ready-made liking heuristic to guide future behavior (Cialdini, 2001; Marcus, Neuman, & MacKuen, 2001; Sears, 2001; Slovic, Finucane, Peters, & MacGregor, 2002; Sniderman, Brody, & Tetlock, 1991). To the extent that such affective links spontaneously provide an evaluative distillation of the stream of information to which the citizen has been exposed, they would seem to offer a fast and relatively simple way around the rationality dilemma (Lodge, Steenbergen, & Brau, 1995). Moreover, unlike most work on heuristic information processing, which offers the promise of low-information rationality, hot cognition, and the online model may provide *high information rationality* in the sense that evaluative tallies appear to reflect a summing up of one's prior evaluations, a distillation of the evaluative implications of most if not all relevant information one has been exposed to (Betsch, Plessner, Schwieren, & Gutig, 2001; Taber, 2003).

Because affect comes to mind automatically at the earliest stages of information processing, we would expect affect to have an immediate “primacy effect” on subsequent processing, such that one's prior attitudes will powerfully constrain the interpretation, depth of processing, and evaluation of new information, as well as one's ultimate course of action. While it seems highly unlikely that the evaluative tallies deposited in memory through time will be an unbiased reflection of experience, the critical questions become where and when will citizens be motivated reasoners (Kunda, 1990)? In a series of complementary experiments we repeatedly find (Taber & Lodge, 2001)—as do others in nonpolitical domains (Ditto & Lopez, 1992; Edwards & Smith, 1996; Lord, Ross, & Lepper, 1979; Munro et al., 2002)—that one's prior attitudes are quite resistant to change. Even when motivated to be even-handed, “to leave their feelings aside,” people find it near impossible to view political policy arguments dispassionately (on gun control, affirmative action, federal support for the arts, etc.). Those holding strong attitudes actively counterargue contrary facts, figures, and interpretations while uncritically accepting attitudinally congruent information—a disconfirmation bias—and they actively seek out supporting information so as to bolster and protect their priors—a confirmation bias. Moreover, both selective biases lead to

attitude polarization, especially among the sophisticated and those with strong priors.

To what degree do our findings on the longer-term consequences of automatic affect undermine rationality? To the extent that motivated biases like those described above overwhelm the objective quality of information, the “hot cognition heuristic” may not be much of a solution to the rationality puzzle. But such “biases” may be innocuous, even useful, when they stop at healthy skepticism, allowing new information to have an independent impact on the evaluation process. When does automatic affect lead to rational skepticism and when does it drive irrational bias? This is a prime question on our agenda for future research.

The experiments reported here find robust facilitation and inhibition effects for political leaders, groups, and issues, complementing research in psychology on the automaticity of nonpolitical attitudes (Bargh et al., 1992; Fazio, 1992; Greenwald & Banaji, 1995). The results of our Experiments 2 and 3 in which we find that the predicted prime valence \times target valence interactions even hold (in fact appear stronger) when the targets are semantically *unrelated* to the primes cannot be readily explained by purely cognitive models. There is no discernable semantic link between, say, Gore or Bush, and “rainbow,” “toothache,” or “mutilate,” yet the responses are speeded up significantly when the prime and target concepts are affectively congruent and slowed down when attitudinally incongruent. Certainly these results offer strong support for the prevalence of hot cognition in political information processing (Marcus, Newman, & MacKuen, 2001). But what are the implications of these findings for the underlying theoretical architecture of political attitudes?

One possibility, following Zajonc’s (1980, 1984) account of the primacy of affect, is that the cognitive and affective systems are separable and somewhat independent (though perhaps architecturally interrelated as depicted in our Figure 1). There is some neurological evidence (e.g., LeDoux, 1996) that the affect system is easily and swiftly sparked and once activated generates a “quick and dirty” approach-avoidance reaction to the situation (JUMP, before you know if it is a stick or a snake), with conscious, deliberative appraisal following moments later. From this perspective the automatic affective response is primary and may or may not (depending on individual and situational factors) be overturned by a later conscious, cognitive assessment (Devine, 1989; Murphy & Zajonc, 1993).

A related perspective—complementary to Zajonc’s independent systems—sees response competition as a plausible explanation for the attitudinal priming effect (DeHouwer, 2001). By this account, attitudes are inexorably linked to behavior. Attitudinal objects automatically potentiate a *bivalent* behavioral response. Mere exposure to an attitudinal object “readies” an immediate approach-avoidance behavioral response. When the prime and target are affectively congruent the behavioral response to the target is speeded up, but when the pairing is affectively incongruent the prepared response must first be inhibited, then redirected, and is consequently slowed down. In this light, a negative attitudinal object

readies an “avoidance” response, which, were it followed by a contrary signal (a “false alarm”), the “to-be-emitted” action must first be stopped and an alternative forward-looking “go” response initiated.

Both Zajonc’s independent-systems perspective and the response competition explanation accomplish a long-sought desideratum of social science—they directly link attitudes to behavior. What is critical from our perspective is that political beliefs, feelings, intentions, and actions will, *if* repeatedly associated, become interconnected in a network of interdependencies that becomes “automatized” in everyday thinking, feeling, and acting, only becoming disassociated in pathological cases (Gazzaniga, 1992, 1998). From this perspective Damasio (1994, 2002) is right in claiming, “the brain is a feeling machine for thinking” and William James (1890) was right in believing that “thinking is for doing.”

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