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Forming Attitudes That Predict Future Behavior: A Meta-Analysis of the Attitude–Behavior Relation

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Abstract

A meta-analysis (k of conditions = 128; $N = 4,598$) examined the influence of factors present at the time an attitude is formed on the degree to which this attitude guides future behavior. The findings indicated that attitudes correlated with a future behavior more strongly when they were easy to recall (accessible) and stable over time. Because of increased accessibility, attitudes more strongly predicted future behavior when participants had direct experience with the attitude object and reported their attitudes frequently. Because of the resulting attitude stability, the attitude–behavior association was strongest when attitudes were confident, when participants formed their attitude on the basis of behavior-relevant information, and when they received or were induced to think about one- rather than two-sided information about the attitude object.

Keywords

attitude formation; attitude–behavior relation; meta-analysis; attitude accessibility; attitude stability

For many decades, social psychologists have attempted to influence people's attitudes to elicit corresponding behaviors (see Ajzen, 1991; Ajzen & Fishbein, 1980; Ajzen & Madden, 1986; Bargh, Chen, & Burrows, 1996; Fazio, 1989, 1990; Fazio, Chen, McDonel, & Sherman, 1982; Fazio & Zanna, 1978b; for a recent review of the effects of attitude-influence strategies on real-world behaviors, see Albarracín et al., 2003). For example, a message reporting the benefits of a new vaccine may stimulate perceptions that the vaccine is indispensable. Hence, it may increase the probability that people will opt to receive the vaccine. Important for our analysis, however, inducing provaccine attitudes at one point in time does not guarantee that people will choose to receive the vaccine (Ajzen & Fishbein, 1980; Albarracín et al., 2003). Instead, there is considerable variability in the degree to which attitudes predict behavior (Ajzen, 2000): Mean correlations between attitudes and actual behaviors have ranged from $-.20$ (Leippe & Elkin, 1987) to $.73$ (Fazio & Williams, 1986).

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Given large variability in attitude–behavior consistency, researchers have specified conditions that make attitudes predict behaviors (Borgida & Campbell, 1982; Fazio & Zanna, 1978a, 1978b; Kraus, 1995; Schwartz, 1978; Sivacek & Crano, 1982). Past research has revealed that attitudes people hold with confidence predict behavior better than the ones people doubt. Decisive attitudes also predict behavior better than ambivalent or internally inconsistent ones. Similarly, easily recollected attitudes predict behavior better than attitudes that are difficult to recall. Further, attitudes based on direct experience promote greater attitude–behavior consistency than those based on indirect experience (for a meta-analysis, see Kraus, 1995).

Despite the value of past research on moderators of the attitude–behavior relation, there are two limitations. First, past research on these issues has often been correlational (e.g., Bagozzi, 1981; Bentler & Speckart, 1981; Davidson & Jaccard, 1979; Fazio & Williams, 1986; Fazio & Zanna, 1978a; Lavine, Thomsen, Zanna, & Borgida, 1998). Thus, it has not been able to demonstrate whether attitudes predict behavior because they are more confident, memorable, or decisive. Second, the past research relying on experimental methods (see Doll & Ajzen, 1992; Fazio, Powell, & Williams, 1989; Fazio & Zanna, 1978b; Sengupta & Fitzimons, 2000; Wilson, Dunn, Bybee, Hyman, & Rotondo, 1984) has been insufficient to conclusively establish the processes underlying the attitude–behavior relation. To further complicate matters, 8 out of 10 prior meta-analyses of the attitude–behavior relation (i.e., Armitage & Conner, 2001; Eckes & Six, 1994; Farley, Lehmann, & Ryan, 1981; Kim & Hunter, 1993; Notani, 1998; Sheppard, Hartwick, & Warshaw, 1988; Van den Putte, 1993; D. S. Wallace, Paulson, Lord, & Bond, 2005) focused on the role of factors other than attitudes (e.g., the mediating role of intentions on the attitude–behavior link, how type of topic or behavior moderates the attitude–behavior relation). The remaining 2 meta-analyses, which did consider the role of attitudes (i.e., Cooke & Sheeran, 2004; Kraus, 1995), were more descriptive than process oriented.

In light of this situation, the objective of our work is to begin resolving this deficiency by pooling evidence from experimental or quasi-experimental designs that dealt with attitude formation. That is, we selected studies about creating a new attitude in an audience, be that by presenting information or by identifying situations in which participants learned about a new object in real-world settings. These studies varied in their use of diverse experimental manipulations (e.g., number of attitude expressions, distraction, consistency among attitude components, personal relevance). They also varied in other factors that presented incidental differences across studies (e.g., the accessibility and stability of attitudes, the relation between attitudes and behavior-relevant information, and the confidence with which attitudes were held). Therefore, synthesizing these studies permitted us to examine the influence of all these variables. The synthesis was conducted with the guidance of a model of the processes that underlie the attitude–behavior correspondence.

To date, two theoretical perspectives have specified the processes by which attitudes guide behaviors. These approaches have also pointed to conditions that moderate these processes. A first approach assumes that attitudes influence behavior when actors activate them from memory. Attitudes appear to be easily accessible (and thus influential of behavior) when they are based on direct experience (Regan & Fazio, 1977). They are also more accessible

when the people who form them are highly motivated to think about the attitude object (Cacioppo, Petty, Kao, & Rodriguez, 1986). It is assumed that both direct experience and personal involvement induce individuals to think about their attitudes. In turn, this cognitive work increases the frequent availability of attitudes as a basis for future behavior (Petty, Haugtvedt, & Smith, 1995).

A different line of research suggests that attitudes influence behavior when actors can reconstruct them on the fly. According to the constructionist point of view, constructing initial and later attitudes on the basis of the same information makes the initial attitudes stable (Erber, Hodges, & Wilson, 1995) and thus predictive of behavior (Wyer & Srull, 1989). It is important to note that attitudes should be most stable when the information that guided them continues to be relevant or diagnostic at the time the person performs the behavior (Ajzen, 1996). In addition, people can construct stable attitudes if all the information they have about an object is one-sided or homogeneous (Erber et al., 1995). People who anticipate only positive outcomes when they form an attitude toward a behavior may maintain the same attitude in light of different outcomes that are also positive. In contrast, individuals may change their attitudes when these attitudes are based on information with diverging evaluative implications at different points in time.

Clearly, there is much high-quality research on the attitude–behavior correspondence. However, this research has not been integrated into a comprehensive model. For example, researchers have found that the attitude–behavior relation is stronger when the measures of attitude and behavior are correspondent (e.g., Ajzen & Fishbein, 1977; Davidson & Jaccard, 1979; Jaccard, King, & Pomazal, 1977). It is also stronger when individuals do not expect to discuss their attitudes with others (Leippe & Elkin, 1987). Further, the relation is stronger when there is an association between attitudes and information relevant to the behavior (Ajzen, 1996; Doll & Ajzen, 1992) and the focus (e.g., thoughts about the instrumental properties of an object) is the same while the person is reporting the attitude and performing the behavior (e.g., an instrumental rather than hedonistic behavior; Millar & Tesser, 1986, 1989). Likewise, consistent attitudes (Jonas, Broemer, & Diehl, 2000), attitudes formed on the basis of direct behavioral experience (Regan & Fazio, 1977), and attitudes formed with high motivation to think about the attitude object (Sivacek & Crano, 1982) all appear to predict behavior better. However, empirical research has not explicated why these apparently heterogeneous factors have similar impact. Furthermore, when researchers have linked some of these factors to the accessibility and stability of attitudes (e.g., Berger & Mitchell, 1989; Fazio et al., 1982; Fazio, Powell, & Herr, 1983; Houston & Fazio, 1989), they have rarely tested all of the paths representing these processes (but see Doll & Ajzen, 1992).

Finally, findings regarding the attitude–behavior relation are not as robust as they appear. For example, ambivalent attitudes have often influenced the attitude–behavior relation in a negative way (Conner, Povey, Sparks, James, & Shepherd, 2003; Conner et al., 2002). However, there is research (e.g., Jonas, Diehl, & Broemer, 1997; Sengupta & Johar, 2002) showing a positive relation. Similarly, attitudes based on direct experience reportedly predict behavior (Regan & Fazio, 1977). However, research has also shown that this is not always the case (Millar & Millar, 1996).

Given the scope and diversity of the attitude–behavior research, meta-analytical methods are ideal to integrate the findings and resolve inconsistencies. It is notable, however, that the attitude–behavior meta-analyses addressing this problem to date have been limited. For instance, Kraus’s (1995) meta-analysis found that attitudes influenced behavior when attitude accessibility, stability, certainty, affective–cognitive consistency, and direct experience with the attitude object were high. Similarly, Cooke and Sheeran’s (2004) review found that attitude accessibility, stability, certainty, ambivalence, direct experience, and affective–cognitive consistency influenced the attitude–behavior relation. However, their analyses investigated neither the interrelations among these moderators nor the processes underlying their influence on the attitude–behavior relation. To the extent that the different moderators are highly correlated, the univariate associations with the attitude–behavior association may be spurious. Therefore, in the present meta-analysis we have more precisely identified the unique contribution of each moderator and tested the causal mechanisms at hand.¹

Another limitation of prior meta-analyses is that they have included designs that do not reveal the influence of attitude accessibility and stability. This situation is problematic. For example, both Kraus’s (1995) and Cooke and Sheeran’s (2004) meta-analyses found that attitude certainty, consistency, and stability were associated with greater attitude–behavior correlations. However, these studies could not determine whether stable reports of attitudes resulted from greater attitudinal confidence and consistency. In fact, stable attitude reports can also cause more confident and consistent attitudes. Similarly, Kraus (1995) and Cooke and Sheeran (2004) found that highly accessible attitudes were stronger predictors of behavior. However, their approach cannot precisely determine the direction of this effect. That is, an association of accessible attitudes with behavior in an integration of research using familiar objects might indicate that past experiences with those objects caused both accessible attitudes and behavior.

To resolve these deficiencies, we selected studies on the attitude–behavior relation in which experimenters created attitudes about unfamiliar objects. Correspondingly, we excluded studies involving manipulations or measures of attitudes toward well-known objects. The focus on new attitudes helped us to control various aspects of attitudes. That is, participants cannot have previous attitudes toward unknown objects. Hence, attitudes about these objects must largely reflect the information and conditions present at the time of the attitude formation. In addition, the stability and accessibility of new attitudes should be relatively independent of past thoughts about the issue, past behaviors in the particular domain, and past attitude reports. One cannot control these factors in research with familiar objects—studies have rarely measured or manipulated all these aspects of attitudes.

¹There are at least eight other meta-analyses that have explored issues concerning attitude–behavior correspondence. Kim and Hunter (1993) examined the effect of the correspondence between the attitude and the behavior measures across different topics. D. S. Wallace et al. (2005) assessed the impact of situational factors associated with the behavior (e.g., perceived difficulty of the behavior, social constraints to perform the behavior). Eckes and Six (1994) examined the influence of measurement correspondence, time interval between attitude and behavior measures, number of behavior alternatives, and behavioral domain. Two other meta-analyses focused on the theory of reasoned action and the factors that moderate the relations proposed by that theory (i.e., Farley et al., 1981; Sheppard et al., 1988). The remaining three explored the relations proposed by the theory of planned behavior and the moderators of those relations (i.e., Armitage & Conner, 2001; Notani, 1998; Van den Putte, 1993).

Finally, the focus on attitude formation has implications for the solution of real-world problems. Private and public agencies frequently face the challenge of inducing new behaviors (e.g., purchase of hybrid and electric cars, participation in a newly recommended health screening, purchase of a new product category, introduction of a new political party). These agencies often attempt to meet this challenge by eliciting behavior-congruent attitudes. With the current state of the literature, however, it is unclear whether it is more effective to discuss the advantages (e.g., Jonas et al., 2000) or the advantages and disadvantages (Jonas et al., 1997; Sengupta & Johar, 2002) of a new behavior or whether it is better to let audiences acquire experience with the behavior (Fazio & Zanna, 1978a, 1978b; Regan & Fazio, 1977). Therefore, a well-organized body of knowledge on this topic is essential.

Processes Involved in the Attitude–Behavior Relation

Two lines of research have implications for the attitude–behavior relation. One has established that easy-to-retrieve attitudes predict behavior better (Fazio & Williams, 1986). In addition, constructionist perspectives (Schwarz & Bohner, 2001; Wilson & Hodges, 1992; Wyer & Srull, 1989) suggest that stable information on which to form attitudes ensures high attitude–behavior relations. These processes appear in Figure 1.

Attitude Accessibility

According to Fazio (1989), people’s attitudes are more likely to guide behavior when they are easy to retrieve from memory. There are two main premises for this hypothesis. First, more accessible attitudes are likely to be available as criteria for a later behavioral decision (Fazio, 1989; Fazio et al., 1989; Fazio & Williams, 1986). In addition, accessible attitudes influence the interpretation of information associated with the attitude object (Fazio et al., 1983; Fazio & Williams, 1986). For example, people with accessible negative attitudes about African Americans who encounter an African American man holding a tool may perceive the man as holding a weapon (Allport & Postman, 1947).

In brief, accessible attitudes allow people to make behavioral decisions and process relevant information (Fazio, 1989). Further, if attitude accessibility increases the attitude–behavior association, so should conditions that increase attitude accessibility. For example, attitude–behavior correspondence is particularly strong when people think carefully about the issue (Cacioppo et al., 1986). It is assumed that more thought about an issue increases the accessibility of the attitude associated with that issue. In addition, repeated expression of the attitude and direct behavioral experience are associated with both greater attitude accessibility and greater attitude–behavior correspondence (Fazio et al., 1982; Powell & Fazio, 1984; Regan & Fazio, 1977). In all, this research suggests that greater *amount of thought* about the attitude object, greater *number of reports* or *expressions* of the attitude, and more *direct behavioral experience* should increase attitude accessibility and, consequently, attitude–behavior associations (see the upper section of Figure 1).

Attitude Stability

People often retrieve and use their prior attitudes as a basis for a behavior. However, they also adjust these attitudes on the basis of information available at the time of the behavior decision (Schwarz & Bohner, 2001; Wilson & Hodges, 1992). Thus, the stability of information associated with attitudes can increase attitude–behavior correspondence (Ajzen, 1996; Doll & Ajzen, 1992). As shown in Figure 1, the behavioral relevance, the one-sidedness of the attitude-related information, and the confidence with which the attitude is held all stimulate attitude stability.

Behavioral relevance of attitude-related information—Presumably, the stability of the information that gives way to attitudes increases the attitude–behavior relation. Hence, people should display greater attitude–behavior correspondence when the initial information is relevant at the behavior point. In this regard, individuals who have *direct behavioral experience* with an attitude object may obtain information that is more relevant to performing a behavior. Therefore, they should form more stable attitudes and have stronger attitude–behavior correlations (Ajzen, 1996; Ajzen & Sexton, 1999). Similarly, the formation of *attitudes toward behaviors* and of *attitudes highly associated with beliefs about behavior outcomes* may influence attitude–behavior correspondence. That is, having behavior-relevant attitudes should facilitate a later behavioral response. In contrast, attitudes about objects and attitudes unrelated to behavioral outcomes may require additional cognitive work to guide behavior.

There are also contextual conditions that affect the relevance of an attitude for a behavior. For example, individuals often report their attitudes to others but perform their actual actions in private. When *public–private correspondence* is low, attitudes should be poor predictors of behavior. In these cases, people’s attitudes may not apply if the context changes from public to private or vice versa (Kraus, 1995; Leippe & Elkin, 1987; Schlenker, 1980).

Hedonic–instrumental correspondence appears to operate in a similar way. Hedonically oriented behaviors, such as playing, tend to be affectively driven. Instrumentally oriented behaviors, such as studying for a test, are more cognitively driven (Millar & Millar, 1998; Millar & Tesser, 1992). Therefore, focusing on feelings at the time of the information reception may facilitate the attitude–behavior correlation when the behavior is hedonic. Moreover, focusing on feelings may decrease attitude–behavior correspondence when the behavior is instrumental. The reverse is also true. Focusing on cognitions may increase the attitude–behavior correspondence when the behavior is instrumental. However, a cognitive focus may decrease correspondence when the behavior is hedonic (Millar & Tesser, 1986). Thus, higher hedonic–instrumental correspondence should be associated with stronger attitude–behavior correlations (see the lower panel of Figure 1).

It is notable that the degree to which one thinks about an attitude object can interact with the information about which one thinks (see the lower panel of Figure 1). For example, people who initially report attitudes toward a behavior can use those attitudes as a basis for behavior later. Similarly, people who report attitudes in public can easily apply these responses when the behavior is public. This correspondence may improve the attitude–behavior relation even when people initially lack ability and motivation to think about the issues at hand. However,

high motivation and ability to think about the attitude object (high amount of thought) may lead one to form attitudes toward behaviors. It may also lead one to consider one's behavior in alternative contexts. Thus, the behavioral relevance of attitudes may not matter when ability and motivation are high.

One- versus two-sided attitude-related information—Attitudes are more likely to be stable and predictive of behavior when the evaluative implications of the initial information are the same at the behavior point (Erber et al., 1995). Thus, univalent information about an object should lead to stronger attitude–behavior correlations than bivalent information (Conner et al., 2002, 2003; Erber et al., 1995; Jonas et al., 2000).

At the time they form an attitude, two factors may induce people to link their attitudes with one-sided information.² First, people can simply receive, gather, or generate (e.g., by answering questions) one-sided information (see Figure 1). Second, greater thought about an issue may increase one's tendency to organize the associated information in a coherent, one-sided way (Sengupta & Johar, 2002; Tesser & Cowan, 1977). Therefore, given a minimum level of thought to form an attitude, receiving or generating one-sided information should increase the attitude–behavior relation. However, only higher levels of thought produce strong attitude–behavior associations when the available information is evaluatively conflicting.

Attitude confidence—People who doubt their attitude should be more likely to attempt to reconstruct it than people who think that their attitude is correct. As a result, attitude confidence may increase the attitude–behavior correspondence by mediating effects on attitude stability (Albarracín, Wallace, & Glasman, 2004; Pelham, 1991; see also Tormala & Petty, 2002, Experiment 4, for more indirect experimental evidence).

At least three factors can influence attitude confidence. First, greater *amounts of thought* can induce attitudes that are based on solid information, which, in turn, increases attitude certainty (Berger, 1992; Krishnan & Smith, 1998). Similarly, attitudes based on *direct experience* may be based on more and better information. As a result, these attitudes may be held with greater confidence (Fazio & Zanna 1978b). Finally, having *one-sided attitude-related information* can also increase attitude confidence because univalent attitudes create less doubt than more complex ones (Jonas et al., 1997; Prislin, Wood, & Pool, 1998).

The Present Meta-Analysis

To examine how people's attitudes predict future behavior, we pooled studies in which participants first received information about a previously unknown object or issue, then reported their attitudes toward that object or issue, and finally had the opportunity to engage in a behavior relevant to that object or issue. We retrieved indicants of (a) the accessibility of the attitude and (b) the stability of the attitude. In addition, we coded for (c) the amount of

²Because we assume that any variation in the valence of the information associated with the attitude may affect attitude stability, *one-sidedness* (vs. *two-sidedness*) of information refers to manipulations that can increase the consistency (vs. inconsistency) of the attitude with beliefs, affect, or behavior as well as the consistency (vs. inconsistency) of different beliefs, different affective reactions, or different behaviors (within-component consistency).

thought that was likely in each condition, (d) the repeated expression of attitudes, and indicators of (e) whether participants formed the attitude on the basis of information relevant to the behavior and (f) whether the information available at the time of attitude formation was one- or two-sided in valence. Also, we recorded (g) the confidence with which the attitude was held.

We then considered the effect of these moderators on the correlation between initial attitudes and future behavior (see Figure 1). In doing this, we included controls for potential confounds, such as the publication year of the report or the time between the attitude and behavior measures, which often affect the attitude–behavior correlation (see, e.g., Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Eckes & Six, 1994).

In looking at the effects of the moderators, we were also interested in the interactions implied in the model in Figure 1. For instance, attitudes based on one-sided information should predict behavior provided that individuals have the ability and motivation to form an attitude. Thus, high and moderate ability and motivation may ensure high attitude–behavior correspondence when the information is one-sided. However, high ability and motivation may be necessary to ensure high attitude–behavior correspondence when the information is double-sided. That is, forming an overall attitude when there is conflicting information may require high amounts of thought (see Sengupta & Johar, 2002; Tesser & Cowan, 1977).

Figure 1 also suggests an interaction between the amount of thought and the behavioral relevance of attitudes. People who initially report an attitude toward a behavior may easily use this attitude for the behavior. Similarly, individuals who report an attitude in public may easily use this attitude for a public behavior. Further, associating attitudes with beliefs about the outcomes of a behavior may increase the chance of thinking of those outcomes at the time of the behavior performance. As a consequence, behaviorally relevant attitudes should produce higher attitude–behavior correlations. This effect, however, may only be the case when motivation and ability are low. For example, high-thought individuals may spontaneously consider how they would behave even if they are not asked to report it. They may also spontaneously think about their potential private responses when they report attitudes in public. Further, they may spontaneously associate a behavior with a number of possible consequences (see Albarracín & Wyer, 2001). Thus, a higher level of thought may ensure strong attitude–behavior correlations even when the previously reported attitude was not relevant to the current behavior decision (see Ajzen & Sexton, 1999).³

Method

Bibliographic Search

We searched for empirical reports on the attitude–behavior relation involving novel objects that were available by October 2004. We initially searched PsycINFO, the Communication

³Note that amount of thought could also interact with attitude accessibility or attitude confidence. For example, Fazio (1990) suggested that chronically accessible attitudes can predict behavior when motivation and cognitive capacity are low. The degree to which the attitudes are automatically retrieved from memory, however, may not matter when motivation and ability are high. However, this does not apply to our review because participants are unlikely to have previous accessible or confident attitudes toward novel objects.

and Mass Media Complete Database, the Sociological Collection Database, the Social Science Citation Index, and Dissertation Abstracts International using the keywords *attitude formation, attitude and behavior, attitude change, persuasive message, persuasion and behavior, behavior prediction, intention and behavior, and nonattitudes*. We also checked the reference lists of the meta-analyses and reviews of the attitude–behavior relation available by 2004 (e.g., Armitage & Conner, 2001; Cooke & Sheeran, 2004; Kim & Hunter, 1993; Kraus, 1995; Notani, 1998; Ryan & Bonfield, 1975; Sheppard et al., 1988; Van den Putte, 1993) and reviewed a systematic collection of 530 empirical manuscripts on the attitude–behavior relation that Dolores Albarracín possesses. Once we identified the scope and type of studies available for inclusion, we further searched databases for combinations of keywords, including *reflection and behavior, argument and behavior, motivation and behavior, ability and behavior, accessibility and behavior, stability and behavior, confidence and behavior, involvement and behavior, elaboration likelihood model and behavior, heuristic systematic model and behavior, and risk perceptions and behavior*. We also retrieved citations of studies involving well-known behavior research paradigms using the keywords *puzzles and attitudes, essay and attitudes, exams and attitudes, petition and attitudes, prisoner’s dilemma and attitudes, and candidate and attitudes*. To further our search for new social objects or behaviors, we combined the keywords *new, novel, fictitious, and unknown* with the keywords *candidate, screening, behavior, method, risk, policy, product, issue, technology, hazard, and group*, always allowing for up to three words between the keywords. This procedure allowed us to identify citations relevant to issues such as *new cancer screening and new sexually transmitted disease screening*. Finally, we retrieved citations related to the attitude–behavior relation from the Internet-based conference proceedings database of the Association of Consumer Research and searched three other Internet-based databases to locate theses and dissertations from universities outside of the United States (i.e., the Index to Theses, the Foreign Doctoral Dissertations Database of the Center for Research Libraries, and the database of the Institute for Psychology Information in Germany). Although calculating the precise number of citations obtained from this search is difficult, the total number of citations retrieved from electronic databases exceeded 25,000, without consideration of overlap.

To further ensure that our literature search procedures were thorough, we manually examined the reference lists of the studies we encountered during the process. We also manually checked the indexes of the most relevant publications in the area, including *Journal of Personality and Social Psychology, Personality and Social Psychology Bulletin, Journal of Experimental Social Psychology, and Journal of Consumer Research*, since the year 1995, when Kraus’s (1995) attitude–behavior meta-analysis was published. Finally, we sent a request for unpublished reports to the e-mail lists for the Society of Personality and Social Psychology and the Association for Consumer Research in two instances at two points in time and contacted authors of reports that were missing attitude–behavior correlations and that met our inclusion criteria and were published after 1990.

Inclusion Criteria

We were interested in attitude formation rather than attitude change. Thus, we selected studies involving attitude–behavior correlations that presented participants with unknown

objects or issues. For instance, we included studies that presented puzzles or unfamiliar commercial products in experimental settings (see Regan & Fazio, 1977, Experiment 2; Sengupta & Fitzsimons, 2000). Further, we selected studies that inquired about new issues (e.g., the institution of a parking fee at the university; Leippe & Elkin, 1987) and studies of behaviors regarding new issues (e.g., voting in favor of or against the institution of comprehensive exams; Albarracín & Wyer, 2000). Correspondingly, we excluded research on attitudes about highly familiar objects. These involved health-related behaviors (e.g., Turner et al., 1994), (real) political candidates (e.g., Cacioppo et al., 1986; Fazio & Williams, 1986), familiar commercial products (e.g., Fazio et al., 1989; Kokkinaki & Lundt, 1997), religion (Zanna, Olson, & Fazio, 1981), and (real) social groups (e.g., Blessum, Lord, & Sia, 1998).

To ensure that participants formed an attitude rather than entirely deducing an attitude from previous ones (Prislin et al., 1998), we excluded surveys and control conditions. These types of studies do not present information on which to base an attitude or provide opportunities to acquire direct experience with the object (e.g., Sivacek & Crano, 1982, Study 1). In addition, we included studies only if they incorporated a measure of attitudes and an observation of overt behavior. Studies that measured intentions (e.g., intentions to try a new detergent; Lutz, 1977; whether participants were willing to recommend one product instead of another; Miniard & Cohen, 1983) were excluded. Finally, we excluded studies in which researchers elicited the relevant behavior before the attitude (e.g., second measure of attitudes; Ajzen & Fishbein, 1974; Wilson et al., 1984, Experiment 2) because these studies did not allow for causal inferences about the influence of attitudes. Of the studies that did meet our inclusion criteria, some were excluded because they lacked an attitude measure (e.g., Berning & Jacoby, 1974; Chaiken, 1979; Wilson & Schooler, 1991) or did not report the attitude-behavior correlation (e.g., Songer-Nocks, 1976).

The search for studies resulted in 29 research reports. This set represents a smaller and more specific literature than the ones synthesized in previous attitude-behavior meta-analyses addressing influences of accessibility and stability (i.e., Cooke & Sheeran, 2004; Kraus, 1995). However, our database excluded unknown past experiences with the attitude object. Thus, we were able to infer the factors associated with accessibility and stability from the context of the attitude formation. Further, this was possible even when researchers did not report or manipulate those factors. Consequently, despite the use of conservative inclusion criteria, the number of conditions available for each moderator in our data set greatly exceeded those in previous studies.

The 29 research reports included in the meta-analysis involved 41 studies and 128 study conditions. Of those conditions, 109 were statistically independent, whereas 19 were based on longitudinal measures completed by the same group of participants. These longitudinal measures allowed us to assess the longitudinal stability of attitudes. However, because the inclusion of the longitudinal reports violates statistical independence assumptions, we presently report results that both include and exclude the dependent conditions.

Study Variables

Two investigators independently coded the studies. Disagreements were resolved by discussion and consultation with experts. Kappa coefficients for each variable ranged from .79 (91% of agreement) to 1.00 (100% agreement). Perfect agreement was obtained in 14 (out of 17) coded variables.

The variables we recorded included the attitude–behavior correlations in each study condition and the potential moderators of that correlation (see Figure 1). Some of the moderators of interest could be found directly within the study reports (e.g., response latencies in each condition and repeated report of attitudes). Other moderators were more inferential (e.g., outcome and value relevance). Study moderators included (a) the accessibility of attitudes, as indicated by the reverse of response latencies; (b) the stability of attitudes at two points in time; (c) the likely amount of thought; (d) the repeated expression of attitudes; (e) the behavioral relevance of the initial attitude; (f) the association of the initial attitude with one-sided information; and (g) the confidence with which the attitude was held. We also coded for (h) potential confounds to control for differences in the study reports included in the meta-analysis.

Attitude–behavior correlations—We retrieved correlations from each study condition included in the meta-analysis. Attitudes were generally measured by semantic differential scales with anchors such as *very good* versus *very bad* (Berger & Mitchell, 1989), *something that I like* versus *something I don't like* (Albarracín & Wyer, 2001), or *pleasant* versus *unpleasant* (e.g., Albarracín & Kumkale, 2003). Measures of overt behaviors included, for example, the number of times participants worked on each of several types of puzzles (e.g., Regan & Fazio, 1977, Experiment 2) or whether participants voted in favor of or against the institution of comprehensive exams in a lab poll (e.g., Albarracín & Wyer, 2000, 2001).

Attitude accessibility—Whenever possible, we retrieved the mean response time (latency) to report attitudes in seconds. Response latencies were assigned a negative sign and used as a measure of attitude accessibility in analyses (see Table 1).

Attitude stability—We used absolute standardized differences between the initial and later measures of attitude to represent attitude stability. Specifically, we obtained Becker's *g* in each condition by subtracting the later attitude report from the initial attitude report and dividing the resulting figure by the standard deviation of the first attitude report. Then we removed the sign of the difference to represent absolute attitude change (e.g., Albarracín & McNatt, 2002). At the end, we reversed the sign of this variable in analyses to indicate the influence of attitude stability instead of change.

Indicators of amount of thought—We recorded the participants' motivation and ability to think about the object or issue at the time of the attitude formation. *Motivation* included the levels of (a) outcome relevance, (b) value relevance, and (c) need for cognition (Cacioppo & Petty, 1982) in each particular sample. Outcome relevance involved the pertinence of the attitude issue to the participants' current goals and was classified as low, moderate, or high. When the issue had no consequences for participants' current goals (e.g.,

participants played with puzzles or with video games for recreational purposes; Doll & Ajzen, 1992; Millar & Tesser, 1989; participants were told that they would not be affected by the introduction of a new policy; Albarracín & Kumkale, 2003), outcome relevance was coded as low. When the issue (e.g., policy) could have consequences for participants' goals but it was not clear how participants might be affected (e.g., there was a policy to be introduced, but participants did not know when or whether they would partake in the decision process; Albarracín & Wyer, 2001), we coded outcome relevance as moderate. When the issue was directly relevant for the participants' goals (e.g., solving puzzles to practice for a test; Millar & Tesser, 1986; acquisition of one product instead of another; Berger & Mitchell, 1989; having the opportunity to influence decision makers with regard to a policy related to one's political stance; G. L. Cohen, 2003; voting on a referendum to decide on the institution of a policy that will affect oneself; Albarracín & Kumkale, 2003), we coded outcome relevance as high.^{4,5}

Value relevance was coded as high or low depending on the implications of the attitude issue to people's values. For example, we coded value relevance as low when researchers presented participants with irrelevant issues, such as puzzles (Fazio & Zanna, 1978b) or video games (Doll & Ajzen, 1992). In turn, we coded value relevance as high when the research concerned issues more likely to be salient to participants' enduring values (e.g., a social program to help poor families; G. L. Cohen, 2003; the institution of comprehensive exams at the university; Albarracín & Wyer, 2001).⁶ Finally, we coded need for cognition as high and low when researchers divided separate groups according to a median split or similar procedure (e.g., H. M. Wallace, 2003) and as mixed when researchers did not split the study samples on the basis of need for cognition.

Ability comprised (a) concentration and (b) information repetition. We coded conditions as low in concentration when participants were distracted while they received the attitude-relevant information (e.g., a high-volume conversation was played at the time of the message reception; Albarracín & Kumkale, 2003). Correspondingly, conditions were high in concentration (i.e., low in distraction) when either the environment was silent (e.g., Leippe & Elkin, 1987) or only low-volume, content-free background noise was presented in a laboratory setting (e.g., Albarracín & Kumkale, 2003). We coded information repetition as low or high depending on whether the researchers presented the information once or multiple times, respectively (e.g., Berger & Mitchell, 1989; see Kumkale & Albarracín, 2004, for similar procedures).

⁴High outcome relevance excluded conditions in which the main goal was to undergo public scrutiny (e.g., discuss one's attitudes; Albarracín & Wyer, 2000; demonstrate one's video game playing skills; Doll & Ajzen, 1992; see Leippe & Elkin, 1987).

⁵We coded outcome relevance on the basis of the instructions participants received before they reported their attitudes. Thus, when participants received instructions to choose a product (e.g., Sengupta & Fitzsimons, 2000) or use a series of puzzles to practice for an analytical test (Millar & Millar, 1996) after they reported their attitudes, we coded outcome relevance as low regardless of those instructions. In one study (i.e., Sivacek & Crano, 1982), however, outcome relevance was coded on the basis of participants' reported involvement (i.e., participants indicated the extent to which they felt that the institution of comprehensive exams at the university would affect them) rather than on actual manipulations.

⁶According to this coding scheme, a condition can be high in outcome relevance and low in value relevance or vice versa. For example, participants can evaluate different brands of candy (low value relevance) to select one brand of candy (high outcome relevance; Berger & Mitchell, 1989). Conversely, the institution of comprehensive exams at the university (high value relevance) may not affect the goals of the participants who evaluate those exams if the policy is to be implemented for future students and they do not expect to partake in the decision process when they form an attitude (low outcome relevance; Albarracín & Kumkale, 2003).

Repeated expression or report of attitudes—We recorded the number of times participants reported their attitudes before they engaged in the relevant behavior. In most of the conditions, participants reported their attitudes only once. In the remaining conditions, researchers explicitly manipulated the number of attitude expressions in a single session (e.g., Fazio et al., 1982, Experiment 4) or measured the participants' attitudes at various points of time (e.g., H. M. Wallace, 2003).

Direct behavioral experience—We recorded whether participants in each group had direct experience with the object. Typical manipulations of direct behavioral experience involved playing with (novel) puzzles (Regan & Fazio, 1977, Experiment 2) or trying (previously unknown) products (e.g., Berger & Mitchell, 1989) before measures of attitudes and behaviors were obtained.

Behavioral relevance of initial attitudes—We coded conditions with respect to behavioral relevance by assessing (a) the use of measures of attitudes toward specific behaviors and (b) the strength of the association of the initial attitudes with cognitions about behavior outcomes. We also classified conditions in terms of the (c) public–private and (d) hedonic–instrumental correspondence between the initial attitude and the overt behavior.

We recorded whether participants reported attitudes toward behaviors (e.g., voting for the institution of comprehensive exams at the university; Albarracín & Wyer, 2000) or targets (e.g., the institution of comprehensive exams at the university; Albarracín & Kumkale, 2003). In addition, when possible, we retrieved the correlation between cognitions of behavioral outcomes and attitudes. Measures of cognitions of behavioral outcomes consisted of the sum or average of the perceived likelihood of each behavior outcome weighted by the desirability of each event (e.g., participants reported on a 10-point scale whether they believed that voting in favor of the institution of comprehensive examinations at the university would result in a salary increase for the university graduates and then evaluated that possibility along a scale from –5 to 5; Albarracín & Wyer, 2001).

To register the effect of public–private correspondence, we first recorded whether participants reported their attitudes in public or in private. We also recorded whether the actual behavior was public or private. Low public–private correspondence comprised conditions in which participants first reported their attitudes in a private way but then performed a behavior that others could observe and judge (e.g., participants wrote and signed an editorial in favor of or against a new social policy; G. L. Cohen, 2003; participants were asked to demonstrate their video game playing skills to others; Doll & Ajzen, 1992). It also comprised conditions in which participants reported an attitude in public but later performed a behavior without witnesses (e.g., participants initially believed that they would discuss their attitudes with a researcher at a later time, but they performed the attitude-relevant behavior in private; Alleman, 1998; Leippe & Elkin, 1987). Moderate public–private correspondence included conditions in which participants explained the reasons for their attitudes. This manipulation may elicit reports that are socially acceptable even when the actual report is private (e.g., reason-analysis conditions; Millar & Tesser, 1986). Finally, high public–private correspondence involved conditions in which the attitude and the behavior were measured in similarly private or public ways.

In addition, we recorded the hedonic–instrumental correspondence of participants’ focus at the time they formed an attitude and the type of behavior they later performed. In particular, the high level of hedonic–instrumental correspondence comprised conditions in which participants concentrated on their feelings about an object and later performed a hedonic behavior (e.g., participants focused on how they felt about a series of puzzles and later played with those puzzles; Millar & Tesser, 1986). In addition, it comprised conditions in which participants focused on reasons in support for their evaluations of the object and later performed an instrumental behavior (e.g., participants reported the reasons for their attitudes toward a series of puzzles and later used those puzzles to practice for a test of analytical ability; Millar & Tesser, 1986; participants received arguments supporting comprehensive exams and later wrote an essay to communicate their opinion about the exams to the university administration; Leippe & Elkin, 1987). We coded conditions in which participants possessed affective and instrumental information (e.g., researchers induced positive or negative mood and also presented a persuasive communication about the outcomes of instituting comprehensive exams at the university; Albarracín & Kumkale, 2003) as well as conditions in which participants were not specifically induced to focus on cognitions or affect (e.g., participants had direct experience with analytical puzzles; Regan & Fazio, 1977) as moderate in hedonic–instrumental correspondence regardless of the type of behavior they performed later. This coding was based on the assumption that either the relevant or the nonrelevant bases might be available at the time of the behavior. Finally, we considered hedonic–instrumental correspondence as low when participants initially had an affective focus and later performed an instrumental behavior (e.g., participants initially reported their feelings about a puzzle but later practiced for an analytical test; Millar & Tesser, 1986) or initially had a cognitive focus and later performed a hedonic behavior (e.g., participants first reported the reasons for their attitudes toward several puzzles but later played with those puzzles; Millar & Tesser, 1986).⁷

Information one-sidedness—To indicate one-sidedness, we first coded for (a) the reception of one-sided information and (b) the absence of an induction of nonspontaneous two-sided thoughts about the attitude object. We coded conditions that presented participants with either positive or negative affect (e.g., Albarracín & Kumkale, 2003), either propolicy or antipolicy persuasive messages (e.g., Leippe & Elkin, 1987), either favorable or unfavorable information (e.g., Berger, 1999; Sengupta & Fitzsimons, 2000), and either positive or negative bogus behavioral feedback (e.g., Albarracín & Wyer, 2000) as involving the reception of one-sided information. In contrast, we coded conditions in which participants received two-sided messages (e.g., H. M. Wallace, 2003) or were allowed to interact freely with the attitudinal object (i.e., direct and indirect experience; Regan & Fazio, 1977, Experiment 2) as presenting two-sided information.^{8,9}

⁷In some conditions (e.g., R.W. Johnson, McArthur, & Wright, 1991; Sengupta & Fitzsimons, 2000), participants focused on their cognitions after they first received the information that provided the basis for their attitudes. However, these participants were likely to form their attitudes on the basis of information they originally received rather than the information that was the focus of their introspection later on. Therefore, we did not consider this manipulation when coding for the consistency of the focus at the time of the attitude and the time of the behavior (see R. W. Johnson et al., 1991).

⁸As suggested by Ha and Hoch (1989) and by Reed et al. (2002), experience might provide ambiguous information when objects are not clearly distinguishable from similar objects, are evaluated on the basis of irrelevant dimensions, or do not present specific positive or negative information. The objects with which participants had direct or indirect experience were not selected to be positive or negative on the basis of pilot data. Thus, we assumed that interacting freely with them would provide mixed information about their

We also recorded whether the researcher induced participants to consider two-sided information about the topic that was unlikely to emerge spontaneously. This coding considered the introduction of questions measuring outcome beliefs and evaluations about the outcomes of a behavior, which were often used in research by Albarracín and Kumkale (2003; Albarracín & McNatt, 2002). In this work, the researchers first presented (one-sided) positive or negative information about comprehensive exams (e.g., a mood or a persuasive message). They later measured cognitions about both negative and positive outcomes of the exams (for a validation of these procedures, see Albarracín, 2002). It is important to note that participants in this population tended to spontaneously think about negative outcomes of comprehensive exams (for a detailed report of the elicitation procedures that established this, see Albarracín & Wyer, 2001). Hence, questions about negative outcomes should not force thoughts about two-sided information even when participants initially received positive information. However, questions about positive outcomes can induce nonspontaneous thoughts when participants initially receive negative information. Therefore, we coded conditions in which participants answered questions about positive outcomes after receiving negative information as induction of nonspontaneous two-sided thoughts (e.g., Albarracín & Kumkale, 2003, Experiment 2). In addition, we coded conditions in which some participants received negative information and others received positive information but all answered questions about positive outcomes (e.g., Albarracín & McNatt, 2002, Experiment 1, Conditions 10, 11, and 12; see Table 1) as sometimes receiving nonspontaneous two-sided thoughts. All other conditions were coded as not inducing nonspontaneous two-sided thoughts.

Confidence—When possible, we recorded the level of attitude confidence participants reported in each condition. Items to measure confidence included “How confident are you in each of the ratings you have just made?” (Fazio & Zanna, 1978b, p. 232) and “I am sure about my attitude about the institution of comprehensive exams” (H. M. Wallace, 2003). Because there were differences in the scales of confidence measures across studies, we converted the confidence means to proportions. We did this by first calculating the position of the mean confidence in a study condition relative to the lowest value of the scale and then dividing this value by the number of positions of the scale (see Albarracín et al., 2003, for the use of this procedure). Thus, a mean confidence of 6.13 on a scale from 1 to 7 (Berger & Mitchell, 1989) resulted in a scale-free mean confidence of 0.73.

Other moderators—To observe the effect of time on the attitude–behavior relation, we first recorded whether researchers introduced a time gap between the attitude and the behavior measures. We next operationalized the time gap as the number of days elapsed

favorableness. The only exception was Berger and Mitchell’s (1989) indirect experience conditions, which were coded as one-sided. In these conditions, researchers first asked a sample of participants from the target population to taste five brands of candy bars (participants were told that the candy bars had been successfully marketed in other countries) and to describe their experience. Next, the researchers designed experimental ads by combining that information with commercials previously used to promote the candy bars. It is very likely that these procedures undermined negative aspects of the candy bars and emphasized positive ones.

⁹Conditions in which participants were induced to experience positive affect before the presentation of antipolicy arguments as well as conditions in which participants were induced to experience negative affect before the presentation of propolicy arguments (i.e., Albarracín & Kumkale, 2003; Albarracín & Wyer, 2001) were coded as one-sided because positive affect induces a bias in favor of the advocacy regardless of whether the advocacy is pro- or counterattitudinal (see Albarracín & Kumkale, 2003).

between the two measures. Thus, a 30-min gap was coded 0.02, and a 5-day gap was coded 5.00.

In addition, we recorded the type of research paradigm used in each study. This potential confound was represented by two variables. One variable indicated whether researchers used the puzzle research paradigm (e.g., participants had direct or indirect experience with a series of analytical puzzles followed by a free-play period; e.g., Millar & Millar, 1996, Experiments 2 and 3). The other indicated whether researchers used the comprehensive exams research topic (e.g., researchers presented arguments in favor of or against the institution of comprehensive exams at the university and then asked participants to vote in favor of or against the institution of the exams; Albarracín & Kumkale, 2003). Finally, we recorded whether each report was published and the year of publication or write-up of the report.

Data Analysis

We used fixed- and random-effects procedures to calculate weighted-mean attitude–behavior correlations and to conduct moderator analyses. The fixed-effects procedures assume that a single or few well-demarked effects underlie the effects sizes synthesized in a meta-analysis. The random-effects procedures, in contrast, assume a random population of effect sizes from which the effect sizes in a meta-analysis are drawn. Thus, in the fixed-effects models the variance of an effect size depends on the error of the particular study. In turn, in the random-effects models the variance includes the error of the particular study plus the variance of the sample of effect sizes as an estimate of the population variance. For these reasons, the random-effects approach allows for generalization to a broader universe of studies and is more appropriate when there is heterogeneity in the database under study. However, it can be excessively conservative and thus increase Type II error (see Hedges & Olkin, 1985; Hedges & Vevea, 1998; but see Hunter & Schmidt, 2000).

In the fixed-effects models we calculated the weighted average correlations following the recommendations of Hedges and Olkin (1985). In these procedures, traditional correlation coefficients are transformed into z coefficients and weighted by $N - 3$. For interpretation purposes, the resulting weighted-mean z values are converted back to r using Fisher's z -to- r transformations. The random-effects models were calculated according to the recommendations of Lipsey and Wilson (2001).

We initially estimated the weighted-mean attitude–behavior correlation and the corresponding homogeneity test (Q). Then, we performed between-units moderator analyses. For this purpose, we first used the aforementioned procedures to calculate the weighted-mean attitude–behavior correlation and confidence intervals (CIs) for each moderator level. Second, we conducted weighted-least-squares simple regressions and corrected the standard errors following procedures recommended by Hedges and Olkin (1985).

It is important to note that we used two strategies to avoid violations of statistical independence in these analyses. First, we simply eliminated the statistically dependent within-subject measures in longitudinal reports. Second, we used the *shifting unit of analysis*

approach (Cooper, 1998). This approach entails decomposing conditions in studies showing variability in the moderator and clustering conditions in studies not showing variability in the moderator. For example, Albarracín and Wyer (2000, Experiment 1) induced two levels of concentration but one level of outcome relevance. Leippe and Elkin (1987) induced two levels of outcome relevance but only one level of concentration. Thus, Albarracín and Wyer's (2000, Experiment 1) study contributed two effect sizes for the analysis of ability and one for the analysis of outcome relevance. Leippe and Elkin's (1987) report contributed one effect size for the analysis of ability and two for the analysis of outcome relevance. (See Table 1 for a description of the manipulated conditions in those studies.) Weighted multiple regression analyses were performed excluding and including the conditions that involved reports by the same participants.

We also conducted within-unit moderator analyses to estimate the effect of the variables of interest while controlling for differences between units. For this purpose, we first estimated the simple correlation between a given moderator and the attitude–behavior correlation using the different conditions of each report.¹⁰ These correlations could only be computed when a report had three or more conditions (e.g., two direct experience conditions and two no-experience conditions; Millar & Millar, 1996, Experiments 3 and 4; two high and one low public–private correspondence condition; Wilson & Dunn, 1986). We next transformed individual correlations to z coefficients and weighted them by the number of participants included in each report minus 3 to obtain an estimate of the effect of the moderator across all reports. Finally, we transformed the resulting z coefficient back to Pearson correlations. We used z tests to estimate whether these correlations were different from zero, using the total number of participants in the synthesized reports as the sample size for the analysis. We conducted these procedures using fixed-effects approaches.¹¹

Finally, we performed mediation analyses using EQS (Structural Equations Modeling Software; Bentler & Wu, 1995). For these analyses we used maximum likelihood estimation methods and set the sample size of the overall analyses at the level of the minimum sample size in the correlation matrix. We corrected the standard error of the resulting coefficients using Hedges and Olkin's (1985) methods.

¹⁰We used reports rather than studies for these analyses to maximize the number of units integrating the minimum three conditions necessary to calculate Pearson correlations. Thus, for example, when a report described two studies involving two and four conditions, respectively, we estimated correlations between moderators and the attitude–behavior relation by pooling all six conditions (see, e.g., Fazio & Zanna, 1978b, Experiments 1 and 2).

¹¹An advantage of these analyses is that we can estimate moderating effects even for reports that did not provide the statistics to calculate the precise effects of the moderators. These analyses, however, ignore reports with $k < 3$. Thus, when possible, we estimated the exact differences between attitude–behavior correlations to supplement these analyses. We converted these to correlations. For example, Wilson and Dunn (1986, Experiment 2) reported $t_s = 2.51$ and 2.60 for three conditions representing two levels of behavior relevance. These t tests ($N_s = 96$ and 95 , respectively) resulted in $d_s = 0.51$ and 0.54 and $r_s = .25$ and $.26$. We averaged these r_s to obtain an estimate of the impact of the behavioral relevance in this study. In other studies, we could calculate r_s by regressing the behavior on the moderator, the attitude measure, and the interaction between the two and then dividing the resulting unstandardized regression coefficient for the interaction term by the corresponding standard deviation (see J. Cohen, 1977). With this method we estimated, for example, an effect for outcome relevance of $r = .16$ from $B = 0.08$ and $SD = 0.52$ (Albarracín & Kumkale, 2003, Experiment 2). The r_s obtained were weighted by the number of participants in each study minus 3 and combined into a single weighted correlation for each moderator. The units in these analyses were studies.

Results

Average Correlation and Description of Studies

The 128 conditions included in the meta-analysis involved 4,598 participants. The overall weighted-mean attitude–behavior correlation was .52 (95% CI = .49, .54) according to the fixed-effects approach and .51 (95% CI = .48, .54) according to the random-effects approach. However, there appeared to be considerable variance among studies, $Q(127) = 278.23, p < .001$.

Given the difficulty of studying attitude formation in real-world situations, most of the studies we selected were carried out in the laboratory with college students. Only one of the studies (Regan & Fazio, 1977, Study 1) examined attitude formation in the field.

Researchers measured the behavior immediately after measuring attitudes in 44% of the cases and introduced a gap of between approximately 15 min and 2 weeks in the remaining cases. Fifty-one percent of the study conditions presented participants with relatively irrelevant objects, such as puzzles (e.g., Regan & Fazio, 1977, Experiment 2; Wilson et al., 1984, Experiment 1) or videos (e.g., Doll & Mallü, 1990). The rest used more important issues, such as the institution of comprehensive exams at the participants' university (i.e., Albarracín & Wyer, 2001). Outcome relevance was low, moderate, and high in 44%, 35%, and 21% of the conditions, respectively. Most of the samples (84%) were composed of participants of mixed levels of need for cognition. Participants were relatively distracted when receiving the information about the attitude object in 7% of the conditions and received the information about the topic more than once in 6% of the cases integrated in this meta-analysis.

Participants reported their attitudes once in 83% of the study conditions, obtained direct behavioral experience with the object in 31% of the cases, and reported attitudes toward behaviors in 35% of the conditions in this review. Public–private correspondence was high in 77% of the cases, moderate in 13% of the cases, and low in 9% of the cases. Hedonic–instrumental correspondence was high in 34% of the cases, moderate in 56% of the cases, and low in 9% of the cases. Forty-six percent of the conditions included two-sided information about the issue being studied, and 8% entailed consideration of two-sided information by means of questions about the pros of an issue that participants were unlikely to consider spontaneously. Thirty-one percent of the conditions used puzzles, and 46% included comprehensive exams as the main study topic. Table 1 describes the studies and conditions included in the meta-analysis in relation to the theoretical variables of interest.

Between-Units Moderating Effects

Simple analyses—We analyzed the influence of individual moderators on the attitude–behavior relation. For this purpose, we first calculated the weighted-mean attitude–behavior correlation and CIs for each level of the moderators. We used the shifting unit of analysis procedures for these analyses because they collapse across levels of the moderators not examined in each analysis (see the *Data Analysis* section for a detailed explanation of these procedures). When moderators were categorical (e.g., outcome relevance), we simply calculated the mean-weighted attitude–behavior correlation for each level of the moderator

(e.g., high, moderate, and low outcome relevance) across all studies. When moderators were continuous (e.g., stability), we first estimated the mean of the moderator for all conditions in each study that reported measures of the moderator. We then classified the studies into high and low levels of the moderator using median splits. Finally, we estimated weighted-mean attitude–behavior correlations for each of those levels.

Second, to obtain comparable estimates of the moderators' effects, we regressed the attitude–behavior correlation on each relevant moderator. We conducted these regressions using random- and fixed-effects procedures and three different samples of conditions: (a) shifting unit of analyses conditions, (b) statistically independent conditions, and (c) all conditions. The weights for fixed-effects models followed Hedges and Olkin's (1985) computational formulas. The weights for random-effects models followed Lipsey and Wilson's (2001) formulas.

The results from these analyses using the fixed-effects approach appear in Table 2. The 4th and 5th columns of the table show the weighted-mean attitude–behavior correlations and CIs for the different levels of the moderators. The 6th, 8th, and 11th columns summarize the corresponding simple weighted regression coefficients. As expected, the attitude–behavior correlation was positively associated with attitude stability, high levels of outcome and value relevance, the repeated expression or report of attitudes, the behavioral relevance of attitudes, and the one-sidedness of information participants received or thought about. However, accessibility, ability, direct behavioral experience, and attitude confidence did not show the expected associations with the attitude–behavior correlation. The effects of accessibility, information repetition, and attitude confidence did not reach significance. Direct behavioral experience and concentration were negatively associated with the attitude–behavior correlation. Of note, these results were comparable when we excluded the longitudinal dependent conditions and when we used the shifting of analyses conditions. In addition, these fixed effects were very similar to the random effects that we also examined. Except for concentration, absence of questions about two-sided thoughts, and direct experience, the moderators that were significant in the fixed-effects analyses were at least marginally significant in the random-effects analyses ($p < .08$). Further, the effects from the two approaches were in the same direction and similar in size, according to J. Cohen's (1977) criteria, in all cases.

The findings in Table 2 also shed light on the impact of methodological issues that can affect the attitude–behavior association. As one can see, the attitude–behavior correlation did not vary as a function of the time elapsed between the measure of the attitude and the measure of the behavior. The puzzles research paradigm elicited lower attitude–behavior correlations. The comprehensive-exam topic elicited higher attitude–behavior correlations. Contrary to the possibility that published studies yield stronger effects than unpublished ones, the simple regression analysis revealed greater effects for unpublished studies. Further, more recent reports elicited higher attitude–behavior correlations than older ones.

Multiple regressions—Next, we observed the effect of the moderators on the attitude–behavior relation, controlling for inter-correlations among moderators. For this purpose, we regressed the attitude–behavior correlation simultaneously on all moderators. These

regressions excluded moderators with k s smaller than 128 to maximize statistical power. For the moderators with k s smaller than 128, we conducted separate multiple regressions, controlling for the potential confounds that showed variability in the data sets that reported measures of those moderators.¹² We performed all these analyses using random-effects and fixed-effects procedures, including and excluding the statistically dependent longitudinal conditions.

The 9th and 12th columns of Table 2 summarize the results of the multiple regressions using the fixed-effects approach. As hypothesized, correlations between attitudes and behaviors were stronger when the motivation to think about the issue or object under study was higher. Correlations were also stronger when participants reported attitudes toward the behavior and public–private and hedonic–instrumental correspondence were high. Further, attitudes predicted behavior to a greater extent when there was no reception or induction of two-sided considerations. It is important to note that controlling for all the other moderators rendered the effect of direct experience positive.^{13, 14}

As was the case with the simple regressions, the multiple regressions were very robust. First, the multiple regressions using the random-effects and fixed-effects procedures yielded comparable results. That is, they replicated in size and direction in all cases. Further, aside from the hedonic–instrumental correspondence, the moderators that were significant in the fixed-effects models were also significant or marginally significant in the random-effects models ($p < .10$). Second, the findings were also comparable when we excluded the statistically dependent longitudinal conditions. Third, results also replicated when the multiple regression included composite measures of motivation, behavioral relevance, and one-sidedness (which we created by standardizing and averaging each relevant set of predictors; see bottom section of Table 2).¹⁵ Finally, with regard to the potential confounds, the multiple regression analysis controlled for intercorrelations among the predictors and rendered the effect of the research paradigm nonsignificant. This latter finding demonstrates that the effect of the paradigms used by different researchers disappears after one takes into account the theoretical moderators of interest (see Figure 1).

Within-Unit Moderating Effects

Next, we performed within-unit moderator analyses. In these analyses, we first obtained the Pearson correlations between the attitude–behavior correlation and the moderators that

¹²We controlled for the potential confounds rather than for all moderators to maximize power.

¹³To observe whether the initial inverse effect of direct experience was related to the use of irrelevant issues (e.g., puzzles), we used two procedures. First, we conducted a weighted hierarchical regression analysis by first introducing the value relevance of the attitude issue together with the potential confounds. We then added the indicators of information one-sidedness and behavioral relevance of the initial attitude. Only when we controlled for the information one-sidedness and behavior relevance did direct experience become positively associated with the attitude–behavior correlation. Second, we regressed the attitude–behavior relation on direct experience, the behavior relevance of attitudes, and the interaction between the two, excluding the statistically dependent conditions and controlling for the potential confounds and the value relevance of the attitude issue. The interaction term of this regression was marginally significant ($\beta = 0.29, p < .06$). Attitudes based on direct experience predicted behavior better when behavior relevance was high ($r_s = .59$ vs. $.48$) but not when it was low ($r_s = .39$ and $.35$).

¹⁴Focus on cognitions or arguments was positively associated with the attitude–behavior relation in the fixed-effects models. Focus on mood or affect was unrelated to the attitude–behavior relation. Neither of these moderators, however, was significant when introduced in the multiple regression. This pattern suggests that the effect of the congruence between the attitude and behavior bases supersedes the effect of the specific type of information that bases attitudes.

¹⁵We did not construct a composite measure of ability because the two indicators of ability clearly had different associations with the attitude–behavior correlation.

varied within each report ($k = 3$). We then combined the correlations using the fixed-effects procedures previously used to estimate the weighted-mean attitude–behavior correlation. As in the between-units analyses, the within-unit analyses showed that the attitude–behavior relation was positively associated with attitude stability ($r = .66, p < .001$), outcome relevance ($r = .48, p < .001$), repeated expression of attitudes ($r = .24, p < .001$), the correlation between attitudes and beliefs about behavior outcomes ($r = .50, p < .001$), public–private and hedonic–instrumental correspondence (r s = .57 and .81, both p s < .001), the one-sided nature of the information participants received ($r = .12, p < .05$), and the absence of two-sided questions ($r = .72, p < .001$). Moreover, as in the between-units multiple regression analyses, direct experience was associated with higher attitude–behavior correlations ($r = .83, p < .001$), and concentration did not reach significance ($p < .5$). However, in contrast to the between-units analyses, the associations of the attitude–behavior relation with attitude accessibility, information repetition, and confidence were significant (i.e., r s = .40, .56, and .44, respectively, all p s < .001). Further, the time between the attitude and behavior measures had a marginally significant association in the set of studies integrated in the within-unit analyses ($r = -.09, p < .08$).¹⁶ These differences in the results are not surprising because within-unit analyses provide better control for methodological discrepancies across studies. These controls appear to be especially critical for the measures of response latencies (see Table 1 for the large between-reports differences in accessibility measures). Other than that, both sets of procedures yielded remarkably consistent results.¹⁷

Test of Interactions Between Moderators

Between- and within-unit analyses showed that a number of moderators were linked to attitude–behavior correspondence. However, the relation of those moderators with the attitude–behavior correlation may not be simple. For example, past research has suggested that ambivalent attitudes may influence the attitude–behavior relation differently depending on people’s motivation to detect and resolve the conflicting views implied in those attitudes (Albarracín, 2002; Albarracín et al., 2004; Sengupta & Johar, 2002). Similarly, people with a high amount of thought at the time of the attitude formation may be able to consider behavioral information (Ajzen, 1996). This possibility may be true even if the study does not elicit attitudes toward the behavior, because people may spontaneously evaluate the behavior. It may be true also when the context of the attitude and behavior measure do not match. That is, even when people report their behavior in public, they may still think about their likely response in private. Finally, even when attitudes have low correlations with beliefs about behavior outcomes, people may think about other behavioral issues if they have a chance. In short, the behavioral relevance of the attitude as captured in Figure 1 may not matter when amount of thought is high.

We thus conducted weighted multiple regression analysis to determine whether the information one-sidedness and the behavioral relevance of attitudes influenced the attitude–behavior correlation in combination with amount of thought. Of the indicants of amount of

¹⁶The remaining moderators varied within fewer than two reports.

¹⁷The significance and direction of the effects generally replicated when we combined the precise within-unit effects of each moderator on the attitude–behavior correlation. However, the confidence with which the attitude was held and the time between measures did not reach significance in the data sets summarized in these analyses.

thought, we selected motivation, as opposed to ability. The reason was that ability was not associated with the attitude–behavior relation in the multivariate regressions (see Table 2).

Regressing the attitude–behavior correlation on the motivation to think, the one-sidedness of information participants received or generated, and the interaction between these two variables (using the statistically independent conditions in Table 2 and controlling for the moderators that significantly influenced the attitude–behavior relation in these conditions) yielded a marginally significant interaction term ($\beta = 0.14, p < .09$). The examination of the mean attitude–behavior correlations corresponding to these interactions showed a fairly complex pattern. That is, when the information that participants received or generated was two-sided, highly motivated participants showed higher attitude–behavior correlations than participants with either moderate or low motivation (adjusted weighted-mean attitude–behavior correlation for high-motivation participants was .50, vs. .36 and .39 for moderate- and low-motivation participants, respectively). In contrast, when participants received or generated one-sided information, the attitude–behavior relation was significantly lower when motivation was low than when it was either moderate or high (adjusted weighted-mean attitude–behavior correlation for low motivation equaled .42, vs. .58 and .66 for moderate and high motivation, respectively).

We conducted similar analyses to examine the interaction between motivation and the behavioral relevance of attitudes. The interaction term, after we regressed the attitude–behavior correlation on indicants of motivation and behavioral relevance (together with the significant moderators in the statistically independent conditions in Table 2), was also marginally significant ($\beta = -0.14, p < .09$). Adjusted weighted-mean correlations indicated that behavioral relevance did not matter when motivation was high: Both high- and low-relevance conditions had high correlations between attitudes and behaviors (adjusted r 's = .59 and .57 for high and low relevance). In contrast, when motivation was either low or moderate, behavioral relevance was critical. When motivation was low, the low and high behavioral relevance conditions had r 's = .25 and .45, respectively. Likewise, when motivation was moderate, the low and high behavioral relevance conditions had r 's = .25 and .47, respectively. That is, relevance needed to be high for the attitude–behavior relation to be high in the low-motivation situations.

Mediating Processes in the Attitude–Behavior Relation

The analyses we reported earlier examined the effects of the proposed moderators on the attitude–behavior correlation. However, these analyses cannot establish the order in which these moderators exerted their effect (see Figure 1). Establishing a causal sequence from meta-analytic correlational data is not always possible. However, the relations proposed in our study relied on a solid theoretical foundation. Further, our database excluded the uncontrolled effect of past experiences with the attitude object. These two aspects make our data set ideal for mediational analyses (see, e.g., Shadish, 1996).

Of course, we could not fully test the model in Figure 1 because only some studies reported attitude accessibility and stability. However, we conducted three partial analyses that shed light on the relevant issues. The first two concerned the effect of accessibility, and the third examined stability as a mediator of the processes we considered.

Attitude accessibility—As we explained previously, the measures of attitude accessibility were not comparable across study reports (see Table 1). Thus, we followed the fixed-effects within-unit calculations to see whether accessibility mediated the effects of other moderators on the attitude–behavior correlation (see left side of Figure 1). For this purpose, we used listwise deletion procedures to construct two separate correlation matrices. The two correlation matrices included the within-unit weighted-mean correlations (calculated from Pearson correlations) between the attitude–behavior correlation and the relevant moderators.¹⁸ The sample size in these analyses equaled the number of participants in the matrix. These correlation matrices were constructed for repeated attitude expression or report and direct behavioral experience. These were the two moderators that affected the attitude–behavior correlation and varied in more than one report that included measures of attitude accessibility.¹⁹ The relevant path models appear in Figure 2, Panels A and B. A visual inspection of each model together with the corresponding Sobel (1982) tests indicated that accessibility mediated the influence of the repeated expression of attitudes and direct experience.

Attitude stability—We next fitted a path analysis to observe the mediating role of stability depicted in Figure 1. This analysis allowed us to examine the influences of participants' motivation (assessed through a composite of value relevance, outcome relevance, and need for cognition), the behavioral relevance of attitude (as indicated by the correlation between attitudes and cognitions about behavioral outcomes), the one-sidedness of the information participants received or were induced to think about (as assessed by a composite of the reception of one-sided information and the absence of induction of two-sided nonspontaneous thoughts), and the reported attitude confidence (as assessed by participants' ratings of confidence, standardized to control for differences in confidence scales) on attitude stability and on the attitude–behavior correlation. The correlation matrix used as a basis for this analysis was obtained through pairwise deletion. It involved simple correlations among all the variables in the model (e.g., between the scale-free mean attitude confidence and attitude–behavior correlation).

The results from the path analysis are displayed in Figure 3 (fit indexes are reported in the figure caption). As predicted, greater attitude confidence, behavioral relevance of attitudes, and one-sidedness of the attitude-related information all correlated with greater attitude stability. In addition, one-sidedness of the attitude-related information also affected attitude stability by inducing greater attitude confidence (Sobel $z = 2.03$, $p < .05$). Attitude confidence, the behavior relevance of attitudes, and the information one-sidedness, in turn, influenced the attitude–behavior correlation by promoting more stable attitudes (Sobel $z = 4.08$, $p < .001$; Sobel $z = 2.32$, $p < .05$; and Sobel $z = 2.79$, $p < .001$, respectively). Finally, a significant Sobel test suggested that the effect of motivation on the attitude–behavior relation was mediated by greater behavioral relevance of attitudes (Sobel $z = 2.02$, $p < .05$; the

¹⁸We used listwise rather than pairwise deletion for these analyses because the matrices resulting from pairwise deletion were anomalous.

¹⁹We constructed two separate correlation matrices because no study that included measures of accessibility manipulated both repeated attitude expression or report and direct behavioral experience.

attitude—behavior correlation instead of stability was used as the outcome variable for this analysis because the latter was not associated with motivation in this data set).^{20,21}

Disentangling Accessibility and Stability

The ideal test of the model in Figure 1 is to simultaneously introduce attitude accessibility (which should reflect retrieval of attitudes from memory) and attitude stability (which may reflect attitude retrieval but also reconstruction) along with the antecedents of the two as external variables. However, we could not fit this model because few conditions reported both accessibility and stability measures.

To distinguish accessibility and stability, we thus used other approaches. To begin, we used the within-unit procedures previously described to estimate the association between accessibility and stability. These analyses yielded $r = .06$, $p < .09$. This correlation implies very little overlap between the two constructs. Second, we checked whether the antecedents of accessibility were similar to the antecedents of stability. On the one hand, repeated expression of attitudes should influence attitude accessibility (retrieval). Moreover, any influence of repeated expression on stability should be accounted for by the influence of repeated expression on accessibility (see Cooke & Sheeran, 2004; Fazio et al., 1982). On the other hand, the behavioral relevance of attitudes, the correlation between attitudes and beliefs about behavioral outcomes, and the information one-sidedness should influence stability via reconstruction. That is, these three factors may promote attitude stability because they make earlier attitudes easier to reconstruct at the time of the behavior (see Ajzen, 1996; Doll & Ajzen, 1992; Erber et al., 1995). In keeping with this rationale, repeated attitude expression should correlate with accessibility and stability. In contrast, the behavior relevance of attitudes, the correlation between attitudes and beliefs about behavioral outcomes, and the information one-sidedness should correlate with stability but not with accessibility.

These predictions were supported when we estimated the associations involving these variables. On the one hand, repeated expression of attitudes was highly related to attitude accessibility (within-unit $r = .77$, $p < .001$). Moreover, repeated expression of attitudes also correlated with attitude stability (between-units $\beta = .31$, $p < .05$). On the other hand, attitude stability correlated positively with the association of attitudes with beliefs about behavior outcomes (between-units $\beta = .25$, $p < .1$) and with the one-sidedness of the information (between-units $\beta = .43$, $p < .01$; within-unit $r = .42$, $p < .001$). However, neither of these variables nor the behavioral relevance of attitudes correlated with attitude accessibility ($p < .3$, $p < .7$, and $p < .2$, respectively).²²

²⁰In the path analyses, we calculated Sobel tests by linking the independent variable with the mediator (e.g., confidence with stability) and then the mediator and the independent variable with the dependent variable (e.g., confidence and stability with the attitude–behavior correlation). However, when mediation was proven, direct paths that became nonsignificant (i.e., the paths linking information one-sidedness and confidence with the attitude–behavior relation; $ps < .4$ and $.8$, respectively) were excluded from the model.

²¹Note that, despite the coherence of the findings, we conducted path analyses using the less conservative fixed-effects approach. Thus, the findings should be considered with caution.

²²The behavioral relevance of attitudes did not vary within any conditions reporting attitude stability. Only coefficients calculated on the basis of two or more studies were used to estimate the within-unit associations.

Finally, we introduced repeated attitude expression for accessibility in the path analysis of stability (Cooke & Sheeran, 2004; Fazio et al., 1982; see Figure 3). This analysis showed that the proxy measure of accessibility influenced the attitude–behavior relation through attitude stability (Sobel $z = 3.81$, $p < .001$; the $r = .21$, $p < .05$ direct path between repeated attitude reports and the attitude–behavior relation became nonsignificant, $p < .7$). It is important to note that the effect of accessibility on stability was independent of the behavioral relevance of attitudes, the one-sidedness of the attitude-related information, and the attitude confidence. Thus, we concluded that accessibility or retrieval of attitudes influenced stability. Nonetheless, stability was also contingent on factors facilitating attitude reconstruction.

Discussion

Several decades of research have stressed the importance of understanding how attitudes guide behaviors (Eagly & Chaiken, 1993; Petty et al., 1995; Regan & Fazio, 1977). Given the significance of this topic, it is not surprising to find several meta-analyses addressing the multiple moderators of the attitude–behavior relation. None of these meta-analyses, however, has summarized the degree to which newly formed attitudes predict future behavior. Nor have they identified the factors that moderate attitude–behavior correlations in those cases. Perhaps more important, none of them focused on how those factors influence the processes involved in the prediction of behaviors from attitudes.

In our review, the overall weighted-mean attitude–behavior correlation was .52. This correlation is higher than the .38 average identified by Kraus (1995) when he included studies with low attitude–behavior correspondence in object, context, and time (e.g., prediction of church attendance from attitudes toward religion). This correlation, however, is virtually identical to the one Kraus found when he included studies that measured attitudes and behaviors in ways that were highly corresponding. This high correspondence was the case of the reports synthesized in our meta-analysis. To this extent, the results from this and Kraus’s meta-analyses are compatible (see also D. S. Wallace et al., 2005, for a recent discussion of the size of the attitude–behavior correlation). The weighted-mean correlation we found is also stronger than the .38 correlation reported by Albarracín et al. (2001). This earlier meta-analysis, however, was specific to the attitude–behavior relation in the domain of condom use, a behavior that varies widely with factors other than attitudes (e.g., control perceptions; Ajzen & Fishbein, 2005; Glasman & Albarracín, 2003; Sheeran, Abraham, & Orbell, 1999).

The most important contribution of our meta-analysis comes from the analysis of moderators pertaining to attitude accessibility and attitude stability. Our meta-analysis suggests that people form attitudes more predictive of behavior when they are motivated to think about the object they are considering, have direct experience with the attitude object, report their attitudes frequently, construct their attitudes on the basis of information that is relevant to the behavior, receive or generate either positive or negative information about the object, and believe that their attitudes are correct. Furthermore, our findings shed light on the processes by which some of these factors influence the attitude–behavior correspondence. In this regard, our review indicates that forming accessible attitudes, considering the consequences

of performing a behavior when first forming an attitude, storing evaluatively consistent (one-sided) information, and holding confident attitudes all allow people to use these attitudes as a basis for future behaviors. In addition, our review indicates that attitude expression and direct behavioral experience affect the attitude–behavior correspondence by influencing attitude accessibility. Further, according to our review, the behavioral relevance of attitudes, the one-sidedness of their informational bases, and the confidence with which an attitude is held influence the attitude–behavior relation because they promote attitude stability. To our knowledge, no prior review has documented all of these effects, nor has primary research previously established the mediating effects of all the moderators we have examined.

Attitude Accessibility

One finding from this meta-analysis is that the effect of attitude accessibility was nonsignificant in the between-units analyses. This finding is not surprising if one considers the large differences in attitude accessibility in different studies. These differences could not be controlled in between-units analyses. Most important, however, the effect became significant in the within-unit associations between response times and the attitude–behavior correspondence. Moreover, when we controlled for between-units variance, direct experience and repeated expression or report of the attitude strengthened the attitude–behavior correspondence through attitude accessibility (see Figure 2). This conclusion is consistent with Fazio’s (1989) model. However, our study provides a test of the complete causal sequence from repeated attitude expression and direct experience to attitude accessibility and attitude–behavior consistency. Furthermore, the use of attitude-formation studies to establish these causal connections is ideal. This approach, for example, controls for the alternative hypothesis that the attitudes people report more quickly derive from past behavioral performances in that domain (see Bem, 1972).

Attitude Stability

According to Ajzen (1996) and Erber et al. (1995), the stability of the attitude-related information influences the stability of attitudes and the extent to which these attitudes predict behavior. This possibility is consistent with findings from past primary research (i.e., Doll & Ajzen, 1992) and meta-analyses (i.e., Cooke & Sheeran, 2004; Kraus, 1995). However, our review precisely establishes the mediating role of stability. That is, the research on attitude formation that we have synthesized allows us to observe the relation between the attitude stability across two time points and the degree to which the initial attitude predicts subsequent behavior. In contrast, similar findings using past attitudes could imply that factors that affected attitude stability also affected the attitude’s behavioral impact. In that case, stability and the attitude–behavior relation might or might not be causally associated.

Attitude Accessibility and Stability as Indicators of Attitude Retrieval and Reconstruction

This article also clarifies that attitude accessibility and stability can capture partially different processes. First, our work supports previous findings suggesting that accessible attitudes are both more stable and better predictors of behavior. This stability presumably occurs because accessible attitudes are easily retrievable from memory. However, we also found that attitudes can be stable and predictive of behavior when they are not retrieved from

memory but reconstructed on line. It is assumed that the association of attitudes with behavioral and one-sided information makes earlier attitudes easier to reconstruct at the time people perform a behavior (see Ajzen & Sexton, 1999; Doll & Ajzen, 1992; Erber et al., 1995). This finding sheds light on previous controversies on the role of accessibility and stability and the possibility of disentangling the two.

Influences on Attitude Accessibility and Stability

Behavioral relevance of attitude-related information—Our study underlines the congruence between the information that guides initial attitudes and the information used for a behavioral decision later on. In the past, this conclusion was presented as a measurement problem. Both primary research and meta-analyses have revealed that attitudes predict behavior better when measures of attitudes and behaviors correspond in target, context, time, and action (Ajzen & Fishbein, 1977, 1980; Kim & Hunter, 1993; Kraus, 1995). The present results, however, go beyond those prior ones. Our findings establish that attitudes predict behavior better when they rely on information relevant to a behavioral decision. For instance, if a behavior is instrumental, beliefs are more relevant than affect. Similarly, if a behavior is public, attitudes expressed in public are more relevant than attitudes expressed in private. That is, the behavioral relevance of the attitude-relevant information guarantees the recycling of the attitude at the time of the behavior (see Figure 3).

Regarding the behavioral relevance of the information associated with an attitude, our study has uncovered a previously unknown role of cognitions about the outcomes of a behavior. These cognitions are key components of Ajzen and Fishbein's (1980) theory of reasoned action. According to this theory, a person's attitude toward performing a behavior is based on his or her beliefs that the behavior will bring about a set of salient outcomes (combined with the perceived desirability of each of these outcomes). Complementing this assumption, we found that stronger associations between attitudes and cognitions about behavior outcomes correlated positively with attitude stability and attitude-behavior consistency.

One-sidedness of attitude-related information—This meta-analysis shows that presenting one-sided information about an object increases attitude stability. This stability occurs because people initially form and later reconstruct attitudes on the basis of similar information (Schwarz & Bohner, 2001; Wilson & Hodges, 1992). This conclusion replicates findings by Kraus (1995) and Cooke and Sheeran (2004). It also replicates findings from primary research on attitude ambivalence and inconsistency (R. Norman, 1975; Rosenberg, 1960, 1968). However, our meta-analysis extends this work by disentangling prior controversial findings regarding the roles of ambivalence and inconsistency (see null findings regarding attitude stability by Armitage & Conner, 2000; Bassili, 1996; and reversals regarding attitude-intentions correlation by Jonas et al., 1997; Sengupta & Johar, 2002). In particular, our results indicate that, all things being equal, information one-sidedness promotes higher attitude stability and stronger attitude-behavior correlations. However, they also suggest that people who have inconsistent information about an object can nonetheless exhibit strong attitude-behavior correlations when they are highly motivated to think about that information. It is assumed that highly motivated individuals are able to integrate ambiguous information in a single evaluative dimension (Sengupta & Johar, 2002;

Tesser & Cowan, 1977). Thus, they form attitudes that can be easy to reconstruct despite the conflicting implications of the information that is initially salient.

Confidence—This meta-analysis replicates prior reports that confident attitudes are more predictive of behavior than doubtful ones (Berger & Mitchell, 1989; Fazio & Zanna, 1978b; Jonas et al., 1997; Tormala & Petty, 2002). Although we obtained a significant attitude confidence effect only in the within-unit analysis, several things are significant in our results. First, attitude confidence reflected the one-sidedness of the attitudinal bases and increased the attitude–behavior correlation by inducing greater attitude stability. Second, by summarizing findings from novel attitudes, our meta-analysis provides an indication about the direction of the effect. Without this focus, it is possible to speculate that confident attitudes are associated with behavior because attitudes that have not changed in the past are perceived as confident and are likely to be stable in the future (see Albarracín et al., 2004). If this were true, attitude confidence would be a by-product of past stability, with no causal role in the promotion of future stability. Our meta-analysis helps to rule out this possibility.

The role of amount of thought—Results of our synthesis support earlier conclusions about the role of motivation to think about an issue in the attitude–behavior correspondence. In particular, our meta-analysis confirms that people who care about an issue when they first consider it (high outcome and value relevance) are more likely to act on these attitudes than participants who do not care (B.T. Johnson & Eagly, 1989; Leippe & Elkin, 1987; Petty & Cacioppo, 1986; Petty et al., 1995).²³

In addition, our meta-analysis establishes some of the mediational mechanisms of the influence of motivation on the attitude–behavior relation. In particular, moderation and mediation analyses showed that greater motivation stimulates people to associate their attitudes with behavioral information. The association of attitudes with behavioral information, in turn, increases attitude stability and the attitude–behavior relation. This process was initially suggested by Ajzen (1996). He specifically argued that people who think about the attitude object are more able to consider information that is relevant for later behaviors. High-thought people can also discard information that is temporarily salient but irrelevant. However, we are the first to examine the complete sequence by which motivation exerts this influence.

One aspect of this review that may surprise readers is that concentration (lack of distracting stimuli in the external environment) did not have the expected effect on the attitude–behavior association. However, other indicators of amount of thought showed a consistently positive effect. Therefore, it seems necessary to await research with more precise measures of concentration in the hope that increased precision will bring about coherent findings.

The role of direct experience—There has been an impressive amount of research on the role of direct experience in the attitude–behavior relation (e.g., Berger & Mitchell, 1989;

²³Unlike past research by Cacioppo et al. (1986), indicators of chronic motivation to think (need for cognition) had a marginally significant impact on the attitude–behavior relation in our synthesis. This lack of effect, however, may reflect our use of median splits instead of the selection of the most extreme levels of need for cognition, as in Cacioppo et al.'s research.

Cooke & Sheeran, 2004; Doll & Ajzen, 1992; Fazio & Zanna, 1978b; Kraus, 1995). In light of this evidence, the initial inverse relation of direct experience and the attitude–behavior correlation found in our study (see the 4th, 8th, and 11th columns in Table 2) is puzzling. In our analyses, however, direct experience was positively associated with the attitude–behavior correlation when we controlled for the behavioral relevance and one-sidedness of the attitudinal bases. In this regard, our synthesis suggests possible boundary conditions for the positive effect of direct experience on the attitude–behavior correspondence. First, direct experience does not seem to induce more consequential attitudes when the attitudes and the behavior bases are incongruent (e.g., if people focus on feelings and then perform an instrumental behavior; Millar & Tesser, 1986). Second, acquiring direct experience with the object may be as important in guiding behavior as receiving information that is unambiguous and consistent (i.e., evaluative diagnosticity; Reed, Wooten, & Bolton, 2002; see also Ha & Hoch, 1989; Hoch & Ha, 1986; Wooten & Reed, 1998). When all else is equal, direct experience should stimulate the use of attitudes as a basis for behavior. However, direct experience can provide mixed evidence about the desirability of an object (e.g., people are presented with neutrally valenced information; Reed et al., 2002; or products with standard qualities; Hoch & Ha, 1986). To this extent, researchers should take into account all direct experience, other indicators of behavioral relevance, and evaluative one-sidedness of the information to understand the impact of attitudes on behavior.

Validity of a Meta-Analysis and the Use of Between- and Within-Unit Moderating Analyses

In this synthesis, we used within- and between-units analyses to detect the moderators of the attitude–behavior relation. Each of these methods has unique advantages. On the one hand, within-unit analyses better account for methodological differences among research paradigms. However, they depend on the manipulations in primary studies. In other words, they show what the primary studies have already shown.

On the other hand, between-units analyses are more vulnerable to differences among study procedures.²⁴ This problem is most acute when researchers make no attempt to control for potentially confounding factors and when the meta-analysis is not theory based. However, between-units analyses have important advantages. First, they go beyond primary research and allow researchers to address new questions and to use novel comparisons. For example, studies to date have seldom, if ever, jointly estimated the influence of direct experience and information with specific evaluative implications. In this context, the between-units procedures permitted this integration. Second, multiple regressions of between-units conditions estimated the combined influence of the selected moderators and identified nonspurious relations. Similar analyses were not possible with the within-unit approach. Thus, the inclusion of within- and between-units analyses allowed us to go beyond previous

²⁴The between-units analyses controlled for potential confounds in several ways. First, we tested the moderators' effects using three different samples of between-units conditions. Results replicated for most moderators. Second, we estimated conclusions about between-units effects after controlling for several potential confounding factors. That is, all multiple regression models included indicators of the value of the attitude issue, the type of research paradigm, the publication status and year of the study, and the time between the attitude and behavior measures. Third, the shifting unit of analyses approach controlled for the overrepresentation of studies with more effect sizes. Fourth, the elimination of the within-subject measures in longitudinal reports discarded the statistically dependent conditions. Finally, aspects such as the laboratory setting, the use of students as participants, the relatively high credibility of the information sources, the measure of actual behavior, and the use of frequency scales as attitude measures were constant or almost constant in our database. Thus, procedural differences could not distort the between-units findings.

research while keeping a high level of methodological rigor. Further, in the case in which results with the alternative methods conflicted, these differences led us to identify potential boundary conditions for the moderator's effect. In other words, the use of both methodologies provides a more valid integration than the use of either methodology alone.

Attitude Formation Studies and the Validity and Generalizability of Our Findings

A unique aspect of our meta-analysis is the inclusion of attitude formation rather than attitude change and survey studies. At first glance, this criterion seems to limit the amount of information in our database without contributing to precision. For example, people often apply information about old attitudes to the new objects they encounter (Prislin et al., 1998). Thus, attitude formation studies cannot perfectly control for the one-sidedness of the information underlying these new attitudes. However, attitude formation studies do provide the most efficient control for other moderators. For instance, when an object is familiar, participants might have had direct experiences with the object that are not at all captured in attitude change experiments. Similarly, studying the influence of prior reports of attitudes is not possible outside of the studies manipulating the repeated expression or report of attitudes. In contrast, selecting attitude formation studies enabled us to classify all studies in terms of amount of thought, information one-sidedness, behavioral relevance of the information, and direct experience, among other moderators and potential confounds. Clearly, no attitude change study would contain information about measures or manipulations of the 21 moderators and potential confounds we have examined.

Integrating attitude formation (vs. attitude change) studies is also important for inferring causality from meta-analytic data (see Shadish, 1996, for a discussion of causal inferences in meta-analyses). That is, integrating attitude formation studies sets baseline levels of some moderators (e.g., attitude stability, repeated expression of attitudes, direct behavioral experience) at zero. Therefore, correlations involving those moderators provide appropriate estimates of the causal associations among them. For example, the integration of attitude formation studies helped us to better establish a link between accessibility and the attitude–behavior relation because this aspect reduces the likelihood that accessible attitudes result from past behavioral performances (an effect also observed in our meta-analysis).

Finally, our database included mostly laboratory experiments and college students. This scope may decrease the external validity of our results. Although further research could explore the attitude–behavior relation following attitude formation in the field, two things are noteworthy in our study. First, our results were tested with different samples of conditions. The significance and direction of the effects replicated in most cases. On these grounds, we can assume that the results accurately apply to the population of students in this specific setting.

Second, we also conducted analyses with the between-units samples using two approaches: fixed-effects and random-effects models. The fixed-effects approach assumes that the population of effect sizes is homogeneous. The random-effects approach assumes that the population is heterogeneous and thus indicates that the findings might be applicable to broader settings. In our study, results of the random-effects and fixed-effects approaches were comparable in size and significance. This equivalence of the findings in the random-

effects and fixed-effects approaches renders the generalizability of our results to other settings plausible.

The Role of the Behavior Measure

A factor that could also influence our result is the availability of different types of behavior measures. For example, some of the behaviors in our database were dichotomous (e.g., voting in favor of or against the institution of comprehensive exams). Other behaviors (e.g., the time participants played with puzzles) were continuous. Continuous behavior measures can better capture different degrees of favorableness toward an object. Therefore, continuous behaviors may be more reliable indicators of attitudes than dichotomous ones (Jaccard & Blanton, 2005).

Most aspects of the behavior measures in the studies we integrated, however, were homogeneous. For example, we excluded studies involving behavior self-reports. Hence, behavioral responses did not vary as a function of recall. In addition, participants in our database had equal behavioral opportunities and faced no situational obstacles to perform the behavior they chose. Further, in most cases, participants performed single behaviors or chose between behaviors that represented different degrees of favorableness toward the attitude object (e.g., sign a petition vs. join a committee). In only two cases, participants opted between different behavioral alternatives (i.e., Ajzen & Fishbein, 1970, 1974). To this extent, we do not expect measures of behaviors to systematically bias our results beyond the moderators we have already considered.

Implications for Future Research

This meta-analysis supports long-held assumptions about how attitudes predict behaviors. Perhaps more important, it sheds light on mechanisms that underlie these predictions. For example, our data support Fazio's (1990) hypothesis that attitudes people access from memory easily are more predictive of behaviors than attitudes that are difficult to access. Also, our work verifies Ajzen's (1996) hypothesis that the association of attitudes with behavior-related information (which is more likely to occur when an issue is personally relevant) strengthens the attitude's correlation with behavior. However, our results suggest that people who receive unambiguous information may behave consistently with their attitudes even when the content of that information is not behavioral. Therefore, future research should establish the conditions under which the behavioral relevance or the one-sidedness of the information predominates.

Similarly, future research can also address the relative influence of forming an attitude from direct experience or from one-sided information. That is, direct experience proved to increase the attitude-behavior correspondence. However, our meta-analysis suggests that this is more likely when the information that people acquire is one-sided. When information is mixed, direct experience should depress the attitude-behavior correlation. Further research could examine this prediction.

Another ambiguity that our work could only partially resolve concerns the impact of the one-sidedness of the attitude-related information. Contrary to most research on attitude ambivalence (see R. Norman, 1975; Rosenberg, 1960, 1968), recent research (e.g., Jonas et

al., 1997; Sengupta & Johar, 2002) has suggested that heterogeneous attitude-related information can promote cognitive effort and thus increase the attitude–behavior relation. However, as Sengupta and Johar (2002) pointed out, this effect takes place when the positive information and the negative information are simultaneously accessible. In our review, we could not control for the accessibility of the contradictory information at the time of the behavior performance. However, such controls might be available in the future.

Finally, further work could also explore the possibility that the attitude–behavior correlation is a function of nonlinear patterns. For instance, our results suggest that inducing high motivation when one processes double-sided information may increase attitude–behavior correlations. However, this finding does not consider the degree or type of conflict that the information involves. For example, when people who must make a behavior decision consider positive and negative outcomes of the behavior, conflict resolution may be difficult. In this case, attitude–behavior associations might be strongest when relevance is high enough to promote identification of the conflict and thus use of the global attitude but not so high as to promote the construction of diametrically different attitudes. Whatever the case, our meta-analysis shows that, despite the quantity of studies generated to resolve the attitude–behavior problem, more process-oriented research is still necessary to understand how attitudes guide behaviors.

Implications for Practice

For many decades, scholars and practitioners have attempted to find ways to induce the attitudes that best predict behaviors (see Albarracín et al., 2003; Armitage & Conner, 2002; Echabe, Rovira, & Garate, 1988; Manfredo, Yuan, & McGuire, 1992; Marsh, Johnson, & Scott-Sheldon, 2001; P. Norman & Smith, 1995). This meta-analysis can contribute to the design of social interventions by identifying factors that increase the behavioral impact of the attitudes one manages to induce in an audience. It suggests that, for example, agencies aiming at increasing the frequency of a new behavior should be well aware of the likely motivation of the targets, the evaluative implications of the behavior, and the situational factors that typically influence the behavior they want to promote. Thus, audiences of those agencies will benefit from receiving unambiguous behavioral information about an object and from attempts to increase their motivation to think about the behavior being promoted.

Further, to induce desirable behaviors, agencies should consider how clearly positive the experience with the object is likely to be. Thus, for behaviors that are likely to be clearly positive (e.g., eating a new type of candy), inducing direct experience with the object may be the strategy of choice. However, for experiences that are unlikely to be unambiguously positive or unambiguously negative (e.g., using a new type of condom, which increases protection but decreases physical pleasure), inducing direct experience may be less effective than presenting information whose implications are controlled beforehand.

In addition to the likely desirability of a behavioral experience, agencies may look at factors related to the behavior they want to promote. For example, eating candy is more likely to be a hedonic behavior. Using a new type of condom is an instrumental behavior. Thus, inducing a focus on feelings should be more effective for promoting the new candy than for promoting the new condom. Finally, our results suggest that well-known strategies to

increase the availability of attitudes for judgment (e.g., having people express their attitudes, presenting memorable information about the object) may also contribute to successfully inducing attitudes that predict the behaviors that persuaders want to promote.

Limitations and Perspectives

Despite the relevance of our findings for understanding the behavioral impact of attitudes, this research integration has limitations. First, the selection of attitude formation studies allowed for a clear-cut estimation of different factors (e.g., the degree to which participants' attitudes were based on direct experience, the number of times they were exposed to information about the object beforehand). However, people may easily generalize information about the attributes of familiar objects to the new attitudes they form. Hence, the estimation of factors such as the one-sidedness of the information that serves as basis of people's attitudes might not be as precise.

Second, as we explain in Footnote 24, we have taken several measures to control for potential confounding factors. These measures also served to examine the validity of our findings across several samples of conditions. However, in a meta-analysis, studies are not randomly assigned to conditions. Hence, uncoded differences among studies may account for the observed effects. For example, direct experience was negatively associated with the attitude–behavior relation in the between-units analyses but positively associated in the within-unit analyses. An inspection of this finding suggested that the reversal was accounted for by conditions with low behavioral relevance of the initial attitudes. In other cases, however, unknown differences among primary studies could contribute to the observed effects.

Third, although our database integrated 128 effect sizes, some of the analyses had a smaller number of study conditions than others. For example, we were able to estimate the effect of most of the relevant moderators on the attitude–behavior relation using the whole sample of studies. However, our results regarding the processes by which accessibility and stability influence the attitude–behavior relation included 43 and 19 units, respectively. Even though these analyses still comprised 1,612 and 864 participants, future research replicating our findings would increase confidence in our conclusions.

There are also factors that proved to influence the attitude–behavior association but were not considered in our integration. For example, recent findings by Visser and Mirabile (2004) have underlined the influence of the social networks on attitude stability. Other findings by Smith and Terry (2003) and White, Hogg, and Terry (2002) discussed the influence of in-group norms on the attitude–behavior relation. Future accumulation of work on the impact of normative factors should allow researchers to incorporate them in a broader model of the attitude–behavior relation. Similarly, future research on attitude formation should take advantage of real-world situations. These could include the introduction of new health recommendations, political candidates, or consumer products.

Finally, results of this meta-analysis apply to the prediction of behavior from novel attitudes. The formation of a new attitude is probably the most effective way to experimentally control the properties of an attitude and the associated information. However, people can develop

more accessible and confident attitudes over time. Thus, they may simply use those attitudes without attempting to reconstruct them later on (see Lingle & Ostrom, 1981). Even more relevant, as objects become familiar, attitudes can connect to the values of the individuals holding them. People who consider their attitudes important seek more information about the attitude object and have better memory for issues related to the attitude (Holbrook, Berent, Krosnick, Visser, & Boninger, 2005). To this extent, determining whether attitudes are important may be critical to understanding the attitude–behavior relation when attitudes are well established.

Conclusion

The attitude–behavior relation has been at the center of discussion in social psychology for years. At one point in time, discouraging findings regarding the size of the attitude–behavior relation stimulated recommendations to abandon the attitude concept altogether (Wicker, 1969). This pessimism was fortunately countered by efforts to identify the conditions that make attitudes more consequential for overt behaviors (e.g., Ajzen, 1991; Ajzen & Fishbein, 1980; Ajzen & Madden, 1986; Bargh et al., 1996; Doll & Ajzen, 1992; Fazio, 1989, 1990; Fazio et al., 1982; Fazio & Towles-Schwen, 1999; Fazio & Zanna, 1978a, 1978b; Kraus, 1995; Sengupta & Fitzimons, 2000; Wilson et al., 1984). These efforts have led to the accumulation of a large literature on the attitude–behavior relation, which has been incorporated into at least 10 previous meta-analyses (Armitage & Conner, 2001; Cooke & Sheeran, 2004; Eckes & Six, 1994; Farley et al., 1981; Kim & Hunter, 1993; Kraus, 1995; Notani, 1998; Sheppard et al., 1988; Van den Putte, 1993; D. S. Wallace et al., 2005).

The existence of 10 attitude–behavior meta-analyses across domains and various others relevant to specific domains (e.g., Albarracín et al., 2003; Hausenblas, Carron, & Mack, 1997; Lynn & McCall, 2000; Sheeran et al., 1999; Whitley, Nelson, & Jones, 1999) suggests that there are answers to the most important questions about this problem. However, a closer analysis of the prior syntheses indicates that such a conclusion is wrong. First, whereas other meta-analyses included a range of studies with varying degrees of rigor in methodological control, in our meta-analysis, we have explored the processes responsible for the attitude–behavior relation by selecting studies about attitude formation. By doing so, we were able to examine the factors influencing attitudes, which can be more efficiently observed when attitudes are produced experimentally. Further, out of the 10 most general meta-analyses, only Kraus’s (1995) and Cooke and Sheeran’s (2004) examined the roles of the moderators that we also examined. However, neither Kraus’s nor Cooke and Sheeran’s studies estimated the moderators’ joint contribution and the ways they can be sequentially arranged. In contrast, our meta-analysis integrates memory-based and online processes in a comprehensive, theoretical interpretation of the attitude–behavior process.

In terms of practical implications, our results suggest that attitudes influence future behaviors when they are easy to retrieve from memory and stable over time. In addition, our meta-analysis shows that expressing attitudes repeatedly and having direct experience with the attitude object influence the attitude–behavior relation by inducing higher attitude accessibility. Our study also indicates that being motivated to think about an object or issue promotes attitudes associated with one-sided and behavior-relevant information. Forming

attitudes on the basis of behavior-relevant information, receiving or generating one-sided information, and believing that one's attitudes are correct, in turn, strengthen the attitude–behavior relation via greater attitude stability. Given these findings, our meta-analysis is the first to meaningfully integrate the processes that underlie the influence of attitudes on behavior. We hope that future research and applications will benefit from this integration.

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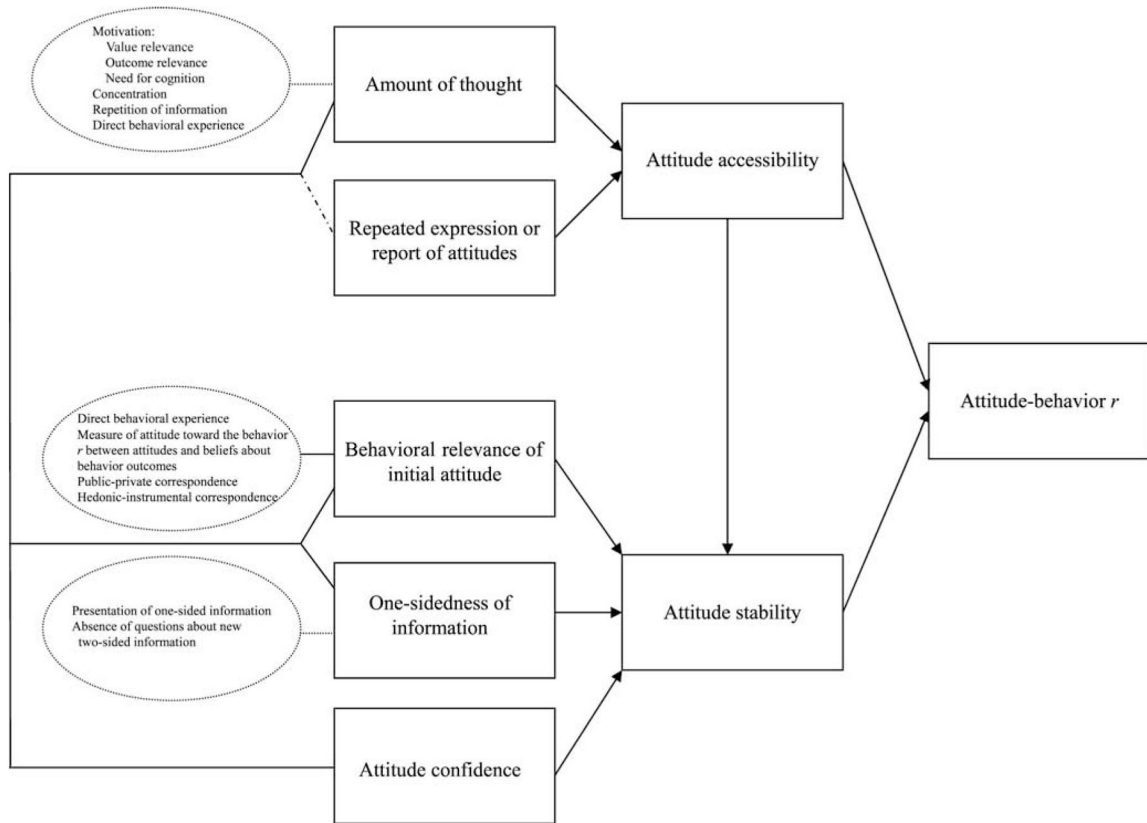


Figure 1. Processes involved in the prediction of behavior from attitudes. Variables in boxes represent factors that influence attitude–behavior correspondence; variables in ovals denote the various indicants of those factors in our meta-analysis.

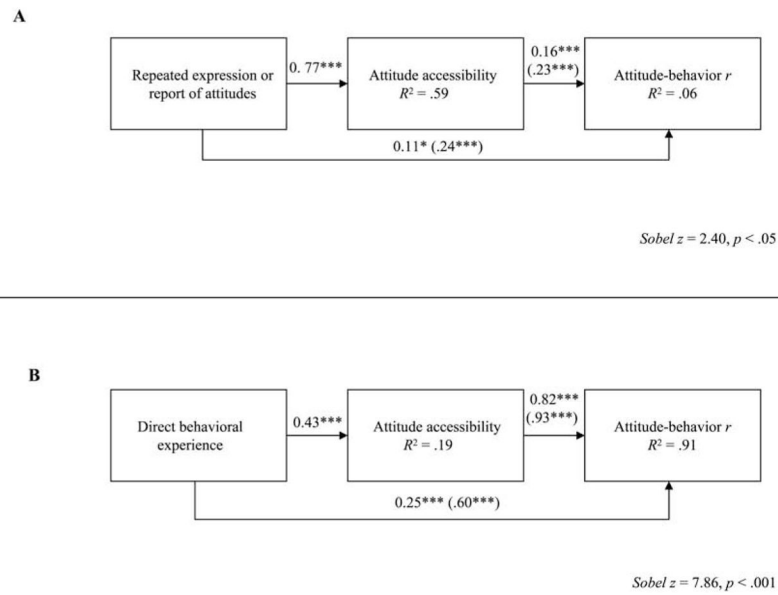


Figure 2. Path analyses for the influence of accessibility. Path coefficients were calculated on the basis of within-report Pearson r s converted to z s. Units in these analyses were all reports involving measures of accessibility with three or more conditions, regardless of whether the conditions in those reports were collapsed for the rest of the analyses (e.g., Millar & Millar, 1996). A: k (number of conditions in the matrix) = 3; n (number of participants in the matrix) = 1,110. B: $k = 3$; $n = 257$. The models in Panels A and B are saturated. * $p < .05$. *** $p < .001$.

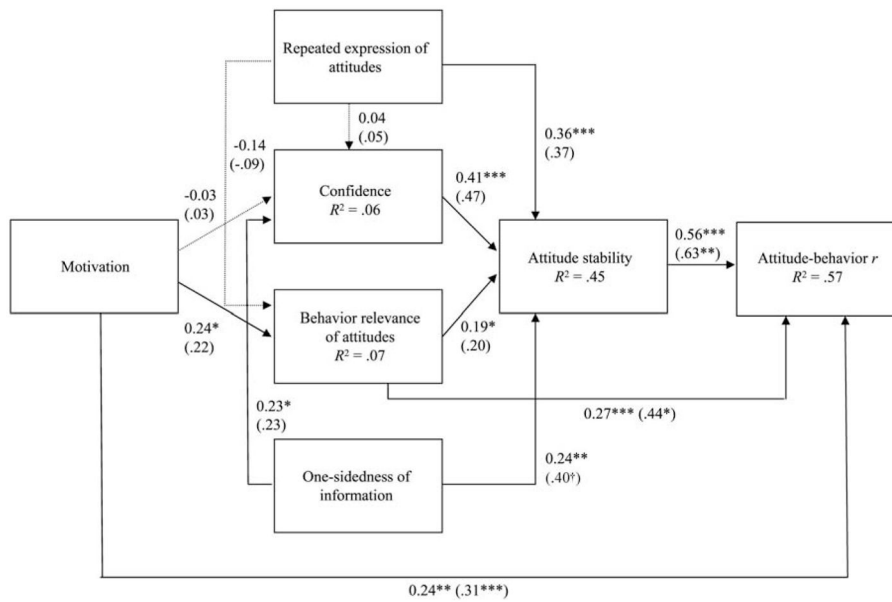


Figure 3. Path analysis for the influence of stability. Correlations between independent variables were as follows: motivation and repeated expression, $r = .22$, $p < .001$; motivation and one-sidedness of the information, $r = .21$, $p < .001$; one-sidedness of the information and repeated expression, $r = .06$, *ns*. Fit indexes for this model were as follows: $\chi^2(6, N = 90) = 10.29$, $p < .2$, Bentler–Bonett normed fit index = .93, comparative fit index = .97, incremental fit index = .97, root-mean-square residual = .05. The chi-square indicates a good fit when the associated significance value is higher than .05. The Bentler–Bonett normed fit index, the comparative fit index, and the Bollen’s incremental fit index reflect good fit when they exceed .90 (Bentler & Wu, 1995), and the root-mean-square residual represents adequate fit when it is equal to or less than .10. The minimum number of conditions shared by two variables in the matrix was 6; the minimum number of participants in the matrix was 90. † $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1

Description of Studies Included in the Meta-Analysis

Description of reports, experiments, and conditions	N	Amount of thought				Ability				Behavioral relevance of attitudes				Information one-sidedness			Time between the attitude and behavior measures ^C
		Outcome relevance	Value relevance	Need for cognition	Concentration	Information repetition	No. attitude reports or expressions	Direct experience	Measure of the attitude toward behavior or target	Correlation between weighted behavioral beliefs and attitude ^D	Public-private correspondence	Heuristic-instrumental correspondence	Presentation of one- or two-sided information	Absence of two-sided spontaneous thoughts	Attitude confidence		
Direct experience	96	H	L	Mx	H	No	Yes	B				L	M	Two	Yes		0.00
Direct experience	144	H	L	Mx	H	No	Yes	T				L	M	Two	Yes		0.00
Albarracín & Kumkale (2006)																	
Experiment 1: Propensity arguments (collapsed across argument strength) and affect induction (collapsed across positive and negative) with varying levels of concentration and outcome relevance																	
1. High outcome relevance and concentration	41	H	H	Mx	H	No	No	T	.66	H	M	H	M	One	Yes		0.01
2. Low outcome relevance and high concentration	41	L	H	Mx	H	No	No	T	.56	H	M	H	M	One	Yes		0.01
3. High outcome relevance and low concentration	43	H	H	Mx	L	No	No	T	.34	H	M	H	M	One	Yes		0.01
4. Low outcome relevance and low concentration	37	L	H	Mx	L	No	No	T	.44	H	M	H	M	One	Yes		0.01
Experiment 2: Antipolicy arguments (collapsed across argument strength) and affect induction (collapsed across positive and negative) with varying levels of concentration and outcome relevance																	
1. High outcome relevance and concentration	41	H	H	Mx	H	No	No	T	.21	H	M	H	M	One	No		0.01
2. Low outcome relevance and high concentration	37	L	H	Mx	H	No	No	T	.55	H	M	H	M	One	No		0.01
3. High outcome relevance and low concentration	42	H	H	Mx	L	No	No	T	.49	H	M	H	M	One	No		0.01
4. Low outcome relevance and low concentration	41	L	H	Mx	L	No	No	T	.19	H	M	H	M	One	No		0.01
Albarracín & McNatt (2002)																	
Experiment 1: Either behavior feedback or argument direction (collapsed across pro and con) at different time points with and without two-sided questions ^D																	
1. Behavior feedback (Time 1)	48	M	H	Mx	H	No	No	B	.34	H	M	H	M	One	Yes		14.00
2. Behavior feedback (Time 2)	48	M	H	Mx	H	No	No	B	.38	H	M	H	M	One	Yes		7.00
3. Behavior feedback (Time 3)	48	M	H	Mx	H	No	No	B	.35	H	M	H	M	One	Yes		0.01
4. Argument direction (Time 1)	46	M	H	Mx	H	No	No	B	.45	H	H	H	H	One	Yes		14.00
5. Argument direction (Time 2)	46	M	H	Mx	H	No	No	B	.44	H	H	H	H	One	Yes		7.00
6. Argument direction (Time 3)	46	M	H	Mx	H	No	No	B	.46	H	H	H	H	One	Yes		0.01
7. Behavior feedback (Time 1)	41	M	H	Mx	H	No	No	B	.17	H	M	H	M	One	No		14.00
8. Behavior feedback (Time 2)	41	M	H	Mx	H	No	No	B	.37	H	M	H	M	One	No		7.00
9. Behavior feedback (Time 3)	41	M	H	Mx	H	No	No	B	.39	H	M	H	M	One	No	.59	0.01
10. Argument direction (Time 1)	37	M	H	Mx	H	No	No	B	.28	H	H	H	H	One	Smt		14.00
11. Argument direction (Time 2)	37	M	H	Mx	H	No	No	B	.35	H	H	H	H	One	Smt		7.00

Description of reports, experiments, and conditions	N	Attitude-behavior			Ability			Motivation			Amount of information			Information on one-sidedness			Behavioral relevance of attitudes			Information on one-sidedness			Time between the attitude and behavior measures ^c
		r	attitude-behavior	behavior-behavior	Response latency	Attitude change ^d	Outcome relevance	Value relevance	Need for cognition	Concentration	Information repetition	No. attitude reports or expressions	Direct experience	Measure of the attitude toward behavior or target	Correlation between behavioral beliefs and attitude ^e	Public-private correspondence	Hedonic-instrumental correspondence	Presentation of one- or two-sided information	Absence of two-sided nonspontaneous thoughts	Attitude confidence			
Beiger (1999)																							
1. Favorable information (single expression, no repetition)	16	.49		2.50	H	L	Mx	H	No	1	No	T	H	H	M	One	Yes	.64	0.01				
2. Favorable information (repeated expression, repetition)	16	.62		2.15	H	L	Mx	H	Yes	3	No	T	H	H	M	One	Yes	.72	0.01				
1. Favorable information (single expression, repetition)	16	.65		2.39	H	L	Mx	H	No	3	No	T	H	H	M	One	Yes	.71	0.01				
2. Favorable information (repeated expression, no repetition)	16	.54		2.12	H	L	Mx	H	Yes	1	No	T	H	H	M	One	Yes	.68	0.01				
Beiger & Mitchell (1989)																							
Direct experience or favorable information with or without repetition of information																							
1. Direct experience	25	.78		2.61	H	L	Mx	H	No	1	No	T	H	H	M	Two	Yes	.73	0.01				
2. Favorable information (no repetition)	25	.48		3.10	H	L	Mx	H	No	1	No	T	H	H	M	One	Yes	.63	0.01				
3. Favorable information (repetition)	54	.69		2.60	H	L	Mx	H	Yes	1	No	T	H	H	M	One	Yes	.68	0.01				
G. L. Cohen (2003)																							
Information congruent with participants' political affiliation with or without a dissimilar source																							
1. No source	25	.74			H	H	Mx	H	No	1	No	T	L	H	H	One	Yes		0.00				
2. Dissimilar source	24	.81			H	H	Mx	H	No	1	No	T	L	H	H	Two	Yes		0.00				
Doll & Ajzen (1992)																							
Direct or indirect experience with fun or skill orientation																							
1. Direct experience (fun orientation)	20	.67		5.09 ^e	L	L	Mx	H	No	1	Yes	B	H	M	M	Two	Yes		0.00				
2. Direct experience (skill orientation)	18	.49		5.44 ^e	L	L	Mx	H	No	1	Yes	B	L	M	M	Two	Yes		0.00				
3. Indirect experience (skill orientation)	19	.27		6.02 ^e	L	L	Mx	H	No	1	No	B	L	M	M	Two	Yes		0.00				
4. Indirect experience (fun orientation)	18	.47		5.07 ^e	L	L	Mx	H	No	1	No	B	H	M	M	Two	Yes		0.00				
Doll & Muth (1990)																							
Direct or indirect experience																							
1. Direct experience	20	.80			L	L	Mx	H	No	1	Yes	T	H	M	M	Two	Yes		0.00				
2. Indirect experience	20	.58			L	L	Mx	H	No	1	No	T	H	M	M	Two	Yes		0.00				
Fazio et al. (1982, Experiment 4)																							
Indirect experience with single or repeated attitude reports or expressions																							

Description of reports, experiments, and conditions	N	Motivation				Ability				Behavioral relevance of attitudes				Information one-sidedness				Time between the attitude and behavior measures ^C												
		Outcome relevance		Value relevance		Need for cognition		Concentration		Information repetition		No. attitude reports or expressions		Direct experience		Measure of the attitude toward behavior or target			Correlation between behavioral beliefs and attitude ^B		Public-private correspondence		Hedonic-instrumental correspondence		Presentation of one- or two-sided information		Absence of two-sided questions about nonspontaneous thoughts		Attitude confidence	
		L	H	L	H	Mx	Mx	H	H	No	No	1	3	No	No	T	T		Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	One- or two-sided information	Two-sided questions about nonspontaneous thoughts	Attitude confidence						
1. Single expression or report	39	L	L	L	Mx	H	H	No	No	1	3	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.64	0.00	0.00				
2. Repeated expressions or reports	40	L	L	L	Mx	H	H	No	No	3	3	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.72	.64	0.00	0.00				
Fazio & Zanna (1978b)																														
Experiment 1: Direct or indirect experience																														
1. Direct experience	15	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
2. Indirect experience	15	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
Experiment 2: Direct or indirect experience with varying levels of confidence																														
1. Direct experience (high confidence)	21	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
2. Direct experience (low confidence)	11	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
3. Indirect experience (high confidence)	10	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
4. Indirect experience (low confidence)	22	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
Fazio et al. (1978)																														
Direct or indirect experience																														
1. Direct experience	15	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
2. Indirect experience	15	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
R. W. Johnson et al. (1991)																														
Direct experience or reason analysis during or after direct experience																														
1. Direct experience (reason analysis during experience)	27	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.02	0.07				
2. Direct experience (reason analysis after experience)	27	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.02	0.07				
3. Direct experience (no reason analysis)	27	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.02	0.07				
Lepper & Elkin (1987)																														
Propensity arguments (collapsed across argument strength) with varying levels of issue and response involvement																														
1. High issue and response involvement	28	H	H	H	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	One	One	Yes	Yes	.61	.58	0.00	0.00				
2. Low issue and high response involvement	28	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	One	One	Yes	Yes	.61	.58	0.00	0.00				
3. High issue and low response involvement	28	H	H	H	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	One	One	Yes	Yes	.61	.58	0.00	0.00				
4. Low issue and response involvement	28	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	One	One	Yes	Yes	.61	.58	0.00	0.00				
Millar & Millar (1996)																														
Experiment 3: Direct or indirect experience (collapsed across instrumental or hedonic behavior)																														
1. Direct experience	20	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
2. Indirect experience	20	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
Experiment 4: Direct or indirect experience (collapsed across instrumental or hedonic behavior)																														
1. Direct experience	20	L	L	L	Mx	H	H	No	No	1	1	Yes	Yes	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				
2. Indirect experience	20	L	L	L	Mx	H	H	No	No	1	1	No	No	T	T	Behavioral beliefs and attitude ^B	Public-private correspondence	Hedonic-instrumental correspondence	Two	Two	Yes	Yes	.61	.58	0.00	0.00				

Description of reports, experiments, and conditions	N	attitude-behavior		Response latency	Attitude change ^a		Outcome relevance	Value relevance	Need for cognition	Ability		Information repetition	No. attitude reports or expressions	Direct experience	Measure of the attitude toward behavior or target	Behavioral relevance of attitudes		Information one-sidedness		Time between the attitude and behavior measures ^c	
		r	β		Δ	Δ				Concentration	Comprehension					Correlation between behavioral beliefs and attitude ^b	Public-private correspondence	Hedonic-instrumental correspondence	Presentation of one- or two-sided information		Absence of two-sided questions about spontaneous thoughts
1. Direct experience	39	.38		3.20			L	L	Mx	H	H	No	1	Yes	T		H	M	Two	Yes	0.00
2. Indirect experience	39	.31		2.75			L	L	Mx	H	H	No	1	No	T		H	M	Two	Yes	0.00
Millar & Millar (1998)																					
Direct experience and cognitive focus with hedonic or instrumental behavior and varying levels of practice with the object																					
1. Hedonic behavior (low practice)	15	-.24					L	L	Mx	H	H	No	1	Yes	T		M	L	Two	Yes	0.00
2. Hedonic behavior (high practice)	15	.33					L	L	Mx	H	H	Yes	1	Yes	T		M	L	Two	Yes	0.00
3. Instrumental behavior (low practice)	15	.35					H	L	Mx	H	H	No	1	Yes	T		M	H	Two	Yes	0.00
4. Instrumental behavior (high practice)	15	.36					H	L	Mx	H	H	Yes	1	Yes	T		M	H	Two	Yes	0.00
Millar & Tesser (1986)																					
Direct experience and cognitive or affective focus with hedonic or instrumental behavior																					
1. Cognitive focus (hedonic behavior)	17	.01					L	L	Mx	H	H	No	1	Yes	T		M	L	Two	Yes	0.00
2. Affective focus (hedonic behavior)	17	.34					L	L	Mx	H	H	No	1	Yes	T		H	H	Two	Yes	0.00
3. Cognitive focus (instrumental behavior)	17	.42					H	L	Mx	H	H	No	1	Yes	T		M	H	Two	Yes	0.00
4. Affective focus (instrumental behavior)	17	.18					H	L	Mx	H	H	No	1	Yes	T		H	L	Two	Yes	0.00
Millar & Tesser (1989)																					
Direct experience with cognitive or affective focus with hedonic or instrumental behavior																					
1. Affect focus (hedonic behavior)	20	.44					L	L	Mx	H	H	No	1	Yes	T		H	H	Two	Yes	0.00
2. Affect focus (instrumental behavior)	20	.13					H	L	Mx	H	H	No	1	Yes	T		H	L	Two	Yes	0.00
3. Cognitive focus (instrumental behavior)	20	.48					H	L	Mx	H	H	No	1	Yes	T		M	H	Two	Yes	0.00
4. Cognitive focus (hedonic behavior)	20	.32					L	L	Mx	H	H	No	1	Yes	T		M	L	Two	Yes	0.00
Regan & Fazio (1977)																					
Experiment 1: Direct or indirect experience																					
1. Direct experience	58	.42					H	H	Mx	H	H	Yes	1	Yes	T		H	M	Two	Yes	0.00
2. Indirect experience	62	.04					L	H	Mx	H	H	No	1	No	T		H	M	Two	Yes	0.00
Experiment 2: Direct or indirect experience																					
1. Direct experience	14	.54					L	L	Mx	H	H	No	1	Yes	T		H	M	Two	Yes	0.00
2. Indirect experience	14	.20					L	L	Mx	H	H	No	1	No	T		H	M	Two	Yes	0.00
Sengco & Fitzsimons (2000)																					
Experiment 1: Favorable information or reason analysis after favorable information with immediate or delayed measures of behavior																					
1. Favorable information (delayed measure)	52	.49					L	L	Mx	H	H	No	1	No	T		H	M	One	Yes	5.00
2. Favorable information (immediate measure)	52	.42					L	L	Mx	H	H	No	1	No	T		H	M	One	Yes	0.00

Description of reports, experiments, and conditions	N	Attitude-behavior				Motivation				Ability				Behavioral relevance of attitudes				Information on one-sidedness				Time between the attitude and behavior measures ^c
		attitude		behavior	change ^a	Outcome relevance	Value relevance	Need for cognition	Concentration	Information repetition	No. attitude reports or expressions	Direct experience	Measure of the attitude toward behavior or target	Correlation between behavioral beliefs and attitude ^b	Public-private correspondence	Hedonic-instrumental correspondence	Presentation of one- or two-sided information	Absence of two-sided questions about nonspontaneous thoughts	Attitude confidence			
		response latency	relevance																	relevance	relevance	
3. Reason analysis after favorable information (immediate measure)	52	.54			L	L	Mx	H	No	1	No	T		M	M	One	Yes		0.00			
4. Reason analysis after favorable information (delayed measure)	52	.27			L	L	Mx	H	No	1	No	T		M	M	One	Yes		5.00			
Experiment 2: Favorable information or reason analysis after favorable information																						
1. Favorable information	111	.54			L	L	Mx	H	No	1	No	T		M	M	One	Yes		5.00			
2. Reason analysis after favorable information	37	.19			L	L	Mx	H	No	1	No	T		M	M	One	Yes		5.00			
Pro- and anti-policy arguments with varying levels of vested interest																						
1. Low vested interest	30	.24			L	H	Mx	H	No	1	No	T		H	H	Two	Yes		0.00			
2. Moderate vested interest	39	.17			M	H	Mx	H	No	1	No	T		H	H	Two	Yes		0.00			
3. High vested interest	27	.64			H	H	Mx	H	No	1	No	T		H	H	Two	Yes		0.00			
Experiment 1: Prophecy arguments at two time points with varying levels of need for cognition																						
1. Low need for cognition (Time 1)	48	.58	0.02		M	H	L	H	No	1	No	B	.69	H	H	One	Yes	.62	0.02			
2. Low need for cognition (Time 2)	48	.55			M	H	L	H	No	2	No	B	.20	H	H	One	Yes	.65	0.01			
3. High need for cognition (Time 1)	42	.59	0.28		M	H	H	H	No	1	No	B	.43	H	H	One	Yes	.65	0.02			
4. High need for cognition (Time 2)	42	.61			M	H	H	H	No	2	No	B	.32	H	H	One	Yes	.68	0.01			
Experiment 2: Prophecy arguments at two time points with varying levels of need for cognition																						
1. Low need for cognition (Time 1)	34	.58	0.55		M	H	L	H	No	1	No	B		H	H	One	Yes	.51	0.02			
2. Low need for cognition (Time 2)	34	.60			M	H	L	H	No	2	No	B		H	H	One	Yes	.56	0.01			
3. High need for cognition (Time 1)	38	.63	0.60		M	H	H	H	No	1	No	B		H	H	One	Yes	.51	0.02			
4. High need for cognition (Time 2)	38	.58			M	H	H	H	No	2	No	B		H	H	One	Yes	.59	0.01			
Experiment 3: Pro- followed by anti-policy arguments at two time points with varying levels of need for cognition																						
1. Low need for cognition (Time 1)	34	.38	0.66		M	H	L	H	No	1	No	B		H	H	Two	Yes	.55	0.02			
2. Low need for cognition (Time 2)	34	.40			M	H	L	H	No	2	No	B		H	H	Two	Yes	.58	0.01			
3. High need for cognition (Time 1)	53	.37	0.62		M	H	H	H	No	1	No	B		H	H	Two	Yes	.60	0.02			
4. High need for cognition (Time 2)	53	.60			M	H	H	H	No	2	No	B		H	H	Two	Yes	.61	0.01			
Experiment 4: Pro- followed by anti-policy arguments at two time points with varying levels of need for cognition																						
1. Low need for cognition (Time 1)	24	.37	0.47		M	H	L	H	No	1	No	B		H	H	Two	Yes	.48	0.02			
2. Low need for cognition (Time 2)	22	.53			M	H	L	H	No	2	No	B		H	H	Two	Yes	.50	0.01			
3. High need for cognition (Time 1)	108	.60	0.20		M	H	H	H	No	1	No	B		H	H	Two	Yes	.55	0.02			
4. High need for cognition (Time 2)	98	.64			M	H	H	H	No	2	No	B		H	H	Two	Yes	.51	0.01			
Experiment 5: Pro- followed by anti-policy arguments at two time points with varying levels of need for cognition																						

Stawick & Ciano (1982, Study 2)

H.M. Wallace (2003)

Description of reports, experiments, and conditions	Amount of thought										Time between the attitude and behavior measures ^c						
	Motivation					Ability											
	N	attitude-behavior	Response latency	Attitude change ^d	Outcome relevance	Value relevance	Need for cognition	Concentration	Information repetition	No. attitude reports or expressions		Direct experience	Behavioral relevance of attitudes			Information one-sidedness	
Correlation between behavioral beliefs and attitude ^e											Public-private correspondence		Hedonic-instrumental correspondence	Presentation of one- or two-sided information	Absence of two-sided questions about spontaneous thoughts	Attitude confidence	
1. Low need for cognition (Time 1)	35	.61	4.00	0.30	M	H	L	H	No	1	No	B	H	H	Two	Yes	0.02
2. Low need for cognition (Time 2)	35	.67	4.07		M	H	L	H	No	2	No	B	H	H	Two	Yes	0.01
3. High need for cognition (Time 1)	30	.55	5.21	0.22	M	H	H	H	No	1	No	B	H	H	Two	Yes	0.02
4. High need for cognition (Time 2)	30	.76	3.92		M	H	H	H	No	2	No	B	H	H	Two	Yes	0.01
Wilson et al. (1984, Experiment 1)																	
Direct experience with and without reason analysis																	
1. Reason analysis	12	.17	4.95		L	L	Mx	H	No	1	Yes	T	M	L	Two	Yes	0.00
2. No reason analysis	12	.54	5.12		L	L	Mx	H	No	1	Yes	T	H	M	Two	Yes	0.00
Wilson & Dunn (1986, Experiment 2)																	
Direct experience with or without reason analysis or affective focus																	
1. Reason analysis	49	.25			L	L	Mx	H	No	1	Yes	T	M	L	Two	Yes	0.00
2. Affective focus	48	.53			L	L	Mx	H	No	1	Yes	T	H	H	Two	Yes	0.00
3. No reason analysis or affective focus	47	.54			L	L	Mx	H	No	1	Yes	T	H	M	Two	Yes	0.00
Wilson et al. (1993)																	
Direct experience with or without reason analysis																	
1. No reason analysis	21	.60			L	L	Mx	H	No	1	Yes	T	H	M	Two	Yes	0.00
2. Reason analysis	21	.60			L	L	Mx	H	No	1	Yes	T	M	L	Two	Yes	0.00

Note. Confidence means are scale free. H = high; M = moderate; L = low; Mx = mixed; Smt = sometimes; T = target; B = behavior.

^a Attitude change comprises the difference between mean attitudes at two points, divided by the standard deviation of the initial attitude.

^b Correlations were computed between attitudes and message-based beliefs about behavior outcomes (weighted by the desirability of the outcomes) when participants received a persuasive message or answered questions about beliefs that they were unlikely to generate spontaneously and between attitudes and beliefs of behavior outcomes (weighted by the desirability of the outcomes) elicited from a similar population when participants received behavior feedback and were not induced to think about new information by answering questions (see Albarracín & Wyer, 2000, 2001).

^c When experimenters introduced a break between measures during the same session, time was coded as 0.01 days, representing an average of 15 min between the attitude report and the behavior performance.

^d Behavior feedback is a manipulation that consists of presenting participants with bogus feedback that they unconsciously voted in favor of or against a policy (Albarracín & Wyer, 2000).

^e Involves average response latencies for attitudes, intentions, and perceived behavioral control.

Table 2
Between-Units Effects of All Moderators on the Attitude–Behavior Correlation (Fixed-Effects Models)

Moderator	Shifting the unit conditions					Independent conditions			All conditions		
	Level	k	r _{a-b}	95% CI	Simple β	k	Simple β	Multiple β	k	Simple β	Multiple β
Main moderators											
Attitude accessibility ^a		12			.25	30	.24	0.51	43	.15	0.20
	Low	6	.55	.50, .60							
	High	6	.59	.55, .64							
Attitude stability ^d		7			.51 [†]	15	.67 ^{**}	0.67 [*]	19	.63 ^{**}	0.68 ^{**}
	Low	3	.53	.46, .58							
	High	4	.59	.55, .63							
Amount of thought Motivation											
Outcome relevance ^b		51			.33 ^{***}	109	.25 ^{***}	0.31 ^{***}	128	.26 ^{**}	0.29 ^{***}
	Low	24	.39	.34, .43							
	Moderate	13	.57	.55, .61							
	High	14	.50	.45, .57							
Value relevance ^c		42			.35 ^{***}	109	.22 ^{***}	0.06	128	.29 ^{***}	0.03
	Low	24	.43	.39, .47							
	High	18	.54	.52, .57							
Need for cognition ^b		47			.13 [†]	109	.05	0.03	128	.11 [†]	0.09
Ability											
Concentration ^c		49			-.16	109	-.18 ^{**}	-0.09	128	-.12 [*]	-0.10
	Low	7	.58	.51, .64							
	High	42	.49	.47, .52							
Repetition of information ^c		47			.11	109	.11 [†]	0.01	128	.08	0.02
	No	42	.50	.48, .52							

Moderator	Shifting the unit conditions					Independent conditions			All conditions		
	Level	k	r _{a-b}	95% CI	Simple β	k	Simple β	Multiple β	k	Simple β	Multiple β
Repeated expression of attitudes	Yes	5	.58	.47, .66							
		52			.26***	109	.02	0.08	128	.22***	0.12
Direct behavioral experience ^c	One	42	.48	.45, .50							
	Repeated	10	.59	.54, .63							
		52			-.29***	109	-.20**	0.24*	128	-.25***	0.22*
Behavioral relevance of initial attitude	No	32	.52	.50, .55							
	Yes	20	.41	.36, .46							
Measure of attitude toward behavior ^c		42			.47***	109	.29***	0.38***	128	.36***	0.41***
	No	30	.44	.41, .47							
Correlation between attitude and beliefs about behavior outcomes	Yes	12	.58	.55, .61							
		9			.54*	24	.48**	0.48*	34	.43**	0.43**
Public-private correspondence ^b	Low	5	.55	.50, .59							
	High	4	.64	.58, .69							
		54			.35***	109	.26***	0.30***	128	.29***	0.28***
Hedonic-instrumental correspondence ^b	Low	6	.37	.28, .45							
	Moderate	11	.40	.32, .47							
		37	.54	.51, .56							
		52			.38***	109	.19**	0.10	128	.30***	0.18*
One-sidedness of information	Low	8	.23	.10, .35							
	Moderate	30	.49	.46, .52							
	High	14	.56	.52, .59							
Reception of one-sided information ^c		44			.38***	109	.31***	0.28*	128	.28***	0.23*
	No	26	.43	.39, .46							
Absence of two-sided questions about nonspontaneous thoughts ^b	Yes	18	.55	.52, .57							
		44			.15*	109	.12 [†]	0.23**	128	.13*	0.24***
	No	3	.46	.37, .53							
	Yes	41	.51	.49, .53							

Moderator	Shifting the unit conditions				Independent conditions				All conditions					
	Level	k	r _{a-b}	95% CI	Simple β	k	Simple β	Multiple β	k	Simple β	Multiple β	k	Simple β	Multiple β
Attitude confidence		12			.31	29	.35	0.24	39	.22	0.21			
	Low	6	.52	.47, .58										
	High	6	.59	.53, .65										
Potential confounds														
Time between the attitude–behavior measures		51			.06	109	.08	–0.02	128	.06	–0.01			
	<1 day	46	.49	.47, .52										
	>1 day	5	.52	.45, .56										
Year of publication		42			.45***	109	.35***	0.36***	128	.39***	0.38***			
	<1996	23	.40	.36, .44										
	>1996	19	.55	.53, .58										
Publication status ^c		42			–.33***	109	–.16*	0.19	128	–.27**	0.27 [†]			
	Unpublished	8	.56	.53, .60										
	Published	34	.46	.43, .49										
Research paradigm		42			–.32***	109	–.20**	0.08	128	–.24***	0.07			
Puzzles ^c	No	28	.52	.50, .55										
	Yes	14	.39	.33, .45										
Comprehensive exams ^c		42			.39***	109	0.25***	–0.23	128	.31***	–0.21			
	No	26	.43	.39, .47										
	Yes	16	.55	.52, .58										
Overall measures of motivation, one-sidedness of information, and behavioral relevance														
Overall motivation		56			.42***	109	.28***	0.27**	128	.33***	0.27***			
	Low	19	.42	.37, .46										
	Moderate	18	.44	.39, .48										
	High	19	.59	.56, .62										
Overall behavioral relevance		62			.50***	109	.36***	0.47***	128	.43***	0.55***			
	Low	43	.46	.43, .49										
	High	19	.58	.55, .61										

Moderator	Shifting the unit conditions				Independent conditions			All conditions			
	Level	k	r _{a-b}	95% CI	Simple β	k	Simple β	Multiple β	k	Simple β	Multiple β
Overall one-sidedness	Two-sided	46	.43	.40, .46	.42***	109	.36***	0.32***	128	.34***	0.30***
	One-sided	17	.57	.54, .60							

Note. Multiple-regression betas for moderators with $k < 128$ in the analyses with all conditions and $k < 109$ in the analyses with independent conditions were estimated via separate regressions of the attitude-behavior correlation on each of these variables and the potential confounds showing variability in the data set reporting measures of the relevant variable. r_{a-b} = weighted-mean attitude-behavior correlation; 95% CI = 95% lower and upper limits of the confidence intervals for the mean attitude-behavior correlation.

^a Attitude latencies and standardized mean differences in attitude-behavior correlations were reversed to represent attitude accessibility and stability.

^b Coded from 1 to 3, with higher values indicating higher levels of a moderator.

^c Coded 1 to indicate presence of this factor and 0 to indicate its absence.

[†] $p < .08$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.