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Views That Are Shared With Others Are Expressed With Greater Confidence and Greater Fluency Independent of Any Social Influence

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Abstract

Research on group influence has yielded a prototypical majority effect (PME): Majority views are endorsed faster and with greater confidence than minority views, with the difference increasing with majority size. The PME was attributed to conformity pressure enhancing confidence in consensual views and causing inhibition in venturing deviant opinions. Our results, however, indicate that PME for binary choices can arise from the process underlying confidence and latency independent of social influence. PME was demonstrated for tasks and conditions that are stripped of social relevance; it was observed in within-individual analyses in contrasting the individual's more frequent and less frequent responses to the same item, and was found for the predictions of others' responses. A self-consistency model, which assumes that choice and confidence are based on the sampling of representations from a commonly shared pool of representations, yielded a PME for confidence and latency. Behavioral implications of the results are discussed.

Keywords

conformity, confidence, metacognition, minority slowness effect, self-consistency model

Social influence has been a central theme in social psychology beginning in the 1950s and continuing to the present day (see Levine & Prislin, 2013). Extensive research has documented dramatic effects of group consensus on the judgments of individual members. The classic studies of Asch (1951, 1955, 1956) demonstrated the powerful conflicts created by disagreement with the opinions of others. Ever since these studies, majority opinions have been found to exert direct influence on individual judgments in many domains. Group consensus was found to be critical: Even a single person giving the correct answer, thereby breaking group unanimity, dramatically reduced conformity to the erroneous majority (Allen & Levine, 1969; Asch, 1951).

The Effects of Group Consensus on Confidence and Response Fluency

Whereas most studies on group influence have concerned object-level performance—the actual views and behaviors demonstrated by individuals—several studies have focused on two meta-level indicators, the subjective confidence in one's judgments, and the speed with which these judgments are made. Let us examine the pertinent research and theorizing.

Subjective Confidence

More than 70 years ago, Johnson (1940) noted that "group confidence is directly related to group agreement" (p. 219; see Orive, 1988a): Group members tend to hold their opinions and attitudes with greater confidence when they perceive agreement in the group. Asch (1951) also noted that one of the effects of a unanimous majority was sometimes the loss of confidence in one's minority (correct) judgment. Indeed, several studies demonstrated the effects of group consensus on the subjective confidence in one's judgments (Erb & Bohner, 2001; Prislin & Wood, 2005; see Crano & Prislin, 2006, for a review). These effects are consistent with social comparison theory, which assumes that people have a basic drive to ascertain that their opinions are correct (Festinger, 1954). When objective criteria for the truth of a perception or a belief are absent, people validate their beliefs

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or perceptions against those of others. The social comparison process would be expected to enhance subjective confidence in the correctness of the shared beliefs and perceptions (Hogg, 2000; Sniezek & Henry, 1989). Conversely, deviations from the consensual views have been assumed to create uncertainty and tension (Stasser & Davis, 1981; Yaniv, Choshen-Hillel, & Milyavsky, 2009). Thus, social consensus is seen to play a causal role in supporting and enhancing one's confidence in beliefs, opinions, and attitudes.

Indeed, people express greater confidence in their views when they learn that others hold the same views (e.g., Clarkson, Tormala, DeSensi, & Wheeler, 2009; Luus & Wells, 1994; Orive, 1988b). For example, Petrocelli, Tormala, and Rucker (2007) asked participants to report their attitudes toward a topic. Those who learned that most others agreed with their attitude expressed greater confidence in their attitude than those who learned that most others disagreed with them (see also Clarkson et al., 2009; Visser & Mirabile, 2004). Confidence in an attitude or opinion was also found to increase as a function of the proportion of other members of the group who hold that attitude or opinion.

Two types of social influence have been distinguished: informational and normative (Cialdini & Goldstein, 2004; Deutsch & Gerard, 1955; Wood, 2000). Informational social influence is the tendency to use information from others as evidence about reality (Fazio, 1979). Normative social influence, in turn, occurs when one conforms to gain social approval and avoid social isolation. Social consensus has been assumed to enhance confidence through both informational influence and normative influence of the group (Fazio, 1979; Sniezek, 1992).

Response Fluency

The time it takes to make a judgment has been assumed to reflect one's confidence in that judgment. Indeed, confidence in an answer or a solution increases with the speed with which that answer or solution is reached (e.g., Koriat, Ma'ayan, & Nussinson, 2006; Robinson, Johnson, & Herndon, 1997; see Dunning, 2012). Confidence judgments also increase with manipulations that enhance the fluency with which an answer or a solution is reached (e.g., Alter, Oppenheimer, Epley, & Eyre, 2007; Kelley & Lindsay, 1993).

Like confidence, response latency has been found to vary with group consensus. A Minority Slowness Effect was observed across several studies (Bassili, 2003; Huge & Glynn, 2013): People who hold a minority opinion express that opinion less quickly than those who hold the majority opinion. According to Bassili, this effect reflects the social inhibition engendered by conformity pressures when one's opinion departs from what one assumes to be the majority position. This interpretation implies a direct influence of social consensus on the speed of expressing an opinion. In support of this notion, it was also found that the majority–minority difference in response speed increased as a function of the proportion of majority choices. Bassili referred to this increase as the "tell-tale correlation."

The Minority Slowness Effect has been replicated recently by Huge and Glynn (2013). Participants made like/dislike judgments in response to images depicting political and nonpolitical objects. They were found to take longer to respond when they made a minority response than when they made a majority response. This was true for both political and nonpolitical objects. As in Bassili's (2003) study, the difference in response latency between majority and minority responses increased with the size of the majority—the proportion of participants who made the majority response.

The tendency to inhibit expression of minority views may have social implications. In a meta-analysis of survey studies, Glynn, Hayes, and Shanahan (1997) examined the "spiral of silence" theory (Noelle-Neumann, 1974) according to which individuals who perceive that they are in the minority will feel pressure either to remain silent or to express the majority opinion. The results indicated a low but significant correlation between people's perception of support for their opinions and their willingness to express those opinions. It should be noted, however, that under some conditions, the expression of minority opinions is especially pronounced when individuals hold strong attitudes that deviate from those of the group (see Rios, 2012).

In sum, studies that focused on the effects of group consensus on confidence and response latency have documented what we shall term a *prototypical majority effect* (PME):

1. Majority responses are endorsed with greater confidence, and are expressed with shorter latencies than minority responses.
2. The difference between majority and minority responses in both confidence and response speed increases as a function of the size of the majority.

The typical interpretation of the majority effect is that it reflects a causal relationship: Group unanimity *influences* the confidence of individuals in their own views and the ease with which they express these views. As noted earlier, the influence can stem from the belief that group consensus is diagnostic of validity or from a tendency to yield to group pressure to evade social isolation.

The Present Proposal

The view advanced in this article, however, is that confidence and fluency are inherently linked to social consensus independent of any social influence. The link is correlational in nature and must be taken into account when studying the presumed effects of group consensus on confidence and response fluency. We will examine evidence suggesting a PME that is independent of external, group influence. This process-based, internally driven PME will be referred to as I-PME, in distinction from the

externally driven PME (E-PME) that has been assumed to derive from group influence.

In what follows, we first outline a model that accounts for the I-PME in terms of the process by which participants form their confidence in their choice (Koriat, 2012a). According to the model, confidence and response latency are bound to correlate with the consensuality of the choice, so that consensual (majority) responses should be endorsed with stronger confidence and faster response time than non-consensual, minority responses (Koriat, 2008a). We then review empirical evidence from three lines of investigation that demonstrated a PME pattern across a variety of domains. The hypothesis will be examined that this PME derives from an internal process that is independent of external, group influence.

The I-PME: Theoretical Account

Basic Assumptions

According to the self-consistency model (SCM), the process underlying two-alternative forced-choice (2AFC) decisions and the confidence in these decisions is bound to yield a PME pattern. SCM was originally developed to explain the accuracy of confidence judgments: Why confidence in a 2AFC decision is generally diagnostic of the accuracy of these decisions (see Dunlosky & Metcalfe, 2009; Koriat & Goldsmith, 1996). The attempt to answer this question, has led to a focus on the *basis* of confidence judgments. Hence, SCM has been extended later to account for confidence in 2AFC tasks for which the response has no truth-value, such as attitudes, beliefs, and preferences.

Let us outline the basic assumptions underlying SCM (for details, see Koriat, 2012a). SCM endorses the metaphor of the person as an intuitive statistician (Gigerenzer & Murray, 1987; Peterson & Beach, 1967; see McKenzie, 2005). People's confidence judgments are modeled by the classical procedures of calculating statistical levels of confidence when conclusions about a population are based on a sample of observations. It was proposed that when presented with a 2AFC item, it is by replicating the choice process several times that a person can appreciate the degree of doubt or certainty involved. Confidence is based essentially on the consistency with which different replications agree in favoring a particular decision (see Williams, Dunning, & Kruger, 2013); it represents an assessment of *reproducibility*—the likelihood that a new replication of the decision process will yield the same choice.

SCM was motivated by the curious observation that for tasks for which the response has a truth-value, a positive confidence-accuracy correlation was observed only across consensually correct (CC) items, for which the correct answer is the majority answer. In contrast, for consensually wrong (CW) items, for which most participants choose the wrong answer, the confidence-accuracy correlation is *negative*. This pattern has been observed for a word-matching task (Koriat, 1976), general knowledge (Koriat, 2008a), semantic memory (Brewer & Sampaio, 2012), perceptual judgments (Koriat, 2011), episodic memory (Brewer & Sampaio, 2006; Roediger & DeSoto, 2014), and the predictions of others' responses (Koriat, 2013). Response latency exhibited a similar pattern: Whereas CC items yielded the typical pattern of accuracy decreasing with response latency, CW items yielded the reverse relationship. These results were seen to support the consensuality principle (Koriat, 2008a)—that confidence judgments are correlated with the consensuality of the answer rather than with its accuracy.

SCM attempted to explain the relationship between confidence and consensuality. The first assumption is that the response to 2AFC items is generally constructed on the spot depending on clues and considerations that are accessible at the time of the judgment. Indeed, with regard to attitudes, it has been proposed that attitudes are formed on the spot and may vary depending on the person's current goals, mood, and context (Bless, Mackie, & Schwarz, 1992; Schwarz, 2007; Schwarz & Strack, 1991; Tourangeau, 1992). A similar proposal has been advanced with regard to personal preferences (Lichtenstein & Slovic, 2006; Slovic, 1995). SCM assumes that a similar constructive process underlies the choice of a response to 2AFC general information questions and perceptual judgments: Participants generally construct their response on the spot and may sometimes change that response from one occasion to another (Koriat, 2012a).

A second assumption is that people construct their response by drawing a small sample of representations (clues, considerations) from a population of representations that are associated with the item. The sampling assumption is common in many decision models (e.g., Fiedler & Juslin, 2006; Stewart, 2009; Tourangeau, 1992) that attempt to account for the variability in judgments across different occasions.[1] The number of representations accessed in making a decision may vary for different items (see Koriat, 2008b) but is assumed by SCM to be relatively small because of the cognitive difficulty in aggregating information across different clues to reach a final response.

A third assumption is that the population of clues from which participants sample their clues is largely commonly shared by participants with the same experience. In the case of general information and perceptual judgments, proponents of the ecological approach to cognition (Dhami, Hertwig, & Hoffrage, 2004; Gigerenzer, 2008) have stressed the idea that people's knowledge is not only shared but also generally accurate by virtue of people's adaptation to the environment. A similar idea underlies studies of the *wisdom of crowds*, which suggest that information that is aggregated across participants may be closer to the truth than the information provided by each participant (Galton, 1907; Surowiecki, 2005). In fact, in discussing his conformity results, Asch (1990) implied that people act under the

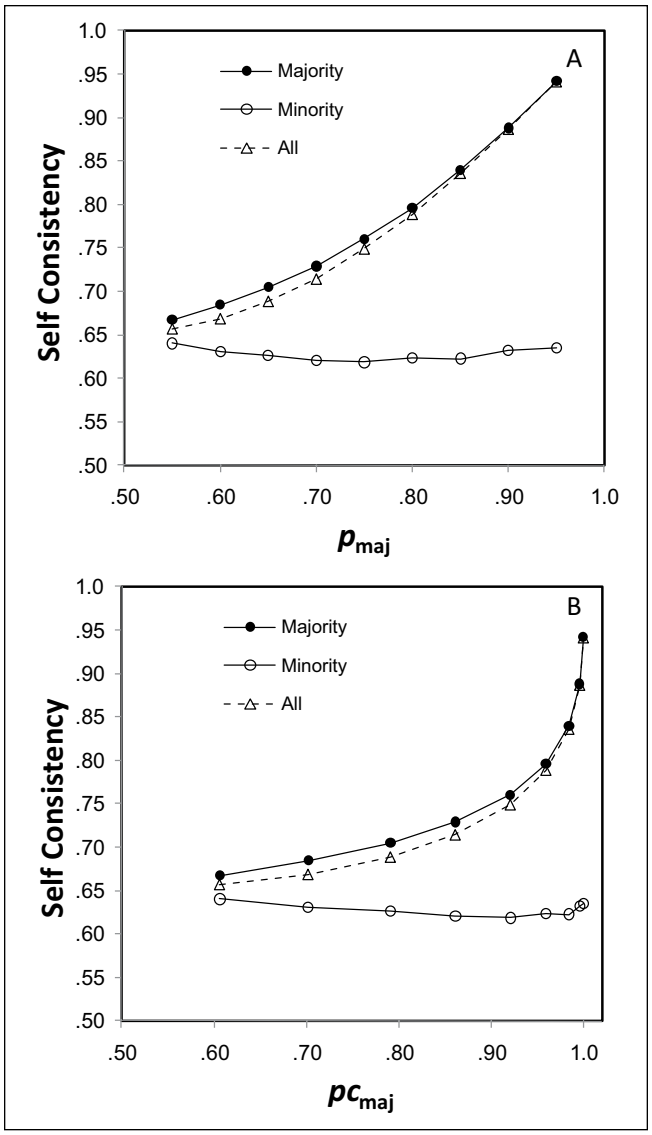

Figure 1. Self-consistency scores as a function of the probability of drawing a majority representation (*Pmaj*) based on the results of the simulation experiment (Panel A) and as a function of the probability of choosing the majority option (*PCmaj*; Panel B which was formed by replacing the p_{maj} values in Figure 1A with the corresponding pc_{maj} values.).

Source. Both panels are adapted with permission from "The Construction of Attitudinal Judgments: Evidence from Attitude Certainty and Response Latency," by Koriat and Adiv (2011). Copyright 2011 by Guilford Press.

assumption that judgments on which people agree tend to be valid.

The SCM of Subjective Confidence

Let us now examine the implications of these assumptions for confidence judgments and response latency. SCM assumes that when faced with a 2AFC item, participants retrieve a number of considerations and clues sequentially from memory and draw the implications of each clue for the decision (see Koriat & Sorka, 2015). Their ultimate decision is based on the balance of evidence in favor of the two options (Vickers, 2001; see Baranski & Petrusic, 1998, for a review). Confidence in the response is based primarily on self-consistency. Self-consistency represents a crude mnemonic cue that reflects the amount of deliberation and conflict experienced in making a choice, and can be captured by the proportion of clues that lean toward the chosen alternative (see Alba & Marmorstein, 1987; M. Ross, Buehler, & Karr, 1998). A detailed description of the model can be found elsewhere (Koriat, 2011, 2012a). Here, only a brief portrayal of a specific instantiation of the model will be presented. This instantiation is clearly over-simple but is sufficient for bringing to the fore the relationship between confidence, response latency, and consensus.

This instantiation assumes the following: (a) For each 2AFC item, a maximum number of representations (n_{max}) is sampled randomly. The term *representation* is used loosely to refer to any consideration, framing, interpretation, or clue that may tip the balance in favor of one option or the other. (b) Each representation yields a binary subdecision that favors one of the two options. (c) If a preset number (n_{run}) of successively retrieved representations yields the same subdecision, the retrieval of representations is stopped, and that subdecision determines the choice (see Audley, 1960). (d) Each subdecision makes an equal contribution to the ultimate overt decision and to a self-consistency index, which is assumed to underlie subjective confidence.

A simulation experiment was run to examine the implications of the model (see Koriat, 2012a; Koriat & Adiv, 2011). In this simulation, we assumed that each item can be characterized by a population of representations, with p_{maj}, denoting the proportion of representations that support the majority choice. We assumed a vector of nine binomial populations that differ in p_{maj}, with p_{maj} varying from .55 to .95, at .05 steps (assuming a uniform distribution of p_{maj}).

For each population, 90,000 iterations were run. In each iteration, a sample of representations was drawn with n_{max} set at 7, and n_{run} set at 3, so that the actual size of the sample (n_{act}) could vary between 3 and 7. The ultimate choice that was based on that sample was classified as "majority" when it corresponded to the majority value in the population and as "minority" when it corresponded to the minority value in the population. A self-consistency index was calculated for each iteration, defined as $1-\sqrt{\hat{p}\hat{q}}$ (range = .5-1.0), with p and q designating the proportion of representations favoring the two choices, respectively. Based on the simulation results, Figure 1A presents the self-consistency index for majority and minority choices and for all choices combined as a function of p_{maj}. Self-consistency is shown to increase monotonically with p_{maj}. More important, however, self-consistency is higher for majority than for minority choices. This is because as long as $p_{maj} > .50$, majority choices will be supported by a larger proportion of the sampled representations than

minority choices. Thus, the expectation is that confidence should be higher for majority choices than for minority choices.

Differences in p_{maj} can be expected to influence differences in pc_{maj}—the probability with which the majority alternative will be chosen either across individuals (consensus) or within-individuals across repeated presentations (consistency). Note that pc_{maj}, which can also be derived from the same simulation, is an accelerated function of p_{maj} (see Figure 1, Koriat, 2012a). When the p_{maj} values in Figure 1A are replaced with the corresponding pc_{maj} values, the results are those depicted in Figure 1B. It can be seen that the predicted pattern conforms to PME: Confidence is expected to be higher for majority than for minority responses, with the difference between the majority and the minority responses increasing with the size of the majority.

Basically, SCM predicts that when a random sample of representations *happens to favor* the majority alternative, confidence should be higher than when it happens to favor the minority alternative. The correlation between confidence and consensuality simply follows from the correlation between sample means and sample standard deviations (*SD*s): Samples that favor the majority choice should have smaller *SD*s (higher self-consistency) on average than samples that favor the minority choice. It should be stressed that the results of the simulation experiment (Figure 1B) were obtained under the assumption that each participant chooses the alternative that is favored by the *majority* of representations in *his* or *her* retrieved sample of representations.

We turn next to response latency. Assuming that response latency is a monotonic function of n_{act}, it can be shown that response speed should vary as a function of p_{maj} and pc_{maj} in much the same way as confidence judgments (see Figures 1A and 1B in supplementary material). The implication is that response latency should be longer for minority than for majority choices, with the discrepancy increasing with majority size. This is the gross pattern that was expected to follow from the inhibition-driven, Minority Slowness Effect (see Figure 1, Huge & Glynn, 2013).

In sum, a model that assumes a random sampling of representations from the same population predicts a PME pattern for both confidence and response speed. Although the simulation just presented is overly simple, it captures the essence of the process that can yield an I-PME pattern, that is, an internally driven prototypical minority effect that is independent of any actual social influence.

Empirical Evidence for the I-PME

We now review empirical evidence in support of the I-PME. This evidence comes from a series of studies designed to test predictions from the SCM of subjective confidence (Koriat, 2012a). The aim of some of these studies was to examine the bases and/or accuracy of people's subjective convictions, whereas others used confidence judgments as a tool that could provide insight into the process underlying people's construction of their attitudes, beliefs, and preferences (Koriat, 2013; Koriat & Adiv, 2011, 2012).

Overview of the Methodology

The procedure in the studies reviewed was similar except for the domains of the items used. Participants were presented with 2AFC items. For each item, they chose one answer and indicated their confidence. Response latency was also measured. In some studies, the task was repeated several times (see below). It should be stressed that in all of the studies reviewed, participants performed the tasks individually and had no direct access to the responses of other participants.

The same analytic procedure was applied to the results of all experiments (see also Bassili, 2003; Huge & Glynn, 2013). First, the two answers to each item were defined *ad hoc* as majority and minority responses on the basis of the distribution of the responses across all participants in each study. There were no items with ties, and the items with 100% agreement were eliminated from the analyses reported in this article. Confidence and response latency were then averaged separately for the majority and minority responses.

As will be shown below, the results yielded consistently a PME, and several observations suggest that the PME observed is due either partly or wholly to internal processes that are independent of the causal influence of the group on its members. The results suggest the existence of a basic substrate of majority effects that emulates the effects expected to ensue from group influence. Three sets of findings will be reviewed that provide support for this proposition.

Majority Effects for Socially Neutral Tasks

The first piece of evidence comes from experiments that yielded a PME even for benign, socially neutral tasks, for which we would expect little motivation on the part of participants to comply with group norms. Two types of analyses were performed. In the first set (subject-based), confidence and response latency were compared for each participant between majority and minority response. In the second set (item-based), for each item, confidence and response latency were compared between participants who made a majority response and those who made a minority response. As will be discussed later, the two types of analyses convey complementary information.

Subject-based analyses of the effects of group consensus. The results reviewed in this section are summarized in Table 1 in supplementary material. Also included in this table are the results on response latency from the study of Huge and Glynn (2013), described earlier.[2]

In the first experiment, 2AFC general knowledge questions were used (Koriat, 2008a). Majority answers were associated with significantly higher confidence and shorter

response latencies than minority answers. The next two experiments used 2AFC perceptual tasks (Koriat, 2011). Participants decided which of two irregular lines was longer (Experiment 1, Lines), or which of two geometric shapes had a larger area (Experiment 2, Shapes).

In the three experiments just mentioned, an attempt was made to include a sufficiently large number of CW items for which the consensual, majority answer was the wrong answer. (This inclusion was intended to address the question of the *accuracy* of confidence judgments in these tasks; see Koriat, 2008a, 2011.) In all three experiments, majority answers were associated with higher confidence and shorter response times than minority answers regardless of their accuracy. Thus, for CW items, it was the wrong answer that was endorsed with higher confidence and shorter latencies.

In the fourth experiment (Koriat & Sorka, 2015, Experiment 2), participants were presented with an object (e.g., *Avocado*) and were asked to judge whether it was a member of a given category (e.g., FRUIT). The results yielded higher confidence and shorter response latencies for majority responses than for minority responses. It can be seen in Table 1 (see supplementary material) that the results of Huge and Glynn (2013) also yielded a similar pattern for response latency (confidence judgments were not collected in that study).

A similar pattern had been observed in an earlier experiment (Koriat, 1976) in which participants were asked to guess the meaning of antonyms from non-cognate languages (e.g., *tuun–luk*) by matching them with their corresponding English translations (*deep–shallow*).[3] The items in that study included CC and CW items, and for both types of items, majority matches were associated with higher confidence than minority matches irrespective of their accuracy.

We included in Table 1 the results for three other domains for which people's responses cannot be said to be socially neutral. These experiments provide additional results that will be discussed later. In the social beliefs experiment (Koriat & Adiv, 2012), participants indicated whether they agreed or disagreed with each belief statement (e.g., "Powerful people tend to exploit others"). In the social attitudes experiment (Koriat & Adiv, 2011), participants made favor/disfavor responses to controversial issues or concepts (e.g., "capital punishment"). Finally, in the personal preferences experiment (Koriat, 2013), participants indicated their preferences (e.g., "Which animal would you prefer to adopt: dog/cat"?). Although the tasks used in these three experiments were performed individually in a laboratory room, participants could possibly have some idea about the dominant group response and might have been influenced by it (see Bassili, 2003). In any case, as can be seen in Table 1, the results for all three experiments also evidenced a significant majority effect for both confidence and response latency.

A meta-analysis of the fixed-effects model (Hedges & Vevea, 1998) was used to evaluate the majority–minority differences observed. For confidence judgments, the average effect size weighted by sample size was .86 (95% confidence interval [CI] = [0.77, 0.95]) across the seven experiments listed in Table 1 (supplementary material). For response latency, the respective effect size across the eight experiments was .41 (95% CI = [0.36, 0.46]). According to Cohen's guidelines (Cohen, 1988), the effect for confidence would be considered a large effect size, and that for response latency would be considered a small-to-medium effect size.

However, the homogeneity Q statistic (Cochran, 1954) was significant for both confidence, $Q(6) = 57.11$, $p < .0001$, and response latency, $Q(7) = 23.15$, $p < .0001$, indicating heterogeneity in effect sizes. Therefore, a random model meta-analysis was also conducted, which yielded $d = .93$ (95% CI = [0.66, 1.20]) for confidence, and $d = .42$ (95% CI = [0.33, 0.52]) for response latency. The heterogeneity observed may stem from the difference in effect size between socially sensitive tasks and the socially neutral tasks. Although this possibility is not supported by a visual inspection of Table 1, it will be evaluated later.

Because individuals differ consistently in both confidence and response latency (see Kleitman & Stankov, 2001), the possibility exists that the results obtained are due to inter-individual differences (e.g., participants who tend to choose majority responses tend to be more confident or tend to respond faster). However, the majority–minority differences were observed even when the confidence judgments and response latencies were standardized to nullify the effects of inter-individual differences in confidence and latency. The item-based analyses to be reported below also argue against the possibility that the majority–minority differences observed are due to chronic individual differences.

One additional experiment is worth mentioning because it testifies for the potential behavioral consequences of the majority effect (see Noelle-Neumann, 1993). That experiment (Koriat, 2011, Experiment 3) focused on wagering rather than on confidence judgments. Participants were asked to judge which of two geometric shapes had a larger area and to indicate how much money they would be willing to wager on the correctness of their answer. Participants placed significantly larger wagers when their choice agreed with the majority choice than when it was the minority choice regardless of the correctness of that choice.

Item-based analyses of the effects of group consensus. An item-based analysis was also applied to the data. For each experiment, participants were divided for each item into those who made the majority response and those who made the minority response. The division of participants between minority choosers and majority choosers differed for different items. As Table 2 in supplementary material indicates, the differences between majority and minority choices were significant for each of the experiments for both confidence and response latency.

In a meta-analysis of the fixed-effects model that was conducted for confidence across the seven experiments, the

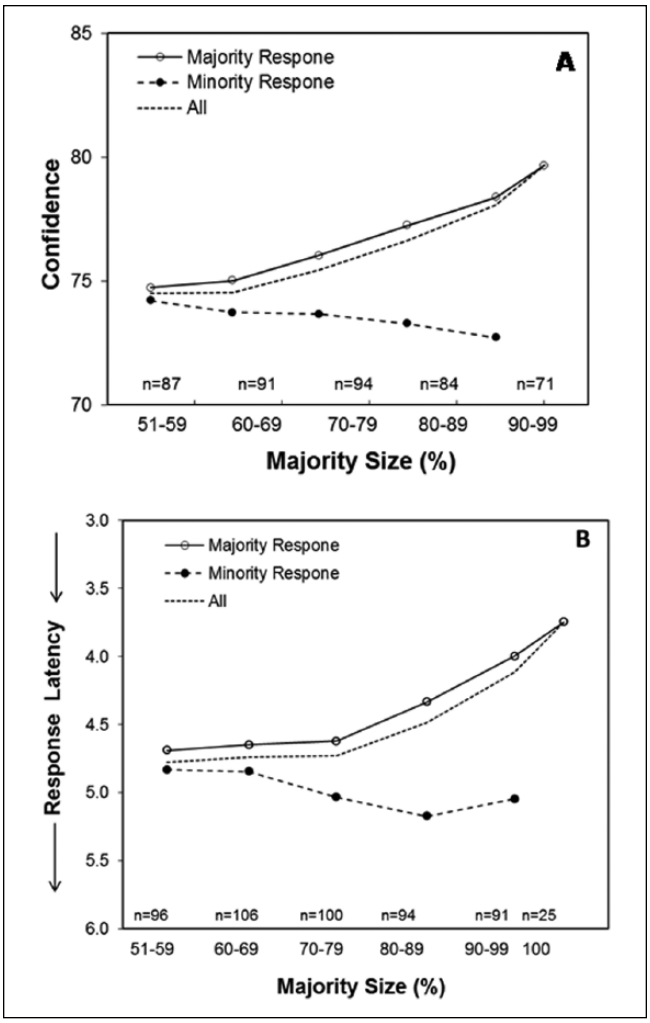

Figure 2. Standardized confidence for majority and minority responses averaged across seven experiments as a function of majority size (Panel A) and for choice latency across eight experiments (Panel B).
Note. See text for details. Also indicated in both panels is the number of items contributing to each category of majority size.

average effect size weighted by sample size was .66 (95% CI = [0.54, 0.77]). The respective effect size for response latency (across eight experiments) was .58 (95% CI = [0.46, 0.71]). Both effects would be considered large effect sizes according to Cohen's guidelines. The homogeneity Q statistic was significant for confidence, $Q(6) = 13.31$, $p < .05$, but not for response latency, $Q(7) = 4.08$, $p < .77$. A random model meta-analysis that was conducted for confidence yielded $d = .78$ (95% CI = [0.57, .98]).

The item-based results highlight the idea that the majority status of a response to a particular item can be gauged from the confidence and response latency associated with that item. One implication of this result is that group decisions that are driven by the most confident members for a given item are bound to shift the group decision toward the majority response irrespective of the accuracy status of that response (Hertwig, 2012; Koriat, 2012b; see "Discussion" section).

Confidence and response latency as they vary with majority size. We turn next to the second aspect of PME, the increase in the majority–minority difference with the size of the majority. Researchers who interpreted the PME as reflecting social influence took this effect to imply that people not only are cognizant of which position is the popular position but they also have a rough assessment of the proportion of people who hold that position (Bassili, 2003; Huge & Glynn, 2013). Note that SCM does not presuppose any direct, privileged knowledge either of the majority opinion or of the size of the majority.

To examine the increase in the majority–minority difference with degree of consensus, the results of each experiment were analyzed as follows (using the first presentation when there was more than one presentation, see later). First, degree of consensus was determined for each item, and the items were divided at the median of degree of consensus into low-consensus and high-consensus items. Mean confidence and response latency for minority and majority responses were then calculated for the two groups of items for each participant. Figure 2 in supplementary material presents the means across participants. Indicated in this figure is also the interaction effect obtained in a two-way, ANOVA, Response type (majority vs. minority) × Degree of consensus (Low vs. High). For both confidence and response latency, the majority–minority difference was larger for the high-consensus than for the low-consensus items. This was true for six of the tasks. The results generally conform to the pattern that has been assumed to stem from group influence (Bassili, 2003; Huge & Glynn, 2013; Sniezek, 1992).

In sum, the results document a PME for both confidence and response latency. Majority responses were endorsed with stronger confidence and were expressed faster than minority responses. In addition, the majority–minority difference for both confidence and response speed tended to increase with majority size. Importantly, these results were obtained under two conditions. First, participants performed the tasks individually. Second, some of the tasks would seem to be socially neutral. Therefore, the PME observed in these studies is not likely to derive from informational factors—the attempt to validate one's decisions against those of others or from social pressure to comply with the group.

We are not aware of other correlational studies that demonstrated a PME for confidence judgments for tasks requiring mundane decisions that are made privately. However, studies of response latency did yield results in support of the Minority Slowness Effect under conditions in which most social elements that could influence the expression of one's opinion were stripped away. In one of Bassili's (2003) studies, participants made like/dislike responses to everyday objects (e.g., *garlic, fortune cookies*). The results demonstrated a Minority Slowness Effect that increased with

majority size. As noted, these results were replicated by Huge and Glynn (2013). In attempting to explain this "somewhat mysterious phenomenon" (Huge & Glynn, 2013, p. 289), it was speculated that people have a "quasi-statistical sense" (Noelle-Neumann, 1993) for what the majority opinion is, and that people hesitate to offer unpopular opinions even when they respond privately to questions assessing mundane attitudes. Expression hesitation was seen to reflect an internal conflict that is deeply ingrained and occurs automatically and below consciousness even in the absence of others. We shall discuss these ideas after presenting other observations in support of the proposition that a PME for both confidence and response latency would be expected in the absence of any group influence.

An Overall Assessment of the I-PME for Confidence and Response Latency

It is useful to obtain a global picture of the PME pattern that was observed across the studies reviewed in this article. Such picture could provide a baseline for evaluating the effects of group influence on confidence and response fluency. To obtain such a picture for confidence judgments, we first calculated the mean and *SD* of confidence for each of the seven experiments listed in Table 1 (in supplementary material). The seven means and *SD*s were then averaged to yield a grand mean (75.95) and a grand *SD* (6.03). For each experiment, the confidence judgments of each participant were then standardized so that the mean and *SD* of each participant equaled the grand mean and grand *SD*. Mean standardized confidence was then calculated for majority and minority responses across all participants (n = 277) for each of six majority size categories—51-59, 60-69, . . . 100. The results are plotted in Figure 2A. It can be seen that the results are very neat, documenting a discrepancy between majority and minority responses that increase systematically with degree of consensus.

A similar analysis was carried out on response latency (including the results of Huge & Glynn, 2013). The results of analysis are plotted in Figure 2B. The pattern is very similar to that observed for confidence.

The results in Figures 2A and 2B possibly contain a component that reflects social influence. How strong is that component? To examine this question, we compared the majority–minority difference for the four socially neutral tasks (general knowledge, comparison of line lengths, comparison of the area of geometric shapes, and category membership judgments) with that observed for the three tasks that were considered to be socially sensitive (social beliefs, social attitudes, and personal preferences). A two-way ANOVA, Type of task (socially sensitive vs. socially neutral) × Response type (majority vs. minority) that was conducted on the standardized confidence judgments yielded $F(1, 275)$ = 519.20, mean square error (*MSE*) = 1,240.32, $p < .0001$, for type of response, with confidence averaging 76.43 and 73.43 for majority and minority responses, respectively. Type of task yielded $F(1, 275) = 4.71$, $MSE = 6.34$, $p < .05$, but the interaction was not significant, $F < 1$, suggesting that the majority–minority difference did not differ for the two types of tasks. For the socially sensitive tasks, standardized confidence averaged 76.56 and 73.54 for majority and minority responses, respectively. The respective means for the socially neutral tasks were 76.32 and 73.35, respectively.

A similar ANOVA on the standardized response latencies yielded $F(1, 472) = 357.04$, $MSE = 0.18$, $p < .0001$, for type of response, with response latency averaging 4.25 s and 4.93 s for majority and minority responses, respectively. Type of task yielded $F(1, 472) = 16.64$, $MSE = 0.14$, $p < .0001$, and the interaction was also significant, $F(1, 472) = 19.98$, $MSE = 0.18$, $p < .0001$. For the socially sensitive tasks, response latency averaged 4.44 s and 4.90 s for majority and minority responses, respectively. The respective means for the socially neutral tasks were 4.19 s and 4.93 s, respectively. Thus, if anything, the majority–minority difference was larger for the socially neutral tasks.

The results presented in Tables 1 to 3 (in supplementary material) suggest that the PME is particularly salient for the social attitudes task and in retrospect, this task might have been expected to reveal the strongest effects of social influence. However, a comparison of the social attitudes task with all the remaining tasks yielded only a small difference between them in the magnitude of the majority–minority discrepancy: For that task, standardized confidence averaged 76.72 and 72.79 for majority and minority responses, respectively, whereas the respective means for all other tasks were 76.37 and 73.63, respectively.

In sum, the results do not support the possibility that the PME observed for the socially sensitive tasks is due to a different mechanism than that underlying the PME observed for the socially neutral tasks. Possibly, in both cases, the PME observed captures primarily the relationships that are expected to obtain independent of the effects of social influence.

Majority Effects in a Within-Individual Analysis

We turn next to a second piece of evidence suggesting a PME that is independent of group influence. The evidence comes from six experiments in which the same task was presented several times. These experiments allow us to examine the possibility that a PME is obtained *within*-individuals. The hypothesis tested is that when the same items are presented several times, confidence and response speed should be higher for the more frequently made response across presentations than for the less frequently made response. This should be true for socially neutral tasks as well as for tasks that are expected to yield group influence. Results in support of this hypothesis will shift the theoretical focus of the I-PME from agreement with others to agreement with oneself, and will help link this effect to the decision-making process

underlying subjective confidence in one's decisions, as postulated by SCM.

Underlying the within-individual PME is the idea of the wisdom of the inner crowd (Herzog & Hertwig, 2009, 2014; Hourihan & Benjamin, 2010; Vul & Pashler, 2008). Previous studies indicated that when the same person provides several judgments, the aggregated judgment tends to be closer to the truth than any of the individual judgments. SCM assumes that the aggregation of the individual's judgments across different occasions provides information about the population of clues from which that individual samples the clues underlying his or her responses. In addition, confidence is assumed to provide information about the central tendency of that population as well as the quality of the samples underlying different responses (see Koriat, 2012b, Study 5).

In the experiments to be reviewed in this section, number of presentations varied between five and seven (see Table 3, supplementary material). These experiments were described earlier but the results presented so far have been based only on the data from the first presentation. In this section, we focus on the consistency with which the same response was made across all presentations.

For each participant, the two responses to each item were classified as frequent or rare according to their relative frequency across presentations. Consistency was defined as the frequency of the frequent response to each item. Figure 3 in supplementary material presents mean confidence for the frequent and rare responses as a function of consistency. For all six experiments, confidence was significantly higher for the frequent (majority) response than for the rare (minority) response (see Table 3, supplementary material), and the frequent-rare difference increased with consistency for all experiments except the personal preferences experiment. Practically, the same pattern was observed for response speed, mimicking the Minority Slowness Effect (see Table 3).

It might be argued that the effects of within-person consistency on confidence actually reflect the effects of cross-person consensus. Indeed, within-person consistency and cross-person consensus were found to be correlated so that the responses that were consistently chosen across presentations by one person were chosen more often by others. However, for social beliefs, social attitudes, and personal preferences, the effects of within-person consistency on confidence were in fact stronger than were those of cross-person consensus (see Koriat, 2013; Koriat & Adiv, 2011, 2012). Also, for personal preferences, the effects of within-person consistency were obtained even when cross-person consensus was held constant (see Koriat, 2013, Figure 5). It would seem that when reliable individual differences exist for a given task, within-person consistency is a better index for within-sample self-consistency than is cross-person consistency.

The results reviewed in this section, which focused on agreement with oneself, are difficult to account for in terms of conformity pressures. They reinforce the idea that the PME contains a general component that is due to the process underlying confidence and latency.

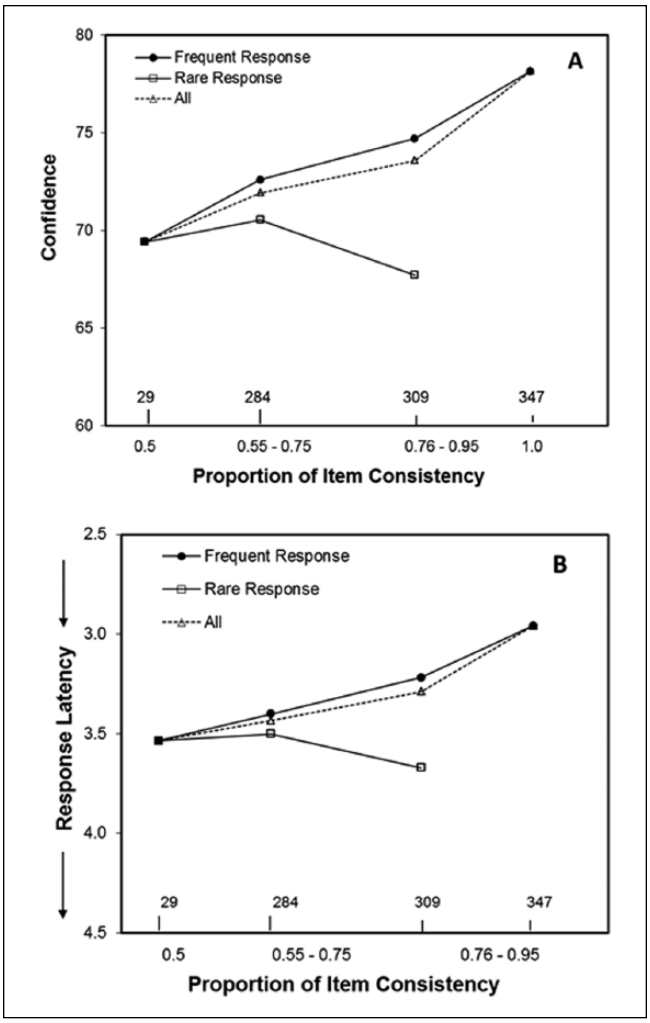

Figure 3. Standardized confidence for frequent and rare responses averaged across seven experiments as a function of proportion of item consistency (Panel A) and for choice latency across eight experiments (Panel B).
Note. See text for details. The figure also indicates the number of items contributing to each category of item consistency.

An Overall Assessment of the Within-Individual I-PME

As we did for the item consensus results, we tried to obtain a similar global picture of the within-individual PME pattern across the six experiments just reviewed. We first calculated the mean and *SD* of confidence for each of these experiments. The six means and *SD*s were then averaged to yield a grand mean (77.35) and a grand *SD* (7.13). For each experiment, the confidence judgments of each participant were then standardized so that the mean and *SD* of each participant equaled the grand mean and grand *SD*. Because the number of presentations varied between five and seven, four

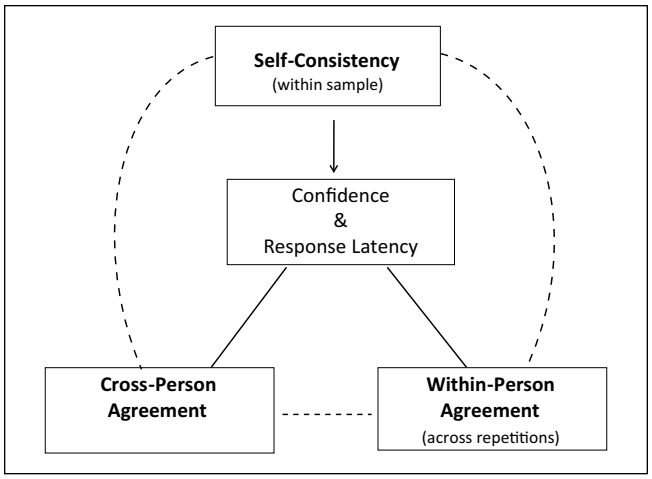

Figure 4. The relationships postulated by SCM between confidence and response latency, on one hand, and self-consistency, cross-person agreement, and within-person agreement, on the other hand.
Note. SCM = self-consistency model.

categories of the proportion of item consistency were used: .50, .55-.75, .76-.95, and 1.00 (for the .5 category, the average of the two responses was used). Mean standardized confidence was then calculated across all participants (n = 236) for each of the four categories. This was done separately for frequent and rare responses. The results are plotted in Figure 3A. The results are neat, documenting a discrepancy between frequent and rare responses that increases systematically with degree of item consistency. A similar analysis on response latency yielded a very similar pattern (Figure 3B).

Majority Effects for the Prediction of Others' Responses

A third piece of evidence for the I-PME comes from studies in which participants were presented with 2AFC items, and were asked to predict which of the two responses would be endorsed more often by others. It may be assumed that in making such predictions, participants are affected to a lesser extent by group norms (if such norms exist) than when they have to make their own responses. In the personal preferences experiment (Koriat, 2013) mentioned earlier, following five presentations of the task, in which participants indicated their own personal preferences, they were asked to predict for each item which of the two options is more likely to be chosen by the majority of participants. In the second experiment (Koriat & Adiv, 2014), participants were presented 7 times (over 2 days) with 2AFC items depicting social beliefs (as in Koriat & Adiv, 2012), and in each presentation, they predicted the majority response (true or false) for each item (only the results from the first presentation will be considered). A third experiment involved social attitudes (as in Koriat & Adiv, 2011). For each item, participants predicted whether *favor* or *disfavor* is the majority. The results for the final two experiments come from a study (Koriat, 2015) in which the first task involved predicting the majority response for a task involving the comparison of the length of lines (Experiment 4) and the comparison of the areas of geometric shapes (Experiment 5). In all of the experiments mentioned, participants indicated their confidence in their predictions.

The results of all the five experiments were analyzed using the procedure described earlier: For each item, the predictions were classified as majority or minority predictions on the basis of the distribution of the two alternative predictions for each item. It can be seen that for each of the experiments, majority predictions were associated with higher confidence and shorter latencies than minority predictions (see Table 4 in supplementary material). This was true independent of the accuracy of the predictions: For a few items for which most participants were wrong about the majority response, confidence was higher for the wrong (consensual) prediction than for the correct prediction. In all five experiments, the discrepancy in confidence between majority and minority predictions increased with the size of the majority, and a similar trend was observed for response latency (see Figure 4 in supplementary material).

Because the experiment involving belief predictions included seven presentations of the task, the results were also analyzed for the effects of within-individual consistency. Across the seven presentations, the more frequent predictions were associated with significantly higher confidence and shorter response times than the less frequent predictions.

Altogether, the results obtained for the predictions of others' responses reinforce the claim that PME is rather general and contains a component that is independent of social influence.

Discussion

Diverse theoretical views lead to the expectation that individuals should hold their opinions with greater confidence and express them with greater fluency when the opinions agree with those of the group than when they disagree with them. Indeed, a solid body of evidence has confirmed these expectations.

The typical interpretation of the results relating confidence and response speed to group consensus assumes a causal relationship: Agreement with the group enhances one's confidence in one's opinion and facilitates the expression of that opinion. This interpretation is consistent not only with research and theorizing on group influence but also with the results of studies in which perceived consensus was experimentally manipulated (Asch, 1951, 1952; Bovard, 1951; Clarkson et al., 2009; Luus & Wells, 1994; Orive, 1988a). Thus, there is little doubt that normative and informational influence of the group on its members can result in higher confidence and greater expression fluency

for majority than for minority judgments and opinions. However, this is not the only pathway for obtaining a PME. In the present article, we showed that both confidence and response speed can increase with group consensus independent of any causal influence of the group on its members.

The results were consistent in demonstrating the two features of the PME pattern. First, confidence was higher and response latency was shorter for majority than for minority responses. Second, the discrepancy in confidence and latency between the majority and minority responses increased with the size of the majority. This pattern is precisely what would be expected from the influence of the group on its members.

However, several observations suggested that PME can also occur independent of any tendency to comply with the group's norms. First, a PME was observed for several socially neutral tasks for which we would expect little influence of the group on the responses of individuals. Second, it was observed even within individuals, when majority and minority responses were defined for each participant in terms of the relative frequency of the two responses across several presentations. Finally, the PME was obtained even for the prediction of others' responses. We suggested that this PME stems from the process underlying people's decisions in 2AFC items and the computation of subjective confidence in the decision reached, and hence referred to it as an internally generated, I-PME.

As seen, the observed I-PME pattern mimics the E-PME pattern that is assumed to result from group influence. The similarity between the two patterns implies that any observed PME may be the result of (a) actual group influence, (b) the internal processes reviewed in the present article, or (c) both. This calls for greater caution in interpreting PME results for confidence and response latency and for attempts to separate their I-PME and E-PME components.

PME for Socially Neutral Tasks

The first set of experiments reviewed documented a majority–minority effect for socially neutral tasks. We are not aware of previously reported similar effects for confidence, but with regard to response latency, Bassili (2003) and Huge and Glynn (2013) documented a Minority Slowness Effect for mundane tasks that were performed individually. How did the authors interpret these results? Huge and Glynn (2013) admitted, "It may at first seem strange that individuals would hesitate when expressing minority viewpoints to a computer (with little possibility of having their answers revealed to others beyond the investigators)" (p. 293). However, their preferred explanation was that the effect was nevertheless due to conformity pressure. They alluded to Noelle-Neumann's (1993) idea that people possess a "quasi-statistical sense" in gauging collective norms and opinions. It was speculated that collective opinion is internalized by the members of the group and affects behavior unconsciously even in situations that are stripped of social influence. Other researchers also argued that the motives for agreement have extended effects that generalize to new contexts in which the original motives are no longer salient or relevant (e.g., Hardin & Higgins, 1996).

Assuming that these ideas have some validity, the majority effect would be expected to be stronger for judgments that are socially relevant than for those that have less social relevance. Indeed, Huge and Glynn (2013) found the Minority Slowness Effect to be stronger for *like*/*dislike* responses to political objects than to non-political objects. The difference, however, was not significant. In the present analyses, we expected that PME should be stronger for attitudes, beliefs, and preferences than for socially neutral tasks such as the task of comparing the areas of geometric shapes. However, this expectation was not borne out by the results. One possibility is that the tendency to be influenced by group norms was not sufficiently strong for the attitudes, beliefs, and preferences tasks, which were performed in an individual laboratory booth. If such is the case, then the PME observed for these tasks is also due primarily to the same mechanism that is responsible for the PME on socially neutral tasks.

The Within-Individual PME

The SCM of subjective confidence (Koriat, 2012a) shifts the interpretation of the consensuality principle (Koriat, 2008a) from agreement with others to agreement with oneself. It was assumed that confidence is based on the consistency within the sample of clues underlying one's choice in each occasion, and that both cross-person agreement and within-person agreement are diagnostic of self-consistency (Koriat, 2012a). Figure 4 presents the postulated relationships underlying SCM. According to this scheme, both within-person agreement and cross-person agreement are expected to yield a majority effect. This is because self-consistency is expected to be higher for samples of representations that favor the majority vote in the population of representations than for those that favor the minority vote. Thus, the PME observed in a within-person analysis reinforces the claim that this effect can occur independent of any social influence.

As noted earlier, within-person agreement tends to correlate with cross-person consensus, supporting the assumption that both reflect roughly the same parameter associated with a choice, a parameter that is relevant to confidence in that choice. However, the results also indicated that for beliefs, attitudes, and preferences, confidence is predicted better from within-person agreement than from cross-person agreement (see Koriat, 2013; Koriat & Adiv, 2011, 2012). Presumably, for tasks that exhibit consistent individual differences, within-person agreement for each item is a better diagnostic of the self-consistency underlying choice and confidence than is cross-person agreement.

PME for the Prediction of Others' Responses

Previous studies that documented a PME for response latency (Bassili, 2003; Huge & Glynn, 2013) assumed that people are influenced by what they perceive to be the majority opinion. How do people gauge the majority opinion (and also the size of the majority)? Researchers who discussed social influence assumed that people somehow have a sense for what most people prefer or believe (Noelle-Neumann, 1993). In general, conformity pressures should contribute to a greater alignment between self-judgments and the perception of social consensus.

Others, however, took this alignment to reflect the reciprocal influence, from the individual's self-perception to the perception of social consensus. Indeed, extensive research provided evidence for the tendency to project one's own beliefs on others, assuming that others behave and believe like oneself. Results suggested that the impact of social projection on the similarity between self-judgments and judgments about other ingroup members is much stronger than that of conformity (Krueger, Acevedo, & Robbins, 2005; see Krueger, 1998, 2007, for reviews). For example, ratings of the self are accessed faster and made with greater confidence than ratings of the group (Clement & Krueger, 2000).

What are the implications of these ideas for the majority–minority differences that we observed in confidence and latency? To the extent that social projection is responsible for the similarity between self-judgments and other judgments, why should the confidence and response latency associated with one's own judgments increase with assumed similarity? Bassili (2003) raised this question in connection with his results on the Minority Slowness Effect: If people overestimate the extent to which their judgments are shared by others (L. Ross, Greene, & House, 1977), then holders of a minority opinion need not perceive their views as minority views. He argued, however, that self-generated consensus is relative rather than absolute: Social projection is not so strong as to create the impression among holders of a minority opinion that most others share their views. His results (Study 4) supported this contention.

Thus, the similarity between self-judgments and perceived consensus can stem from two causal processes that are not mutually exclusive: conformity pressure and social projection. Whereas conformity pressure may be expected to yield higher confidence and shorter response latency for majority than for minority views, it is unclear how social projection can account for the majority–minority differences observed in the present study.

SCM implies a third process yet that is assumed to contribute to self–other similarity. This process does not entail a causal influence. Rather, it is assumed that people construct their judgments by sampling clues from a commonly shared population of clues. This construction is assumed to result not only in self–other similarity in judgments but also in increased confidence and response speed with increased correspondence between one's responses and the responses of the majority. Indeed, the simulation that gave rise to the results presented in Figure 1 did not assume any causal influence in either direction between one's views and the perception of others' views.

Some discussions of social projections (see Krueger, 1998) have challenged the assumption that the projection of one's own views on others necessarily yields inaccurate predictions as implied by the studies of the false-consensus effect (L. Ross et al., 1977; see Marks & Miller, 1987). In fact, Hoch (1987) observed that although perceived consensus was quite high for some target populations, participants could have increased their predictive accuracy by weighting their own positions even more. It is interesting to note in this connection that confidence in the predictions of others' views does not monitor the accuracy of these predictions. Rather, it predicts the likelihood that others will make the same predictions. For example, in the study of Koriat (2013) on the prediction of others' personal preferences, the items were divided into those for which the mean prediction of the majority response was correct and those for which it was wrong. Whereas for the former items confidence was higher for the correct predictions than for the wrong predictions, the opposite was found for the latter items. These results indicate that confidence is correlated with the consensuality of the predictions independent of the accuracy of these predictions. Thus, SCM adds a metacognitive facet to the question of the accuracy of people's perception of social consensus (see Krueger's [1998] distinction between accuracy and validity).

PME and the Process Underlying Confidence Judgments

Originally, SCM for subjective confidence was developed to explain the accuracy of confidence judgments for tasks for which the response has a truth-value. Its extension to tasks measuring attitudes, beliefs, and preferences helped in shedding some light on the constructive process assumed to underlie the choice of a response. These tasks typically exhibit not only a certain degree of cross-person and within-person stability but also some variability and fluctuation. Confidence judgments were shown to track the stable and variable contributions to response choice. The I-PME can be seen to derive precisely from the combined contribution of these two components to choice and confidence.

Specifically, SCM was based on the assumption that judgments and decisions are largely constructed on the spot on the basis of the information accessible when making the judgment (Bassili, 2008; Lichtenstein & Slovic, 2006; Schwarz, 2007; Schwarz & Strack, 1991). The distinction between the stable and variable components was 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, whereas the choice made in each specific instance is assumed to rely on a small set of representations that are *accessible* at the time of the judgment. What members of a group have in common is the repertoire of item-specific representations available in memory. Because judgments rely on a small set of representations that are sampled on each occasion depending on contextual circumstances, some fluctuation may be expected in the decision reached and in the confidence in that decision. However, the extent of fluctuation is constrained by the polarization of the population of representations associated with an item. It is the constraint imposed on the consistency with which different decisions are reached that is responsible for the I-PME.

This conceptualization has implications for the question "How does a person know what others feel, believe or think?" According to the proposed conceptualization, a person need not have direct access to others' views and opinions to behave as if he or she is influenced by them (see also Denrell & Le Mens, 2007). We have access to others' views by virtue of the fact that we draw on clues, associations, and considerations that are largely shared by all people with similar experiences. We share the same databases from which we sample the ingredients for the construction of our judgments in each occasion. These databases constitute what might be referred to as the distributed wisdom of the crowd (Surowiecki, 2005; see Koriat & Sorka, 2015). When it comes to general information or perceptual judgments, these databases are largely biased in favor of the correct judgments by virtue of the adaptation to the environment (Dhami et al., 2004). What SCM shows is that confidence and response latency tap into the distributed wisdom of the crowd, discriminating between judgments that are consistent with that "wisdom" and those that are inconsistent with it (Hertwig, 2012; Koriat, 2012a). Thus, SCM helps resolve the "mysterious" observation that responses that depart from the majority are ventured more slowly even for a task involving a comparison of visual stimuli (Koriat, 2011) or one that assesses preferences for everyday objects (Bassili, 2003; Huge & Glynn, 2013).

SCM helps to link several "strength" attributes of judgments. Consider for example the concept of attitude strength (see Bassili, 2008; Koriat & Adiv, 2011). Our analysis and results suggest that four of the attributes that have been identified with this concept (see Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Raden, 1985; Visser & Holbrook, 2012) are generally inter-correlated: certainty, accessibility, stability, and impact. Response speed (as an index of accessibility, see Fazio, 1995) is related to confidence or certainty. These two attributes not only are correlated but also exhibit the same relationship to item consensus and item consistency for majority and minority responses (see also Holland, Verplanken, & van Knippenberg, 2003).[4] Both are also diagnostic of stability: Across a number of studies in which the same task was repeated several times, the confidence and speed with which a response was ventured in the first presentation of the items predicted quite well the likelihood that the same response would be made in subsequent presentations of the item (see Koriat, 2011, Figure 3; Koriat, 2012a, Figures 9-10; Koriat & Adiv, 2011, Figure 7; Koriat & Adiv, 2012, Figure 6). This observation was seen to support the proposition that confidence in a decision monitors reproducibility—the likelihood of making the same decision in the future. Results also suggest that confidence judgments affect behavioral decisions (Gill, Swann, & Silvera, 1998; Koriat & Goldsmith, 1996; Sniezek, 1992; Visser & Holbrook, 2012). As mentioned earlier, the same pattern of majority effects that has been observed for confidence and response speed was found for wagering behavior: Participants placed significantly larger wagers on the majority than on the minority choices regardless of the correctness of their choices. Bassili (1995, 1996a, 1996b) reported results suggesting that response speed also predicts the likelihood of acting on one's attitudes.

SCM and Sampling-Based Approaches

SCM can be said to align with the sampling-based perspective. This perspective has proved successful in providing parsimonious accounts of many phenomena in judgment and decision making that had been explained by invoking higher level processes (see Fiedler & Juslin, 2006). The merit of some of these accounts is that they have the potential of explaining not only biases and errors but also the impressive accuracy of judgments under many conditions (Herzog, & Hertwig, 2013; Koriat, 1993).

Of particular relevance to the present article is the experience sampling model of Denrell and Le Mens (2007), which focused on social influence. Unlike most theories of social influence, which assume that information about the attitudes of others has a direct effect on the attitude of the individual, it was proposed that the attitudes of others can influence only the activities and objects that individuals are exposed to. Assuming that individuals form attitudes by learning from experience, the biased sampling of activities and objects is sufficient to produce a social influence effect. Denrell and Le Mens (2007) demonstrated that the attitudes of two individuals will become positively correlated even if they have independent experiences when they do sample these experiences. Thus, interdependent sampling of activities provides a different explanation for social influence.

Note that unlike the experience sampling model, SCM does not assume direct or indirect influence between individuals. The assumption that people sample representations largely from the same item-specific population of representations is sufficient to explain similarity between individuals. Indeed, properties of 2AFC items, notably, the likelihood of choosing the majority response, and mean confidence in that response, have been found to be very reliable across participants.

The unique contribution of SCM, however, concerns the difference between different responses to the same items. The sampling assumption alone is sufficient to explain why people with the same experience are likely to feel more confident when they endorse the majority option than when they endorse the minority response. The observation that confidence and response latency discriminate between majority and minority responses parallels the finding that retrieval fluency tracks the popularity of different choices (see Herzog & Hertwig, 2013). These observations suggest that people possess internal indicators that signal the preferences of others. Thus, both similarities and differences in confidence and response latency between people or between different occasions are handled by SCM within the same sampling-based framework.

Some General Implications

In this final section, we note some general implications of the present proposal. Discussions of social influence have proposed a variety of mechanisms to account for the differences observed between majority and minority judgments. However, as Erb and Bohner (2001) noted, the effects of numerical majority have not been sufficiently dissociated from the effects of many related variables such as social power, status, and normative position. In the present study, we focused on numerical majority. Erb and Bohner also focused on the effects of *mere consensus*, claiming that consensus, as such, has evaluative implications and can evoke differential information processing strategies. For example, high consensus is valued because it provides social support and validation and may imply correctness.

It should be stressed, however, that although the I-PME described in this article is also due solely to the consensus status of a judgment or opinion, it differs from the mere consensus effect discussed by Erb and Bohner (2001). The latter depends critically on participants' awareness of the majority–minority status of the judgment or opinion. The I-PME, in contrast, derives from a process that does not presuppose any awareness of that status. SCM assumes that all participants choose the option that is supported by the majority of the representations *in their own sample*. In a sense, the SCM account of the I-PME assumes a uniform process underlying majority–minority differences in confidence and response speed. In this respect, it differs from some theories of majority *influence*, which assume that minority and majority influences are mediated by distinctly separate processes (see Kruglanski & Mackie, 1990, for a discussion).

The work reviewed in this article suggests that the majority effects that have been observed in previous studies are likely to include two components. The first, I-PME component, is a basic component that derives from the very process underlying confidence in 2AFC problems. The second, E-PME component, is due specifically to social influence, normative or informational. Whereas the I-PME component is expected to hold for all tasks, the E-PME component should be particularly pronounced for tasks for which the response is prone to the effects of social influence.

To examine this distinction, it would be important to compare the magnitude of the majority effect for different tasks. Our comparison of this effect for tasks tapping social attitudes, social beliefs, and preferences with those tapping general information, perceptual judgments, and category membership did not yield clear differences. An alternative approach is to compare majority effects for the same task under two conditions, one that induces social influence and another that does not. For example, research has indicated that people's conformity is greater in public than in private situations (e.g., Deutsch & Gerard, 1955). Also, preference for the majority position is stronger when people perceive themselves as being part of the same psychological group than as being part of an aggregate of individuals (Prislin, Brewer, & Wilson, 2002). Using such experimental manipulations, it would be possible to determine whether the I-PME and the E-PME are additive.

An important implication of the I-PME is that it does not only mimic the effects of social influence but also is expected to have similar behavioral consequences as those assumed to result from social influence. Consider, for example, Noelle-Neumann's (1993) proposal that the spiral of silence mechanism leads to the convergence of public opinion on commonly shared positions. This mechanism was assumed to derive from the fear from social sanctions that motivates people to monitor the media for cues about the majority opinion, and to avoid expression of minority opinions. However, I-PME alone would also be expected to lead to the same convergence on majority opinions. Results suggest that confidence in one's beliefs affects the likelihood of translating that beliefs into action (Gill et al., 1998; Koriat & Goldsmith, 1996). Similarly, it was suggested that the speed with which an attitude is expressed affects the likelihood of acting on that attitude (Bassili, 1995). Thus, I-PME alone would be expected to result in people remaining "silent" about their minority judgments. Would the confidence-based and latency-based tendencies to avoid expression of minority views serve to catalyze the spiral of silence that is assumed to result from conformity pressure? Research is needed to address this question.

Studies of group decisions also suggest that groups tend to converge on shared decisions. This convergence, however, can arise independent of social influence. Consider, for example, a study by Bahrami et al. (2010) that compared the accuracy of individual versus dyadic decisions in a visual comparison task. Their results showed that "two heads are better than one." However, based on the observation that group decisions are generally dominated by the more confident members of the group (see Tormala & Rucker, 2007; Zarnoth & Sniezek, 1997), several results indicated that the dyadic advantage effect obtains only when the normative judgment is more likely to be correct than wrong (Koriat,

2012b). In contrast, when participants are more likely to be in error, group decision is likely to be *less* accurate than the decision of each member alone. Because subjective confidence is correlated with the consensuality of a decision, individuals will tend to converge on the same decision even in the absence of any interaction or influence between them.

In sum, in this article, we reviewed evidence in support of the proposition that majority views are held with stronger confidence and are expressed more quickly regardless of any social pressure toward conformity. This is not to imply that social pressure does not affect confidence and response latency. We only showed that a model that assumes a random sampling of representations from a commonly shared pool of representations is bound to yield stronger confidence in majority than in minority views. This difference should occur irrespective of the *content* of these views, and when a criterion of accuracy is available, irrespective of the correctness of these views. The results help resolve the puzzling observation that a Minority Slowness Effect is found even for tasks that are stripped of social relevance and that are performed privately. The majority–minority differences that are independent of social influence are expected to have similar behavioral consequences as those assumed to ensue from social influence. Research is needed that can help tease apart the two components of PME and the interaction between them for conditions that involve group influence. Until the relative contributions of I-PME and E-PME are better understood, it is important to keep in mind that any observed PME may or may not include a social contribution.

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Notes

1. For a comparison between self-consistency model (SCM) and other models of choice and confidence, see Koriat (2012a) and Koriat and Sorka (2015).
2. We are grateful to Michael Huge for providing us with the raw data. In line with our previous studies, latencies that were below or above 2.5 standard deviations from each participant's mean were eliminated from the analyses (3.14%). We should note that no other previously published data could fit our analytical requirements except for those of Bassili (2003), but these were not available. However, the Huge and Glynn (2013) study is essentially an extended replication of Study 2 in Bassili (2003).
3. The raw data from this study are not available. Therefore, the results of this study were not included in the tables and in the detailed analyses reported here.
4. In the factor analysis reported by Bassili (1996b; see also Krosnick, Boninger, Chuang, Berent, & Carnot, 1993), attitude certainty and response latency were found to load on separate factors. However, his analyses were based on between-individual correlations, whereas our analyses captured within-individual correlations. The two types of analyses sometimes yield very different patterns (see Koriat, 2012a; Roediger & DeSoto, 2014).

Supplemental Material

The online supplemental material is available at http://pspr.sagepub.com/supplemental.

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