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THE CONSTRUCTION OF ATTITUDINAL JUDGMENTS: EVIDENCE FROM ATTITUDE CERTAINTY AND RESPONSE LATENCY

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Some researchers regard social attitudes as enduring predispositions, whereas others argue that they are constructed on the spot on the basis of accessible information. According to the sampling model proposed, certainty in one's attitude and the latency of forming that attitude track the online construction of the attitude and provide clues to the stable and variable contributions to attitude construction. An attitudinal judgment is based on a sample of accessible representations drawn from a large base of representations that are associated with the attitude object. Respondents behave like intuitive statisticians who infer the central tendency of a population on the basis of a small sample, and their certainty reflects the likelihood that a new sample will yield the same evaluation. Results on within-person consistency and cross-person consensus provided support for the model. Judgments that deviated from the person's own modal judgment or from the consensually held judgment took relatively longer to form and were associated with relatively lower confidence, presumably because they were based on non-representative samples. The effects of social consensus were found in the absence of any overt forces toward social conformity.

There has been a great deal of interest in the study of attitude strength (see Petty & Krosnick, 1995). Underlying this interest is the assumption that attitude strength determines the extent to which an attitude is translated into action. Indeed, results suggest that strong attitudes have greater influence on thought and behavior than weak attitudes (see Davidson, Yantis, Norwood, & Montano, 1985; Fazio & Zanna, 1978; Krosnick & Abelson, 1992; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993). In the present study we focus on two indexes of attitude strength—the degree of certainty with which an attitude is held, and the speed with which

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the attitude is formed. These aspects have proved to be among the best predictors of the pliability and stability of social attitudes (Bassili, 1996). We argue that the study of these properties, besides being of interest in its own right, provides valuable insights into the processes underlying the on-line construction of attitudinal judgments.

THE VARIABILITY AND STABILITY OF ATTITUDINAL EVALUATIONS

In their discussion of attitude strength, Krosnick and Petty (1995) pointed out that on the one hand, there is evidence that most attitudes are very stable and only rarely change in the course of daily life. On the other hand, experimental evidence indicates that it is quite easy to change people's attitudes and opinions (see also Gawronski & Bodenhausen, 2006; Wilson, Lindsey, & Schooler, 2000). These two observations seem to have led to two divergent approaches regarding how attitudes should be portrayed. Traditionally, attitudes have been treated as evaluative predispositions that are relatively stable over time. These dispositions are assumed to account for individual differences in characteristic evaluative judgments and behavior (Allport, 1935; Eagly & Chaiken, 1993; Petty & Cacioppo, 1981). It has been proposed that an attitude is stored in memory as a link between an object and its summary evaluation (Fazio, 1995). This link is automatically activated or deliberately retrieved upon exposure to the attitude object (see the "file-drawer" analogy in Wilson, Lisle, & Kraft, 1990).

In contrast, a posititon that has been gaining in popularity in recent years is that attitudinal judgments are constructed on the spot on the basis of the information accessible when making the judgment rather than being read out directly from memory (Schwarz, 2007; Schwarz & Strack, 1985; Wilson & Hodges, 1992). Indeed, a great deal of evidence suggests that attitudinal judgments vary according to the respondent's current goals, mood, social context, and the specific descriptive features of the attitude object (Bless, Mackie, & Schwarz, 1992; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). Wilson and his colleagues (for a review see Wilson & Hodges, 1992) also observed that when people are asked to introspect about the reasons for their feelings, they often construct a new attitude that is based on reasons that are accessible and plausible. Thus, people's judgments are influenced by the kind of thought in which they engage when pondering about an attitude object.

The attitude-as-construction view has led to increased emphasis on the malleability and context-sensitivity of attitudinal judgments. Nevertheless, researchers subscribing to this view admit that attitudinal judgments may exhibit some degree of stability and consistency. Wilson and Hodges (1992) proposed that perhaps only some types of attitudes are unstable, and even those attitudes may vary only within a "latitude of acceptance." Schwarz (2007), on the other hand, proposed that degree of stability mirrors the stability and consistency of the conditions under which judges arrive at their evaluations (see Bless, Schwarz, & Wänke, 2003; Schwarz & Bless, 2007). Thus, attitudinal judgments can be relatively stable under conditions in which contextual influences are small.

The present study is concerned with attitude certainty and response latency. These aspects of attitude strength are assumed to throw light on the dynamics underlying the construction of the attitudinal evaluation itself. We propose that at-

titude certainty and response latency can help partition the variance in attitudinal judgments into its stable and variable components. We subscribe to the view that attitudinal judgments are constructed on the spot on the basis of the associations that come to mind at the time of making a judgment. Therefore, some fluctuation in attitudinal judgments may be expected even in the absence of any manipulation that attempts to affect these judgments. The degree of certainty attached to an attitude is also determined ad hoc (Bassili, 1996). At the same time, however, we also postulate a certain degree of within-person stability and cross-person consistency in attitudinal judgments. The challenge, then, is to extract both the stable and variable properties from the same set of attitudinal judgments. These properties can be gauged from the variations in attitude certainty and attitude latency. We first sketch our general approach before describing the proposed model.

We assume, along with many other researchers, that the person's attitudinal judgments are rooted in the myriad of mental representations stored in memory (e.g., Fazio, 1995; Pratkanis, 1989; Tourangeau, 1992). People are assumed to have a large data base relevant to their attitudes toward a particular object. This data base contains the underlying ingredients from which an evaluation is constructed. Thus, when they are exposed to an attitude statement (with a specific wording), and are required to make a *favor/oppose* evaluation, they form their evaluation on the basis of the pieces of information that they retrieve from memory at the time of making the judgment (Wilson & Hodges, 1992; Wyer, 1980). We shall use the term "representation" to refer broadly to any particular interpretation of the attitude statement, or any consideration or piece of information that can tilt the pendulum in the direction of *favor* or *oppose*. Representations may differ in the degree to which they have clear implications for the attitudinal judgment, and in terms of the extent to which they are verbalizable or accessible to awareness.

Because of the limitations of the cognitive system, the number of representations accessed at any point in time must be quite limited, particularly because the information has to be integrated across the accessed representations to produce a "summary evaluation" (Fazio, 1995). Fluctuations are assumed to occur in the sampling of representations from long-term memory as a result of several factors including those discussed in stimulus-sampling theory (Bower, 1972; Estes, 1950). Importantly, these fluctuations are reflected in systematic changes in both attitude certainty and response latency.

The distinction between the stable and variable components can be conceptualized in terms of the distinction between availability and accessibility (see Tulving & Pearlstone, 1966). The stable components derive from the constraints imposed by the population of representations *available* in memory. The specific choice made in each encounter, in contrast, is determined by the small set of representations that are momentarily *accessible*. We assume that each attitude statement is associated with a population of potentially accessible representations from which the person draws a small sample of representations in each encounter with the attitude statement. The critical property of that population is the distribution of representations that speak for a positive or a negative evaluation. In the extreme case, we can think of many attitude statements that are likely to be associated only with same-valence representations for all participants. (Such attitude objects are hardly included in attitude research because of the general interest in interindividual differences.) For these statements, despite whatever fluctuations that might occur in the specific representations that are accessible at any point in time, these represen-

tations are likely to yield the same attitudinal judgment across participants and across occasions. Such consistency need not imply a "crystallized" attitude that is retrieved ready-made from memory (Krosnick & Schuman, 1988). In general, the extent of fluctuation in attitudinal judgments is constrained by the polarization of the population of representations associated with an attitude statement. Amount of fluctuation, in turn should be generally diagnostic of the polarity of the underlying population of representations.

Essentially, then, the closest we can come to a definition of the person's "latent" attitude as a hypothetical construct would be in terms of the population of available representations associated with the attitude object at a given time. One way to obtain some information about the "latent" attitude is through repeated measurements. Although repeated measurements cannot be assumed to be independent (Holland, Verplanken, & van Knippenberg, 2003), they can approximate the situation in which a statistician who is interested in obtaining information about the central tendency in a population cannot draw a large enough sample, and must make do with several small samples taken one at a time.

Proponents of the view of attitudes as enduring dispositions may interpret spontaneous fluctuations in attitudinal judgments as reflecting a measurement "error" (for discussions see Eagly & Chaiken, 2005; Ferguson & Bargh, 2007). What is unclear, however, is whose "error" it is. According to the present view, the respondent, who is to make an attitudinal judgment, is himself or herself a measuring instrument. He or she is in a position similar to that of the statistician who has to infer the central tendency in a population on the basis of a small sample of observations. Furthermore, as will be discussed below, the respondent's certainty in the attitudinal judgment, like the statistician's level of confidence, reflects the assessment that the judgment that is based on a specific sample of representations is indeed true of the entire population. Thus, like the statistician, the respondent may also "err" when the sample happens to be unrepresentative of the population. According to the sampling model, the degree of certainty in an attitudinal judgment and the speed with which it is formed are diagnostic of both the central tendencies of the population of representations associated with the attitude statement, and whether the sample of representation underlying a particular attitudinal judgment is representative or unrepresentative of that population in terms of the implications for attitudinal evaluation.

CERTAINTY IN ATTITUDINAL JUDGMENTS

Let us examine the on-line determinants of attitude certainty. In metacognition research the question of the bases of subjective certainty (or confidence) has been addressed primarily in the context of learning and memory (see Koriat, 2007). In that context, a distinction has been drawn between two general bases of metacognitive judgments (see Koriat, Nussinson, Bless, & Shaked, 2008). *Information-based* metacognitive judgments are said to rely on an analytic inference, in which various considerations retrieved from long-term memory are consulted and weighed to reach an educated metacognitive judgment (Griffin & Tversky, 1992; Juslin, Winman, & Olsson, 2003; McKenzie, 1997, 1998; Nelson & Narens, 1990). For example, confidence in the decision that one German city has a larger population than another city may be based on the memory that that city has a soccer team that plays in the

German soccer league, assuming that cities with more inhabitants are more likely to have a team in that league (Gigerenzer, Hoffrage, & Kleinbölting, 1991). *Experience-based* metacognitive judgments, in contrast, are assumed to rest on a variety of mnemonic cues that reside in the immediate feedback from task performance (Benjamin & Bjork, 1996; Koriat, Ma'ayan, & Nussinson, 2006; Robinson, Johnson, & Herndon, 1997). These cues (e.g., processing fluency and ease of retrieval) are assumed to give rise directly to a sheer subjective feeling that can be translated into a metacognitive judgment (see Koriat, 2000, 2007). In the case of subjective confidence, for example, it has been found that confidence in the correctness of one's solution to a psychometric problem decreases with the amount of time it took to reach that solution (e.g., Koriat et al., 2006). Similarly, confidence in the answer to a general-information question was found to increase with the speed with which that answer was retrieved or selected (see Kelley & Lindsay, 1993; Zakay & Tuvia, 1998). It also increases with the ease with which arguments in support of that answer are retrieved: When participants were asked to list four reasons in support of their answer, their confidence in the answer was *lower* than when they were asked to list only one supporting reason (Koriat et al., 2008). Presumably retrieving more reasons is subjectively experienced as more difficult than retrieving fewer reasons (see Schwarz, 2004, for a review).

Research on the determinants of people's certainty in their social attitudes has provided evidence for the effects of both informational content and mnemonic cues on degree of certainty or conviction (Schwarz & Bless, 2007; Holland et al., 2003; Tormala, Clarkson, & Petty, 2006; see Tormala & Rucker, 2007, for a review). With regard to informational content, a large body of research suggests that declarative arguments presented by an experimenter or generated by the participant can influence social judgments (Petty, Briñol, & Tormala, 2002; Petty & Cacioppo, 1986). Other findings suggest that attitude certainty is also affected by mnemonic cues such as accessibility and ease of retrieval. Thus, the requirement to report one's attitude several times rather than only once was found to increase attitude certainty by enhancing the accessibility of the attitude (Holland et al., 2003; Petrocelli, Tormala, & Rucker, 2007). Repeated presentation was also found to affect judgments of attitude importance (Roese & Olson, 1994). Using the ease-of-retrieval paradigm, it was found that asking participants to list a few arguments in support of their attitude resulted in higher certainty than asking them to produce many arguments (Haddock, Rothman, Reber, & Schwarz, 1999).

Assuming that participants construct their attitudinal judgment on the spot (Schwarz, 2007; Sherman & Corty, 1984; Wilson & Hodges, 1992), how do informational and mnemonic cues combine in determining certainty in the judgment? The findings obtained with the ease-of-retrieval paradigm (Haddock et al., 1999; Koriat et al., 2008) suggest that the effects of ease-of-retrieval can override those of the declarative content of the supporting arguments in affecting confidence judgments. These findings suggest that confidence judgments rest more heavily on mnemonic cues (e.g., accessibility, fluency) that derive on-line from the *process* of attempting to form a judgment than on the content of specific arguments. This conclusion is also consistent with findings indicating that participants do not spontaneously apply some of the most basic beliefs about learning and remembering in making metacognitive judgments about memory performance. For example, in making judgments of learning, participants do not consider spontaneously the belief that

studied information is forgotten over time or that memory improves with repeated study trials (Koriat, Bjork, Sheffer, & Bar, 2004; Kornell & Bjork, 2009).

It has been proposed that the *immediate* basis of metacognitive feelings lies primarily in mnemonic cues that derive on-line from task performance (see Jacoby, Kelley & Dywan, 1989; Koriat, 2007). In terms of the heuristic-systematic model of Chaiken and her associates (Chaiken, 1980; Chen & Chaiken, 1999), it may be argued that even when participants engage in a systematic mode of processing when attempting to construct their attitudinal evaluation, they act like cognitive misers when assessing their certainty in that evaluation. Thus, when having to decide between *favor* and *oppose* responses to an attitude object, participants might engage in an analytic-like process, exploring different meanings or interpretations of the statement, and examining various considerations retrieved from memory (Pratkanis, 1989). When they later assess their certainty in their judgment, they do not go over the entire process of deliberation, but rely primarily on the "gist" of that process (Stephen & Pham, 2008): They base their certainty mainly on cues that reside in the feedback from the process of making a judgment—the amount of deliberation, hesitation, and conflict that had been experienced in making a choice, the amount of effort invested, the speed with which the judgment had been formed, and so on. Although these *nonanalytic* cues (Jacoby & Brooks, 1984) differ in quality from the pieces of information that may have determined the attitudinal judgment itself, they mirror significant aspects of the process underlying that judgment. In particular, they reflect the balance of evidence in favor of each of the two response options. Of course, participants sometimes simply retrieve a previously formed judgment (Wilson et al., 2000). When they determine the judgment on the spot, however, as they move from making a judgment to assessing their certainty in that judgment, the contribution of information-driven processes decreases and that of experience-driven processes increases.

ATTITUDE CERTAINTY AND SELF-CONSISTENCY

The model of attitude certainty to be sketched below incorporates the basic assumptions of the self-consistency model (SCM) of subjective confidence (Koriat, 2011a, 2011b). The SCM was originally developed to address the question of how people know that they know, and has been applied so far to the confidence-accuracy relationship in general-knowledge questions and in perceptual judgments. The question of accuracy or correctness does not apply to social attitudes. However, some of the assumptions of SCM regarding the *basis* of subjective convictions can be assumed to apply to attitude certainty as well. In the present context, these assumptions will be shown to provide some clues regarding the construal of attitudinal judgments.

Underlying the sampling model of attitudinal judgment is the assumption that participants construct their judgments by sampling information from long-term memory. Each attitude-relevant statement is associated with a large set ("population") of potentially accessible representations, only a small part of which ("sample") is accessed at any encounter (Wilson & Hodges, 1992). The choice of a *favor/oppose* response is determined by the "majority vote" in the sample. In assessing their confidence in that choice, participants behave essentially like intuitive statis-

ticians (see Gigerenzer & Murray, 1987; McKenzie, 2005; Peterson & Beach, 1967) who have to infer the central tendency in a population on the basis of a sample of observations. Attitudinal certainty represents the assessed likelihood that a new sample of representations drawn from the same population will yield the same attitudinal response. Hence, the main cue for certainty is the *reliability* with which the representations that are sampled favor the same response. Therefore, the construction of an attitudinal judgment may be conceptualized as involving a series of replications of the decision process. In each replication a representation is retrieved, its implication for the judgment is evaluated, and an implicit subdecision in favor of one of the two responses is made. The sampling of representations continues until a preset sample size has been reached or until a series of draws yields the same subdecision a number of times in succession (e.g., 3 times, see Audley, 1960). The ultimate, overt choice is the choice most consistently favored across the series of subdecisions. Subjective confidence in that choice is based on the degree of consistency among the subdecisions, that is, on the proportion of representations supporting the choice made. The assumption is that however analytic is the process underlying attitudinal judgments, certainty in that judgment can be assumed to depend on a simplified portrayal of that process in which each of the representations provides a binary subdecision and all subdecisions have the same weight.

THE SAMPLING MODEL OF ATTITUDE CONSTRUCTION

The model to be tested makes several very basic assumptions. These assumptions are clearly over-simple, but they are sufficient for bringing to the fore several trends that are of interest in this study. First, it is assumed that each potential representation implies a binary decision, speaking either for or against the attitude statement. Thus, the critical property of the population of representations associated with a given attitude statement is the proportion of representations favoring the dominant, majority choice. This property will be designated p_{maj} (range .50-1.0). We may assume that for each person, different attitude statements are associated with different p_{maj} values that are relatively stable over time. Second, all accessed representations are assumed to have the same weight as far as confidence in the choice is concerned. Finally, the sampling of representations is assumed to be sequential and random. For simplicity, we will use in this article a version of the model in which two free parameters were fixed. First, we assume that the maximum number of representation (n_{max}) for each attitude statement is 7. Second, once a series of draws yields the same subdecision 3 times in succession, the search is terminated, and the outcome of the run-3 sequence determines the overt choice. Thus, the actual sample size, designated n_{act}, will vary between 3 and 7.

Confidence in the choice is assumed to depend on self-consistency, which is inversely related to the sample standard deviation. We use $1-\sqrt{\hat{p}\hat{q}}$ as an index of self-consistency (range .5 - 1.0). This index is calculated over the actual number of representations sampled (n_{act}). Response latency, in turn, is assumed to increase with actual sample size, n_{act}, that is, the number of representations drawn before an overt choice is made.

An important prediction of the model concerns the difference in confidence and latency between majority and minority responses. Majority responses occur when

a sample is representative, so that the majority of the subdecisions favor the same response choice as the one favored by the entire population of representations. Of course, the likelihood of a representative choice should increase with p_{maj}. However, because the number of representations sampled is relatively small, some of the samples may be unrepresentative of the population, favoring the minority option.

To explore the predictions of this model, a simulation experiment was run. It assumed a vector of 9 binomial populations that differ in p_{maj}, the proportion of the majority value, with p_{maj} varying from .55 to .95, at .05 steps. For each population, 90,000 iterations were run. In each iteration, 7 representations were sampled from the population and the majority value in the sample was defined as the overt choice. However, when a sequence of 3 identical values occurred, the sampling was stopped, and the repeated value was defined as the overt choice. Responses were classified as "majority" when they corresponded to the majority in the population, and as "minority" when they corresponded to the minority value in the population. A self-consistency index and n_{act} were calculated for each iteration, as described above.

The results of the simulation (Figure 1A) bring to the fore the diagnostic value of the self-consistency index, which is assumed to underlie subjective confidence. Mean self-consistency ("All") increases with p_{maj}. However, self-consistency is systematically higher for majority than for minority choices. Why is that so? The answer lies in the relationship that exists between the mean and the variance when sampling information randomly from a population in which p_{maj} differs from .50. To illustrate: With p_{maj} = .70, a sample of 7 representations has a .329 likelihood of yielding 6 or 7 representations that favor the frequent, majority response. In contrast, the likelihood that it will yield 6 or 7 representations that favor the less frequent, minority choice is only .004. In general, then, as long as p_{maj} differs from .50, minority samples should have a lower self-consistency and hence lower confidence than majority samples.

Turning next to Figure 1B, it can be seen that the simulation results for n_{act} mimic very closely the results obtained for self-consistency. The implication is that response latency should decrease consistently with p_{maj}. However, for each value of p_{maj} (when $p_{maj} > .50$) response latency is longer for minority than for majority choices.

The general conclusion from the results presented in Figure 1 is that attitude certainty and response latency are diagnostic of both the stable and variable aspects of attitudinal judgments. The stable aspects are reflected in the systematic functions relating mean self-consistency and mean n_{act} to p_{maj}. The variable aspects, which stem from sampling fluctuations, are disclosed by the systematic differences between majority and minority choices in both self-consistency and n_{act}.

In order to derive testable hypotheses, it is necessary to obtain an estimate of p_{maj}. This estimate can be obtained from the likelihood of choosing the majority answer, which will be designated pc_{maj}. The theoretical function relating pc_{maj} to p_{maj} can be obtained from the simulation described earlier assuming that the choice is dictated by the majority vote in the sample. pc_{maj} is an accelerated function of p_{maj} (see Figure 1, Koriat, 2011b). For example, when p_{maj} = .55, samples of n = 7 (with a run-3 stop rule) are expected to lead to a .60 proportion of choosing the majority response. When p_{maj} = .70, the respective pc_{maj} is .86. The data presented in Figures

1A and 1B were therefore reorganized to form Figures 2A and 2B, respectively, by using in the *x*-axis the pc_{maj} values corresponding to the p_{maj} values.

There are two ways in which pc_{maj} can be indexed operationally. It can be indexed by the proportion of times that the preferred choice is made by the same participant over repeated presentations ("item consistency"). Alternatively, it may be indexed by the proportion of participants making the choice that is preferred by most participants. Because these two properties are assumed to be specific to each item, they will be referred to as "item consistency" and "item consensus," respectively.

The first property has been mentioned earlier. If the same items are presented to the same person repeatedly, it can be assumed that the most frequent choice across repetitions is the choice that is favored by the population of representations for that item. An index of $pc_{maj,}$ then, is the proportion of times that that choice is made across presentations.

Let us examine the predictions depicted in Figure 2 in light of this operational definition of pc_{maj}. The results in Figure 2A imply the following predictions regarding the relationship between confidence and item consistency: (1) Across all items, confidence should increase monotonically with item consistency—the proportion of times that the frequent choice is made across repetitions. (2) Confidence should be higher on average for the frequent choice than for the rare choice. That is, people should express greater confidence when making their more frequent attitudinal judgment than when making their less frequent judgment. (3) Confidence in the frequent judgment should increase strongly with item consistency, whereas confidence in the rare judgment should decrease but more shallowly so. Consequently, the discrepancy between confidence in the frequent and rare judgments should increase with increasing item consistency. It can be seen in Figure 2B that precisely the same pattern of results is expected for response speed, which is assumed to reflect n_{act}.

The predictions just described depend on the extent to which the responses to repeated presentations of an item can be assumed to be independent. The usefulness of the second operational definition of pc_{maj} depends on a stronger assumption still, but avoids the problems inherent in repeated measurements. In this definition, pc_{maj} represents the proportion of participants who choose the majority, consensual response in a particular occasion ("item consensus"). This definition is based on the assumption that when people respond to an item, the representations that come to mind are sampled from a population that is partly commonly shared. The results obtained for general-information questions and perceptual judgments (Koriat, 2011a, 2011b) accord rather well with predictions that are based on this assumption. However, it is a question whether we can assume that even for social attitudes different people sample representations largely from the same populations of representations. If such is indeed the case, the results presented in Figure 2 imply that when an individual's response to an attitudinal item *happens to be* the same as the consensual response, confidence will be higher and response latency will be shorter than when the response *happens to be* the nonconsensual, minority response.

It should be stressed that the pattern of results that is predicted by the sampling model is similar to that predicted by theories that stress the effects of social pressure on confidence and response time. For example, Bassili (2003) documented a

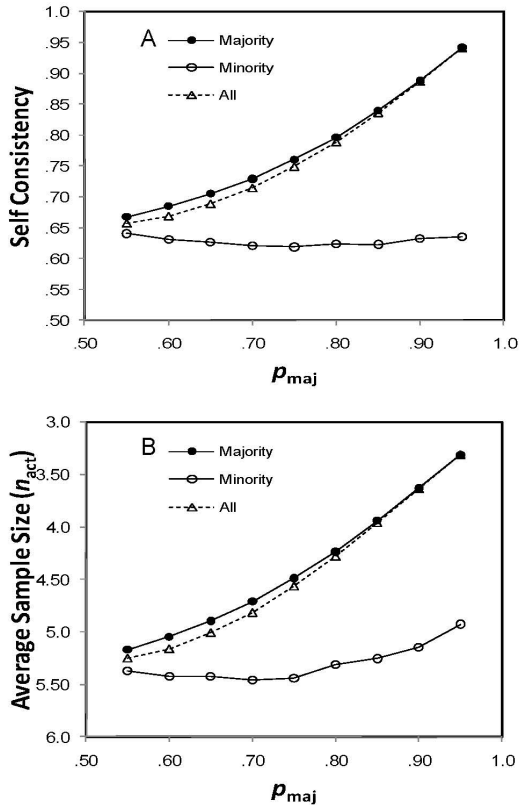

FIGURE 1. Self-consistency scores (panel A) and average sample size (nact) as a function of the probability of drawing a majority representation (Pmaj) based on the results of the simulation experiment (see text).

"minority slowness effect" that was attributed to the social inhibition felt in expressing views that depart from the social consensus. Here, however, we make the same prediction without presupposing any influence between participants.

THE STUDY

In the study, we used a version of the Conservatism Scale (Wilson & Patterson, 1970). The task was administered seven times over two days, with self-report questionnaires interpolated between different administrations. In each administration participants marked either *yes* (favor) or *no* (oppose) for each item, and indicated their degree of confidence in their response. The latency of attitudinal judgment was measured. If we ignore the possibility of crossover effects between presentations, the variation across presentations can be assumed to stem from fluctuations in the samples of representations that are momentarily accessible in making each choice. In turn, the consistency with which the same choice is made across presentations is assumed to reflect the central tendency of the population of available representations associated with the attitude statement.

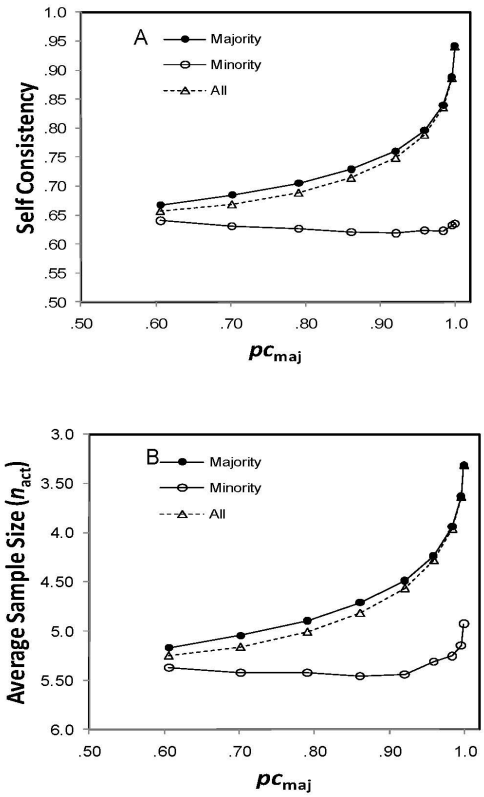

FIGURE 2. Self-consistency scores (panel A) and average sample size (nact) (panel B) as a function of the probability of choosing the majority option (PCmaj) based on the results of the simulation experiment (see text).

METHOD

Participants

Initially 41 participants were run but because two of them made the same response to each item across all presentations, they were replaced by two new participants. The final sample included 41 Hebrew-speaking University of Haifa Psychology undergraduates (22 females and 19 males) who participated in the experiment for course credit.

Stimulus Materials

The experimental materials consisted of a 50-item Conservatism Scale (C scale; Wilson & Patterson, 1970). Each item describes a controversial issue or concept (e.g., death penalty, evolution theory, disarmament, legalized abortion, and so forth). The scale has been assumed to measure conservatism in the general sense and has been found to include four dimensions: Militarism-Punitiveness, Anti-Hedonism, Ethnocentrism, and Religion-Puritanism. However, Wilson and Patterson

(1968) reported a split-half reliability of .943 (N = 244). Cronbach's alpha was .837 in Feather's study (1980). In a study conducted on a group of Israelis, Katz and Ronen (1986) found a Cronbach alpha of .82 for participants of Western origin, and .74 for participants of Eastern origin.

In the present study we used a Hebrew version that was adapted to the Israeli population. Several items were modified. In addition, whereas the original response format includes three response options ("Yes" "?" "No"), in the present study, a *yes/no* response format was used. For half of the items "yes" indicated higher conservatism, and for the other half "no" indicated higher conservatism. In addition, a confidence scale (0–100) was added beneath the alternatives.

Three self-report questionnaires were used, primarily to serve as fillers between different administrations of the C Scale. These were the Need for Closure Scale (NFCS; Webster & Kruglanski, 1994), The Rational-Experiential Inventory (REI; Pacini & Epstein, 1999), and The Impulse Control Scale (ICS; Plutchik & Van Praag, 1989). The NFCS is a 42-item questionnaire requiring ratings of each item on a 6-point Likert scale. The REI is a 40-item questionnaire, requiring a rating of each statement on a 9-point scale. The ICS scale includes 15 items requiring a rating of each statement on a 4-point scale.

Apparatus and Procedure

The experiment was conducted on an IBM-compatible personal computer. It consisted of two sessions, one on each of two successive days. Session 1 included three blocks in each of which the entire task was administered, and Session 2 included four blocks. Participants were told that they would be presented with 50 items describing controversial issues, and that they should respond to each item with *Yes* (in favor) or *No* (oppose). It was stressed that there are no correct answers, and that they should respond according to their own feelings. The opening question read: "For each of the following please respond whether you are in favor or opposed." This question was followed by the list of 50 items. Participants were further instructed to click the *confirm* box, after which they could not change their answer, and after clicking the *confirm* box, to judge on a 0–100 scale how confident they were in their response. They were encouraged to make use of the full range of the confidence scale.

The procedure was similar to that used in Koriat (2008) for the assessment of confidence and response time in two-alternative, general-knowledge tasks. In each trial, each attitude item was presented until the participant pressed the left mouse key to indicate that he/she had finished reading it, at which time the response options (*yes*/ *no*) were added beneath the statement. The participant indicated the response by clicking the chosen response. Response latency was measured, defined as the interval between the left-key press and the choice of a response. After pressing the *confirm* box, a confidence scale (0–100) was added beneath the alternatives, and participants marked their confidence by sliding a pointer on a slider using the mouse (a number in the range 0-100 corresponding to the location of the pointer on the slider was shown in a box). After clicking a second *confirm* box, the next trial began.

Following Block 1, the first part of the NFCS scale (21 items) was administered on the computer followed by Block 2. The second part of that scale was then pre-

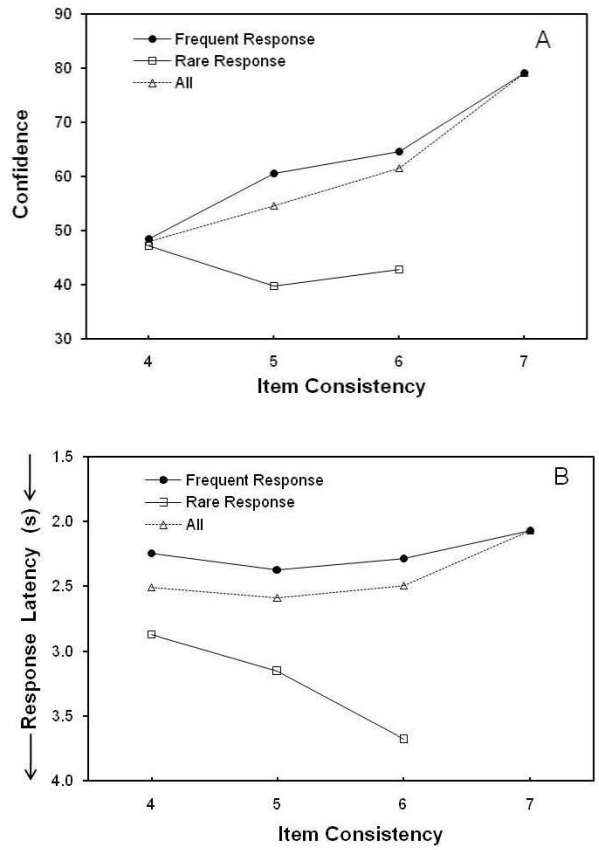

FIGURE 3. Panel A presents mean confidence judgments for the frequent and rare responses as a function of item consistency (the number of times that a response was made across all blocks). Panel B presents mean response latency as a function of item consistency.

sented, followed by Block 3. The procedure in the second session was identical except that the first part of the REI scale (20 items) was presented after Block 4, the second part was presented after Block 5 and the ICS scale (15 items) was presented after Block 6.

The order of the attitude items was determined randomly for each participant and block. In addition, each block was preceded by two warm-up items. These items were taken from a set of 14 items that were similar in content and format to those of the 50 experimental items. Session 1 lasted about 45 min and Session 2 about 60 min.

RESULTS

Two items were eliminated from the analysis because several participants indicated that they were not clear on them. Therefore, the results to be reported were based on 48 items, 24 scored so that *favor* indicates high conservatism, and 24 with *oppose* indicating high conservatism. Participants tended to give the same response consistently throughout the seven presentations. Thus, if we focus on the response

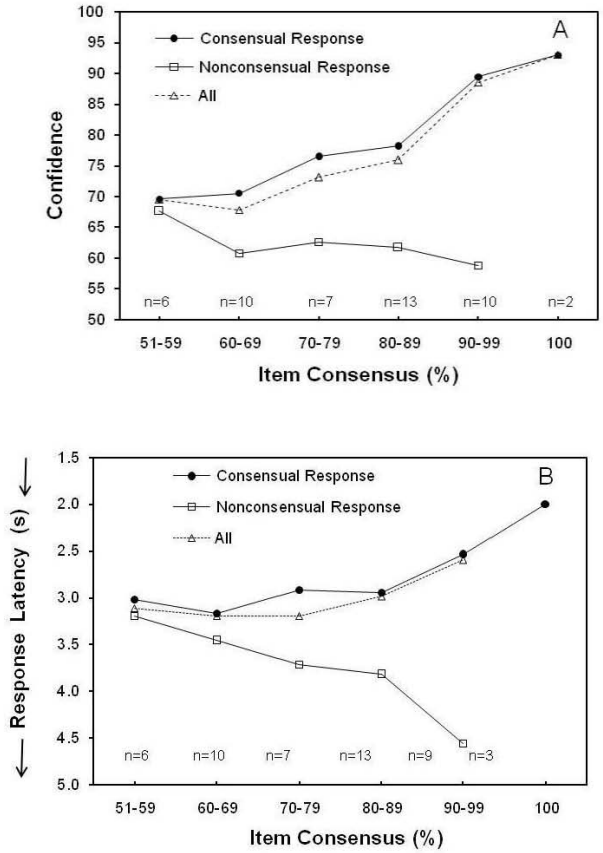

FIGURE 4. Panel A presents mean confidence judgments in Block 1 for consensual and nonconsensual responses and for all responses combined as a function of item consensus (the percentage of participants who chose the majority response). Panel B presents the same data for response latency (see text).

made in Block 1, the likelihood of choosing that response again over the next six blocks averaged .94 across all participants.

The Relationship between Confidence and Response Latency

Because in the results to be presented below we evaluated the predictions for confidence judgments first and then for response latency, we will begin by examining the relationship between these two aspects of attitude strength. This relationship was examined on the results from Block 1. All items were divided for each participant at the median of response latency (response latency for below-median and above-median responses averaged 1.82s and 4.03s, respectively, across participants). Confidence judgments were significantly higher for below-median latencies (82.25) than for above-median latencies (70.36), $t(40) = 12.03$, $p < .0001$. The Pearson correlation across all items between confidence and latency averaged -.39 across participants, $t(40) = 17.76$, $p < .0001$. Thus, confidence was inversely related to response latency as has been found in previous studies (Kelley & Lindsay, 1993; Koriat, 2008; Koriat et al., 2006; Robinson et al., 1997; Zakay & Tuvia, 1998).

Confidence and Latency as Related to Within-Person Response Consistency

We first focus on the predictions regarding the within-person relationships involving confidence and response latency. These predictions are based on the idea that each attitude statement is associated with a relatively stable population of representations and that in each block participants base their judgments on a small sample of representations drawn from that population.

Confidence as a Function of Response Consistency. All items were classified for each participant into those that elicited the same response across all seven blocks (full consistency) and those for which there was some degree of inconsistency (partial consistency). Mean confidence was significantly higher for the full-consistency items (79.18) than for the partial-consistency items (57.28), $t(40) = 12.85$, $p < .0001$. Of the 41 participants, 40 exhibited this pattern, $p < .0001$ by a binomial test. This result accords with the suggestion that strong attitudes tend to be stable (Krosnick et al., 1993; Petty & Cacioppo, 1986).

We next compare confidence for the participant's frequent and rare responses as a function of item consistency, that is, the number of times that the frequent response was chosen. Figure 3A presents the pertinent results. The figure also includes the mean of the full-consistency items. As expected, mean confidence increased monotonically with item consistency, in line with the idea that item consistency is diagnostic of the polarity of the population of potential representations. This polarity is assumed to constrain both the likelihood of making a deviant, minority (rare) choice, as well as the mean confidence associated with the choice.

In addition, however, confidence differed for the frequent and rare responses: Using only the partial-consistency items, confidence was significantly higher for the frequent responses (59.84) than for the rare responses (44.93), $t(40) = 4.53$, $p < .0001$. Of the 41 participants, 34 exhibited this pattern, $p < .0001$, by a binomial test. Thus, participants were less confident when their response deviated from *their* modal response. In addition, confidence in the frequent response tended to increase with increasing item consistency.

Response Latency as a Function of Response Consistency. In all of the analyses of response latency to be reported, latencies that were below or above 2.5 *SD*s from each participant's mean were eliminated (3.71% for Block 1 and 3.62% across all seven blocks) from all analyses of response latency. The results (Figure 3B) mimic roughly those obtained for confidence, particularly with regard to the difference between the frequent and rare choices: For the partial-consistency items, response latency was shorter (2.29s) when participants made their frequent response than when they made their rare response, (3.49s), $t(39) = 3.07$, $p < .005$. The pattern of faster response latencies for the frequent responses was observed for 29 of the 40 participants, $p < .0001$, by a binomial test. Response latency did not decrease with item consistency for frequent choices, but it tended to increase for rare choices.

The Postdiction of Confidence and Latency from Response Repetition

There is little question that repeated presentation of the same item is not ideal for testing the hypotheses of the present study. Several previous studies indicated that repeated measurements affect attitudinal judgments (Holland et al., 2003; Petrocelli et al., 2007). Indeed, confidence tended to increase with repeated presenta-

tions, although this increase was quite small: Confidence averaged 76.4, 76.1, 76.9, 76.8, 77.6, 77.8, and 77.9, respectively, for blocks 1 to 7, $F(6, 240) = 3.68$, $MSE = 5.47$, $p < .005$. The respective means for response latency were 2.9, 2.0, 1.9, 2.1, 2.0, 2.0, and 1.9, $F(6, 240) = 27.27$, $MSE = 0.21$, $p < .0001$.

It might be argued that the differences observed between frequent and rare choices are due to the changes that occur across blocks: Repeated choices tend to exhibit increased confidence and reduced response latency across repeated presentations. In order to show that the frequent-rare differences are not entirely due to repeated presentations, we attempted to postdict the Block-1 confidence and response latency from the frequency with which the Block-1 choice was made across the subsequent blocks. For each participant, each choice in Block 1 was classified into two categories according to whether it was repeated three times or more in the subsequent six blocks or two times or less. Confidence for the two categories averaged 77.44 and 53.62, respectively, across 39 participants who had both means, $t(38) = 10.15$, $p < .0001$. This analysis was repeated after eliminating the full-consistency items for each participant. The respective means were 68.61 and 53.72 across 31 participants who had both means, $t(30) = 4.62$, $p < .0001$.

A similar analysis was carried out for response latency. Response latency in Block 1 averaged 2.80s for choices that were repeated three times or more, and 4.57s for those that were repeated two times or less across 36 participants who had both means, $t(35) = 3.96$, $p < .0005$. When the full-consistency items were eliminated, the respective means were 3.83s and 4.49s across 30 participants who had both means, $t(29) = 1.67$, $p < .11$.

Thus, even for Block-1 responses, both confidence and latency discriminate between the more frequent and the less frequent responses: Responses that were made more often across the seven blocks yielded higher confidence and shorter latencies in Block 1 than responses that were made less often.

In our interpretation of the results just presented, we assumed that confidence in an attitudinal judgment is assessed *ad hoc* by participants on the basis of the consistency with which that judgment is favored by the sample of accessible representations. Therefore, samples that *happen to favor* the dominant choice tend to be endorsed with higher certainty than those that *happen to favor* the less dominant choice. An alternative interpretation of the pattern of results observed in Figure 3A, however, is that perhaps it is confidence in one's attitude that determines the likelihood of repeating an attitudinal judgment in subsequent encounters with the item. This possibility is difficult to refute. Therefore, there is some advantage to seeking converging evidence based on interperson consensus in choice. In the analyses to be reported in the next section, pc_{maj} was estimated from the likelihood to which the response is consistently made by different participants in Block 1.

Confidence and Latency as Related to Cross-Person Response Consensus

Confidence as a Function of Cross-Person Consensus. The following analyses are based on the idea that although there is a great deal of between-individual variation in attitudinal judgments, different participants may be assumed to draw their representations from item-specific pools of representations that are largely commonly shared. Therefore, the pattern relating confidence to cross-person consensus should be similar to that observed for within-person consistency. Specifically, participants should express stronger confidence in their evaluation when it accords

with the consensual evaluation than when it deviates from it. Also, confidence in the consensual evaluation should increase with item consensus whereas confidence in the nonconsensual evaluation should decrease with item consensus.

We used only the results from Block 1. For each of the 48 items, we determined the consensual or majority response, and calculated item consensus—the percentage of choices of the consensual response. Item consensus averaged 78% across items (range 53% to 100%). For two items all participants gave the same response. Figure 4A presents mean confidence ratings for the consensual and nonconsensual responses for each of the 6 item consensus categories (51-59%; 60-69%; 70-79%; 80-89%; 90-99%; 100%). These means were obtained by calculating the means for each participant and then averaging across participants.

Mean confidence increased monotonously with item consensus, as predicted (Figure 4A). In addition, when mean confidence and mean item consensus were calculated for each item, the correlation between them over all 48 items was .79 ($p < .0001$). These observations are consistent with the idea that confidence increases with the polarity of the population of representations associated with an item.

However, as expected, consensual responses were endorsed with higher confidence than nonconsensual responses: Across 46 items (for two items, as noted, all participants made the same response) confidence judgments averaged 77.80 for consensual responses and 62.28 for nonconsensual responses, $t(45) = 5.65$, $p < .0001$. This difference was consistent: For 36 items, confidence was higher for the consensual response than for the nonconsensual response, in comparison with 10 items in which the pattern was reversed, $p < .0001$, by a binomial test. Across the 46 items, confidence in the consensual response correlated .72 with item consensus, $p < .0001$. The respective correlation for the nonconsensual response was -.19, $p < .21$. These results are in line with the idea that participants sample representations from a largely shared population of representations, and that when a participant *happens to draw* a sample whose valence polarity deviates from that implied by the population, his/her confidence should be relatively low.

Because the confidence means for consensual and nonconsensual responses were based each on different participants, the possibility exists that the results just presented reflect a between-individual effect: Participants who tend to choose consensual responses tend also to use relatively high confidence judgments. Consistent with previous findings (e.g., Stankov & Crawford, 1997), there were marked and reliable individual differences in the tendency to make relatively high or relatively low confidence judgments. Thus, when mean confidence was calculated for each participant for each of the seven blocks, the correlations across participants between the means for different blocks averaged .94. To control for these interparticipant differences, the confidence judgments of each participant were standardized so that the mean and standard deviation of each participant were the same as those of the raw scores across all participants. The results were very similar to those obtained with the raw scores and will not be presented. These results suggest that the pattern depicted in Figure 4A is not due to chronic between-participant differences.

In sum, participants expressed stronger confidence when they chose the consensual response than when they chose the nonconsensual response. Note that this pattern was relatively consistent across items so that for each item those individuals who made the consensual choice tended to express greater confidence than those who made the nonconsensual choice.

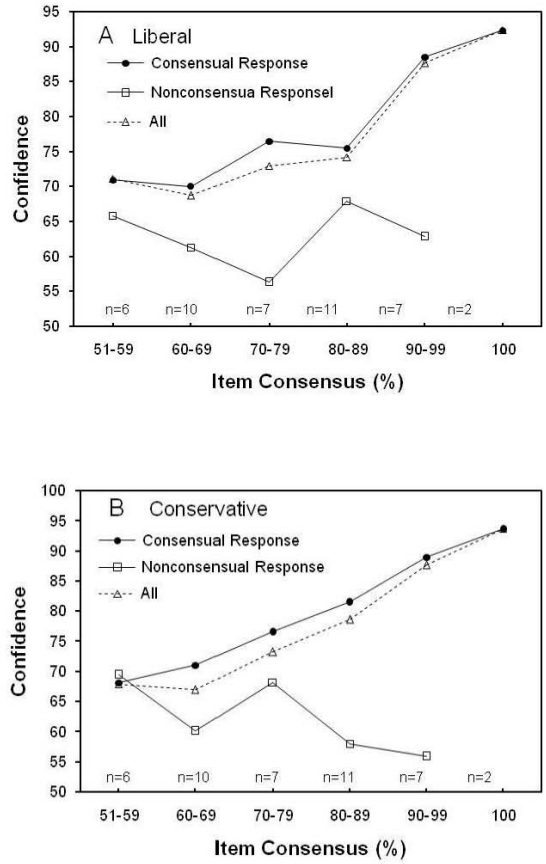

FIGURE 5. Mean confidence judgments in Block 1 for consensual and nonconsensual responses and for all responses combined as a function of item consensus (the percentage of participants who chose the majority response). The results are plotted separately for participants with more liberal attitudes (panel A) and those with more conservative attitudes (Panel B).

Response Latency as a Function of Cross-Person Consensus. Similar analyses were conducted for response latency, and are presented in Figure 4B. The pattern mimics largely the pattern obtained for confidence. Mean overall latency tended to decrease with item consensus. The correlation between mean latency and item consensus was -.44 across the 48 items, $p < .005$. However, response latency was longer for nonconsensual than for consensual responses: Across 45 items for which response latencies were available for both consensual and nonconsensual responses (all participants chose the consensual response for 3 items, after eliminating outlier responses), mean response latency was 3.85 for nonconsensual responses, and 2.86s for consensual responses, $t(44) = 3.13$, $p < .01$. For 35 items, response latency was longer for nonconsensual responses than for consensual responses, in comparison with 10 items in which the pattern was reversed, $p < .0005$, by a binomial test. When response latencies were first standardized to control for individual differences, the results were very similar to those presented in Figure 4B.

We should note that when mean (raw) confidence and response latency were calculated for each participant in Block 1, the correlation between them across participants was -.20, *ns*. This result accords with the proposition that confidence and response latency are relatively independent in a between-individual analysis

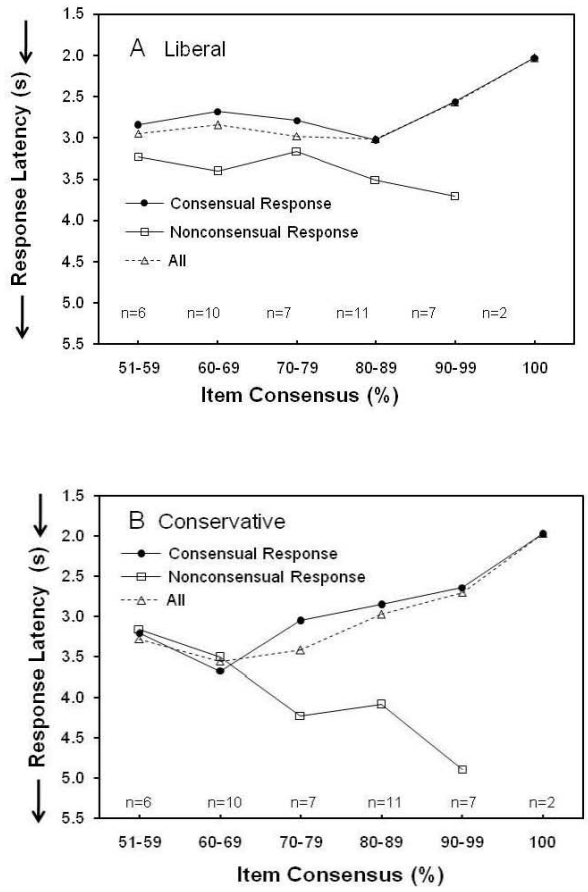

FIGURE 6. Mean response latency in Block 1 for consensual and nonconsensual responses and for all responses combined as a function of item consensus (the percentage of participants who chose the majority response). The results are plotted separately for participants with more liberal attitudes (panel A) and those with more conservative attitudes (Panel B).

(Bassili, 1996). However, recall that the within-person correlation between confidence and latency averaged -.39 ($p < .0001$) across participants in Block 1.

Individual Differences in Attitudes

The results on the effects of interparticipant consensus may seem surprising in view of the consistent individual differences in social attitudes. Because the items used in this study were taken from a scale that measures individual differences in conservatism, it is of interest to examine the results for participants who differ in their attitudes. In particular, is it plausible to assume that in responding to an attitude statement, participants who are more conservative and those who are more liberal sample their representations from a commonly shared pool of representations?

To examine the effects of reliable individual-differences, the responses for each participant in Block 1 were scored on conservatism, and the total score for each participant was determined across all 48 items. On the basis of the item-total correlations, 5 items with very low correlations were eliminated. The total score for

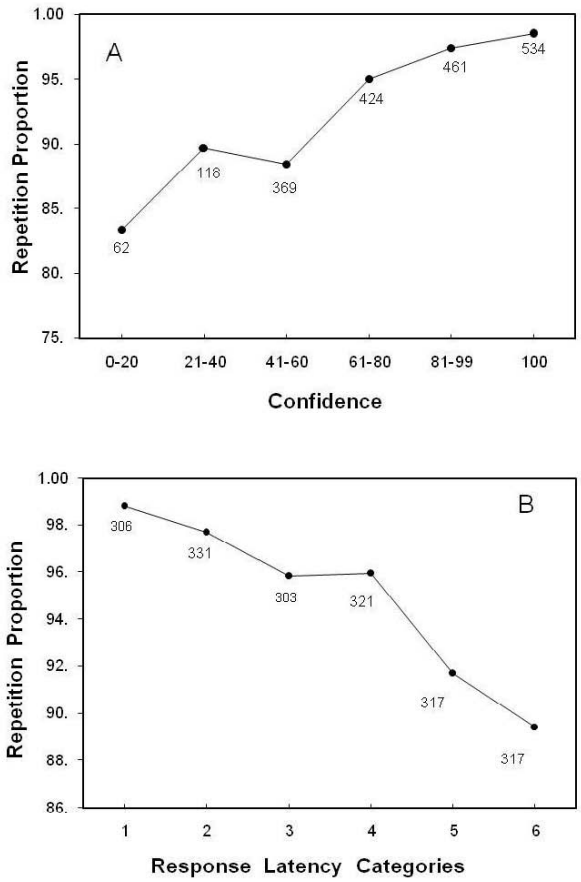

FIGURE 7. Panel A presents the likelihood of repeating Block-1 responses as a function of confidence in these responses in that block. Indicated also is the number of observations in each confidence category. Panel B presents the same data for response latency.

the remaining 43 items were used as a Conservatism-Liberalism (CL) scale, with higher scores indicating conservatism. The Cronbach Alpha reliability for this scale was .71. The CL scores ranged from 12 to 31 across participants. Participants were divided into two groups with 21 participants with a score of 18 or less, as "Liberal," and 20 participants with a score of 19 or more as "Conservative."

The following analyses focused on the results from Block 1, and only on the 43 items included in the scale. We defined responses as consensual or nonconsensual on the basis of the responses of all participants. In Figure 5 we present the results in a format similar to that of Figure 4A, but calculated separately for the Liberal and Conservative groups. It can be seen that the pattern of results is quite similar across the two groups, and is also similar to that obtained across all participants (Figure 4A). For the Liberal group confidence in the consensual and nonconsensual responses averaged 77.83 and 64.25, respectively, $t(20) = 8.69$, $p < .0001$. The respective means for the Conservative group were 80.05 and 63.46, respectively, $t(19) = 12.49$, $p < .0001$.

A similar analysis was carried out for response latency (see Figure 6). Again, the pattern was roughly similar for the two groups. For the Liberal group response latency for the consensual and nonconsensual responses averaged 2.74s and 3.31s,

respectively, $t(20) = 2.37$, $p < .05$. The respective means for the Conservative group were 2.96 and 3.64, respectively, $t(19) = 4.10$, $p < .001$. Thus, the two groups of participants yielded the expected separation between consensual and nonconsensual responses despite the fact that consensuality was defined on the basis of the results across the two groups.

We also repeated the analyses but with consensuality defined separately for each of the two groups. The results were very similar to those reported above and will not be described.

In sum, despite the existence of reliable individual differences in conservatism, the results for participants scoring high and low on their general attitudes were very similar and did not differ from those obtained for the entire sample. Presumably, despite some systematic differences in the representations retrieved from memory, there is a core of representations that is shared by all participants. It is this core that seems to contribute to the classification of responses as consensual or nonconsensual and to the different levels of confidence and response latencies associated with these responses.

Cross-Person Consensus and Within-Person Consistency

Underlying the analyses of cross-person consensus is the assumption that the representations associated with an item are commonly shared by and large. This assumption implies that properties of items, notably, the likelihood of choosing the majority response and confidence in that response, are reliable across participants. Interparticipant reliability for Block 1 was assessed using Cronbach's alpha coefficient (Crocker & Algina, 1986), which yielded a coefficient of .96 for response choice and .90 for confidence judgments. These coefficients are remarkably high, supporting the assumption that participants base their choice and confidence on representations that are commonly shared.

The results on within-person consistency, in turn, were based on the assumption that participants also draw representations from the same population across repeated presentations of an item. Therefore a correlation may be expected between consistency and consensus: Responses that are consistently chosen by the same person should also be more likely to be selected by others.

To examine this possibility, we calculated for each participant two scores for each item: (a) The proportion of times that the response made in Block 1 was repeated across the subsequent 6 blocks, and (b) the proportion of *other* participants (out of 40) who made that response in Block 1. These two scores were then averaged for each item across participants. The correlation between them (across the 48 items) averages .52, $p < .0001$. Also, the confidence of a participant in the response made in Block 1 predicted the likelihood that that response would be made by other participants: The correlation was .83, $p < .0001$. These high correlations suggest that indeed consistency and consensus reflect roughly the same parameter associated with a choice, a parameter that is relevant to confidence in that choice.

Confidence and Latency as Predictors of Reproducibility

In this final section we examine the general idea that attitudinal judgments are based on the sampling of representations, and that confidence as well as response

latency monitor the likelihood that a new sample of representations will yield the same choice.

The confidence judgments in Block 1 were grouped into 6 categories, and repetition proportion—the likelihood of making the same response over the subsequent 6 blocks—was calculated across all participants. The results, pooled across participants and items, are presented in Figure 7A. Indicated in this figure is also the number of observations in each category. The function is generally monotonic, indicating that response repetition increases with confidence in Block 1. The Spearman rank-order correlation over the 6 values was .95, $p < .005$.

Similar analyses were carried out for response latency. The response latencies in Block 1 were grouped into six categories of about the same frequencies across all participants. Figure 7B presents mean repetition proportion as a function of response latency. The function is monotonic: The Spearman rank-order correlation across the 6 points was -.94, significantly different from 0, $p < .0001$.

GENERAL DISCUSSION

The present study addressed a recent debate regarding the way in which attitudes should be conceptualized. In the traditional view, social attitudes are conceived as *enduring predispositions* that are relatively stable over time. In contrast, more recent discussions advocate the *attitude-as-construction* view according to which attitudinal judgments are constructed on the spot on the basis of the information accessible when making the judgment (Schwarz, 2007; Wilson & Hodges, 1992). Research has provided evidence in support of both views. On the one hand, many attitudes are quite stable and rarely change in the course of daily life. On the other hand, several studies indicated that people can be made to change their attitudes in response to simple experimental manipulations.

In this study we proposed a conceptual framework that integrates both views, taking advantage of two measures of attitude strength—confidence and response latency—to obtain some clues about the process underlying the construction of attitudinal judgments. With regard to the attitudinal judgments themselves, the results documented both their stability as well as their variability across repeated presentations. On the one hand, there was a great deal of intraperson reliability in responding to the same item across different presentations. On the other hand, the results clearly indicated a certain degree of within-person variability in the response to the same item across presentations. What is notable, however, is that the certainty in one's attitudinal judgment and the latency of forming that judgment were found to be sensitive to both the stable and variable aspects of attitudinal judgments, providing a clue to the on-line construction of these judgments. Both certainty and latency yielded a pattern of results that accord with the sampling model of attitude construction.

In what follows, we first consider the propositions regarding the determinants of attitude certainty. We then examine how attitude certainty helps track the processes underlying attitude construction.

The Bases of Attitude Certainty

In discussions of attitude strength the question was raised whether properties of an attitude, such as its certainty or intensity are stored in memory. Bassili (1996) proposed that even if attitudes are represented in memory as an association between an object and a summary evaluation (Fazio, 1995) it is implausible that attitude properties ("meta-attitudes") are also represented in memory and are read out by the participant directly. The position that attitude certainty is represented in memory is analogous to the direct-access approach in metacognition (see Schwartz, 1994), according to which metacognitive judgments, such as the feeling of knowing, are based on a direct retrieval from memory (Hart, 1965). Most researchers in metacognition, however, subscribe today to the cue utilization approach according to which metacognitive judgments are inferential in nature, constructed *ad hoc* on the basis of a variety of cues (Benjamin & Bjork, 1996; Koriat, 1997). Assuming that attitude certainty is also based on inference, what are the cues that contribute to the degree of conviction in one's attitudinal judgment?

The sampling model proposed adopted the basic tenet of SCM that the mnemonic cue for validity is reliability. SCM assumes that confidence in the truth of an assertion is based on the consistency with which that assertion is supported by the considerations that come to mind. In this study we assumed that this is also true for attitude certainty: Once an attitude evaluation has been constructed, degree of certainty is based on mnemonic cues that disclose the extent to which that evaluation was consistently supported. These cues include the amount of doubt or conflict experienced and the amount of time invested in making a choice. Because the attitudinal evaluation formed as well as the certainty in that evaluation are based on-line on roughly the same information, certainty assessments can help track the dynamics of attitude construction.

As far as the underlying process is concerned, the sampling model incorporates the assumption that people behave like intuitive statisticians who make inferences about a population on the basis of a limited sample. The assessment of certainty was assumed to have much in common with statistical inference: Participants draw a sample of representations, evaluate their implications, and form their attitudinal evaluation. Confidence in their evaluation depends on the extent to which various representations converge in supporting or leaning toward one response option rather than the other. Thus, in the same way that statistical level of confidence depends on sample variance, subjective confidence is assumed also to monitor the variability or consistency among the subdecisions implied by the sampled representations.

Also, in the same way that statistical level of confidence represents an assessment of the likelihood that the same conclusion will be reached if a new sample is drawn, subjective confidence also reflects an assessment of the reproducibility of the judgment. Indeed, confidence in the judgment made in Block 1 for a particular item predicted rather well the likelihood of making the same judgment in subsequent blocks (Figure 7A). The same was true for response latency. Thus, both confidence and latency predict the likelihood that an evaluation that is formed in one encounter with an attitude object will persist in a subsequent encounter with that object.

Stability and Variation in Attitudinal Judgments

The sampling model proposed attempted to account for both stability and variation in attitudinal judgments. It assumes that even in the absence of external influences, some random fluctuation may occur in the specific representations that are *accessible* at the time of making a judgment. Given the cognitive constraints on the number of representations that can be retrieved and consulted at any moment, the fluctuation in the accessible samples may result in some variability in the attitude judgment. At the same time, however, some degree of commonality was assumed to transpire across the samples of representations drawn by the same person on different occasions and also by different people. This commonality was seen to reflect the characteristics of the representations that are *available* in memory in connection with the attitude statement, in particular the proportion of representations favoring the dominant, majority choice (p_{maj}). This proportion necessarily constrains the distribution of the valences of any random sample of representations drawn from that population. For example, in this study, 90% of the items on average elicited the same response across the seven blocks, and two items elicited the same response from all participants. These items may have activated the same sample of representations across repetitions or across participants, but they may have also activated different samples of representations that favored the same choice. It was assumed that the likelihood of making the majority choice (the frequent or consensual choice) is indicative of the degree to which the population of representations associated with an attitude statement is biased in favor of the majority option.

To allow testable predictions, it was necessary to obtain an estimate of pc_{maj}—the likelihood of choosing the majority response. Two different indexes were used, one based on within-person consistency and the other based on cross-person consensus. Each of these indexes has its own limitations. However, it is impressive that both yielded roughly the same pattern of results. Let us examine first the results concerning within-person consistency.

Within-Person Response Consistency as Reflected in Confidence and Response Latency

The predictions of the sampling model concerning the within-person relationship between confidence and response consistency were clearly confirmed. First, mean confidence associated with an item increased with increasing within-person consistency, reflecting the stable aspects of attitudinal judgments. Consistent with the model, average confidence in the response to an attitude object was found to be diagnostic of the amount of possible fluctuation in attitudinal judgments. In the extreme case, confidence was highest when little fluctuation occurred.

In addition, however, the more frequent attitudinal judgments were associated with stronger confidence than the less frequent judgments, and for the former judgments confidence increased with item consistency. This pattern discloses the variable aspects of attitude construction: Confidence is higher when the response is consistent with what follows from the entire population of representations than when it deviates from it. What is notable is that this is true even in Block 1: A Block-1 judgment that is repeated less often in subsequent blocks is associated with lower confidence than one that is repeated more often.

The results for response latency also disclosed a similar pattern to that found for confidence, consistent with the results of the simulation experiment (Figure 2A). These results suggest that it takes longer to "reach" the choice that departs from the most frequent choice.

On the whole, the results accord with the assumption that people construct their attitudinal judgment on the spot by drawing a small sample of representations from the same population of representations associated with the object. Clearly, there is no question that some systematic changes take place in choice and confidence across repeated presentations (see e.g., Hasher, Goldstein, & Toppino, 1977; Holland et al., 2003; Shaw, 1996). But it would seem that despite these changes, the population of representations from which people draw their sample is more or less the same across different encounters with the item.

Cross-Person Consensus as Reflected in Confidence and Response Latency

The pattern obtained for response consistency was replicated by the results for response consensus. A clear difference was observed between confidence in majority (consensual) and minority (nonconsensual) responses. In addition, whereas for the former responses, confidence increased with item consensus, for the latter it decreased with item consensus (Figure 4A). The results for response latency yielded a very similar pattern to that observed for confidence, indicating a clear separation between majority and minority judgments (Figure 4B).

These results were expected on the basis of the assumption that there is some overlap between the data bases from which different people draw their sample of representations when forming an attitudinal judgment. Therefore, information about items that is aggregated across individuals, notably the distribution of different choices, can provide some clues regarding the processes that occur within individuals. Thus, consistent with predictions, confidence decreased as a function of the deviation of the individual's attitudinal judgments from the group judgment.

The assumption of a commonly shared population of representations underlying social attitudes may seem odd in view of the consistent individual differences generally found in social attitudes. However, this assumption was supported by two observations. First, very similar patterns of results were obtained for participants who differed in their liberal-conservative attitudes (Figures 5 and 6). Possibly, some overlap exists between individuals in the type of considerations that an item brings to mind even if these considerations sometimes yield different judgments.

A second observation concerns the reliability of interitem differences. The assumption that the representations associated with an item are commonly shared is supported by the observation that attitudinal judgments and the confidence associated with them were quite reliable across participants. The Cronbach coefficient for interparticipant reliability was .90 for confidence and .96 for latency. In addition, responses that were made consistently by the same person across blocks were more likely to be chosen by other participants than those that were selected less consistently.

We shall now discuss several general issues that derive from these findings.

The Relationship between Confidence and Response Latency

The present study is correlational in nature. However, unlike many correlational investigations of attitude strength, which focused on between-individual relationships, the focus of this study was on within-person relationships. These relationships were assumed to provide information about the construction of attitudinal judgments. The focus of previous studies on cross-person correlations (e.g., Bassili, 1996; Krosnick et al., 1993) is understandable in view of the interest in individual differences in social attitudes and their strength. However, it should be stressed that the correlations that emerge in the analysis of between-individual differences do not mimic always the within-person correlations between the same variables. To cite an example from the forensic area, the actual correlation between confidence and accuracy is very low when calculated across witnesses (see Wells, Memon, & Penrod, 2006). One reason is that there are reliable individual differences in confidence that are not always diagnostic of differences in accuracy (Stankov & Crawford, 1997). In contrast, the within-person confidence-accuracy correlation is generally moderate-to-high (e.g., Koriat & Goldsmith, 1996).

We mention this point because in the between-individual correlations reported by Bassili (1996; see also Krosnick et al., 1993), attitude certainty and response latency were found to load on separate factors. In contrast, our simulation results (Figure 1) indicated that confidence and latency are intimately tied, presumably because both reflect differences in self-consistency. The empirical results also indicated that the effects obtained for response speed mirror closely the pattern obtained for confidence judgments.

A related issue concerns Bassili's (1996) argument that confidence and response latency represent two different types of measures of attitude strength—meta-attitudinal judgments and operative indexes, respectively. Meta-attitudinal judgments are respondents' impressions of their own attitudes (e.g., its importance, certainty, etc.). Operative indexes, in contrast, are derived from the judgment process itself or from its outcomes. This distinction was related by Bassili to Greenwald and Banaji's (1995) distinction between direct and indirect measures of cognitive processes. Bassili argued that operative measures have an advantage over meta-attitudinal measures "because they stem from the same cognitive representations and information processing responsible for judgmental and behavioral manifestations of the attitude" (p. 638).

However, according to the view that we presented, attitude certainty is also based on the feedback from the process underlying attitudinal judgments. In fact, the commonly held view in metacognition (see Benjamin & Bjork, 1996; Koriat, 2000) is that metacognitive feelings are based on heuristics and mnemonics that operate below full consciousness to produce a sheer feeling of knowing or a feeling of certainty. Thus, for example, the ease with which a task is performed and the amount of time invested were seen to affect subjective confidence directly and implicitly (see Kelley & Lindsay, 1993; Koriat & Ackerman, 2010; Koriat et al., 2006; Robinson et al., 1997). Therefore, it was argued that although metacognitive judgments are explicit and conscious, their basis is generally implicit and unconscious (Koriat, 2000). On the basis of his results, Bassili (1996) concluded that attitude certainty and response latency constitute "the two stars among measures of attitude strength" (p. 649). In the present study these two measures are assumed to

be strongly related, yielding similar information about the dynamics of attitude construal.

Attitude Certainty in Moderating the Predictive Validity of Attitudinal Judgments

What are the implications of the present study regarding the usefulness of confidence as a measure of attitude strength? It has been argued (and found) that attitude strength, as measured by confidence and latency, predict the likelihood that an attitude is translated into action. Confidence and latency also predict the pliability and stability of social attitudes (Bassili, 1996; Davidson et al., 1985; Fazio & Zanna, 1978; Krosnick et al., 1993). However, as Schwarz (2007) noted, an attitude assessed at one time is unlikely to predict behavior at a later time if the attitude does not persist over the time interval. In fact, the results of the present study suggest that confidence in a particular attitudinal judgment can be quite misleading regarding the strength of the person's overall attitude toward a particular object (see Figure 3A). Thus, the conclusion is that repeated measurement of one's evaluation is essential for extracting the stable properties of one's attitude toward a specific object (Bassili & Krosnick, 2000). And when repeated measurements are taken, the attitude associated with higher confidence has greater predictive validity.

Let us examine this proposition in some detail. Consider two judgments obtained in two points in time (without intervening manipulations that may change the data base on which the attitudinal judgments are based). Let us label these judgments J1 and J2, respectively, and their associated confidence judgments as C1 and C2, respectively. C1 can be high only if (a) p_{maj} is relatively high, and (b) J1 is based on a majority sample. In that case, chances are high that J2 will be the same as J1, because it will also be based on a majority sample. Thus, high confidence predicts a repetition of the same attitudinal judgment and possibly a behavior that is consistent with J1.

What happens when C1 is low? This can occur under two conditions. Either p_{maj} is relatively low or p_{maj} is relatively high but J1 is based on a minority sample. In either case, the chances that J2 will be the same as J1 are low. However, the two conditions differ: In the latter condition, when J1 happens to be based on a minority sample, the chances are that J2 will be based on a majority sample, yielding the opposite attitudinal judgment of J1. Thus, a low C1 will be associated with a shift in one's judgment from the first measurement period to the second measurement period. Because J2 will tend to be associated with higher confidence than J1, J2 would be more likely to be expressed in behavior. Thus, J1 would be counterpredictive: It may predict an action that is opposite to that implied by J1.

These two conditions can be distinguished in terms of what happens when a third judgment (J3) is taken. When C2 is measurably higher than C1 (presumably because it is based on a majority sample), chances are higher that J3 will be the same as J2 than when C2 is not much higher than C1. A large difference between C1 and C2 can occur also when J1 is based on a majority sample and J2 on a minority sample. Thus, more generally, when the difference in confidence between J1 and J2 is high, chances are that J3 will be the same as J1 or J2 depending on which of them is associated with higher confidence.

Unfortunately, these predictions could not be tested empirically in the present study because there were not enough observations for each participant that exhibit the different profiles of confidence judgments. However, they are worth testing, perhaps with a larger number of participants and items. What is important to note is that in a repeated-measurement design, the history of participants' choices and confidence are expected to be diagnostic of the samples of representations underlying each attitudinal judgment.

Another cue that may indicate whether J1 is based on a minority or a majority sample is the consensuality of the response. Assuming that nonconsensual judgments are more likely to be based on a minority sample for each participant than consensual judgments, we examined the possibility that nonconsensual judgments are less predictive of future responses than consensual judgments. To examine this possibility, all Block-1 responses were scored as consensual or nonconsensual for each participant on the basis of the results across all participants in Block 1. The proportion of response repetition was 86.08 for nonconsensual responses, and 96.75 for consensual responses, $t(40) = 5.36$, $p < .0001$. These results are consistent with the idea that a majority response has a higher predictive validity than a minority response.

The Notions of "Latent" Attitudes and of Measurement Error

Many discussions of attitude measurement (for a review, see Krosnick, Judd, & Wittenbrink, 2005) have treated attitudes as latent psychological constructs that cannot be observed directly and must be inferred from observed responses. Part of the fluctuations in attitudinal judgments has been attributed to measurement errors because measures of attitudes reflect imperfectly the latent attitudes.

The present conceptualization, in contrast, implies a different view which derives from the assumption that the respondent himself or herself is a measuring instrument. In constructing an attitudinal evaluation, the respondent is in a similar position to that of a statistician who must infer a central tendency of a population on the basis of a limited sample of observations. Because the number of representations that are accessible to the respondent at any point in time is quite small, there is always some degree of uncertainty in the extent to which the evaluation formed accords with the evaluation that is implied by the entire population. Thus, uncertainty (or "error") is inherent in the sampling process underlying attitude construction. Confidence judgments, however, provide a clue to the degree of inferential uncertainty involved, in the same way that statistical level of confidence provides some information about the extent to which a result can be trusted to be replicable. Thus, the respondent is portrayed as an intuitive statistician who engages in inference at both the cognitive and metacognitive level. Not only does the respondent attempt to infer the evaluation that is consistent with the population of representations, but also to assess the likelihood that a new sample of representations will yield the same conclusion. Of course this is not to deny the possibility that the attitude judgment elicited in a *particular* occasion is also subject to an experimental measurement error.

In this view, a "latent" attitude might be defined as the attitude that is implied by the entire population of available and potentially accessible representations that is associated with the attitude object at a specific period of time. Such hypothetical

construct is expected to determine (a) the *modal* attitudinal judgment across repeated measurements, and (b) the likelihood of a *deviant* or *minority* judgment.

The Observed Relationship between Confidence and Consensus

The present study yielded a systematic relationship between confidence and consensus. Participants were found to express stronger confidence in their judgments when these judgments agreed with those that are consensually endorsed. This observation is actually in line with findings in social psychology that suggest a *causal* relationship between social consensus and confidence. For example, Orive (1988) found that participants who learned that their fellow participants largely shared their views expressed greater confidence in their judgments regarding sentencing in a criminal case. Also, Luus and Wells (1994) found that eyewitness confidence was enhanced markedly when witnesses learned that another person corroborated their identification. In a study by Petrocelli et al. (2007), participants who learned that most others agreed with their attitude, expressed greater certainty in the correctness of their attitude than those who learned that most others disagreed with them. Similar findings were reported by Visser and Mirabile (2004), and more recently, by Clarkson, Tormala, DeSensi, and Wheeler (2009). These findings are consistent with social comparison theory, which assumes that when objective criteria are absent, people assess the correctness of their views by comparing their own attitudes to those around them (e.g., Festinger, 1950). They are also in line with Fazio's (1979) proposal that social consensus may be taken to reflect validity, signaling that all evidence points in the same direction.

In view of the experimental evidence testifying for a causal link between confidence and perceived social consensus, it is important to stress that SCM does not posit a *direct* link between confidence and interperson agreement. Rather, the critical determinant of confidence is self-consistency, or agreement with oneself, rather than agreement with others. The relationship between confidence and consensus derives from the assumption that participants who share the same experience draw representations from a commonly shared pool of clues and considerations. Because of that, responses that are associated with higher self-consistency are likely to be endorsed by a larger proportion of participants than responses that are associated with lower self-consistency. Thus, the confidence-consensus relationship that was documented in this study is assumed to be a by-product of the *causal* link between self-consistency and confidence. Indeed, the expected pattern relating confidence to item consensus for majority and minority responses (see Figure 2A) was derived from a binomial distribution that does not assume any dependence between observations.

The same argument holds true with regard to response latency. It has been observed that participants who hold a minority opinion tend to express that opinion less quickly than people who hold the majority opinion (Bassili, 2003). This "minority slowness effect" was attributed to social inhibition that derives from conformity pressures. This interpretation assumes a direct influence of agreement or disagreement with others on the speed of expressing an opinion. In this study, however, we found a similar relationship between consensus and response latency that is independent of any direct effects of social consensus. Furthermore, a "mi-

nority slowness effect" was demonstrated even within-person: People took longer to form an attitudinal judgment that deviates from their own modal judgment.

Clearly, there is no question that perceived or actual agreement with others may enhance one's confidence in one's beliefs and attitudes, and may also affect the speed with which a person expresses his or her opinion. However, researchers should bear in mind that a consensuality-confidence correlation and a consensuality-latency correlation should be expected in the absence of any direct social influences (see Koriat, 2008).

Possible Behavioral Implications of Subjective Convictions

It has been claimed that understanding the processes underlying confidence in beliefs and attitudes is important, because confidence affects the likelihood that people translate their beliefs into behavior (Gill, Swann, & Silvera, 1998; Goldsmith & Koriat, 2008; Hall, Ariss, & Todorov, 2007). Indeed, several studies indicated that confidence has behavioral consequences (e.g., Fischhoff, Slovic, & Lichtenstein, 1977; Koriat & Goldsmith, 1996).

What are the behavioral implications of the confidence findings observed in this study? One implication derives from the relationship just discussed between confidence and consensus. This relationship implies that participants will be more likely to act on the basis of their attitudes when these attitudes coincide with the consensual attitudes than when they do not. Indeed, in one experiment (Koriat, 2011a; Experiment 3), participants were asked to wager a sum of money (between 0 and 10 Israeli Shekels) on the correctness of their answers. The amount wagered was higher for consensual than for nonconsensual answers and this was true both when the answer was correct and when it was wrong. Thus, possibly the sampling model of attitude construction has implications for the conditions in which a person is likely to act rather than refrain from acting, and for the likelihood that the action taken is likely to lead to a positive or a negative outcome.

Note again that these predictions are independent of any direct influences on one's tendency to act. In fact, the fluctuations in one's choices that have been predicted and observed in this study suggest that on those occasions in which one's decision happens to agree with the consensual decision, one would be more likely to act on that decision than when one's decision happens to depart from the consensual decision.

Another general implication of the model derives from the assumption that reliability is used as a cue for validity. Reliance on reliability as a cue for the validity of one's beliefs and evaluations is bound to foster unwarranted convictions in the correctness of one's beliefs and evaluations. There are many factors that may enhance reliability and self-consistency. Closed-minded individuals, with clear views about specific social objects or issues, are likely to sample clues from a biased pool of ideas and recollections. The persistent recurrence of these cues may instill a feeling of certainty in one's beliefs and attitudes, reinforcing further one's attitudes. When it comes to real-world knowledge, reliability is generally diagnostic of validity: An answer that is consistently supported across several considerations that come to mind is more likely to be correct than one that receives less consistent support. Such is not necessarily the case for social beliefs and social attitudes. The fact that whenever a person thinks about Muslims memories of terrorist attacks comes

to mind does not prove that all Muslims are terrorists. However, it may strengthen the person's assurance that such is indeed the case. Investigation of the factors that contribute to inflated self-consistency may provide a clue to the dynamics underlying very strong, sometimes unwarranted, subjective convictions.

In conclusion, the sampling model that was proposed and tested in this study is clearly over simple and does not make due allowance to the complexity of the processes involved in attitude construction. Furthermore, the main parameters of the model were fixed at certain values that were selected arbitrarily. Nevertheless the model brought to the fore certain gross aspects of the process that were largely supported by the observations.

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