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Changing Attitudes on Implicit Versus Explicit Measures

What Is the Difference?

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Introduction

In the typical situation in which persuasion is possible, a person or a group of people (i.e., the recipient or audience) receives an intervention (e.g., a persuasive communication) from another individual or group (i.e., the source) in a particular setting (i.e., the context). Successful persuasion is said to occur when the recipients' attitudes are modified in the desired direction. After a long tradition of assessing the impact of persuasion treatments on attitudes with deliberative self-reports (Eagly & Chaiken, 1993; Petty & Wegener, 1998), more recent work has assessed change with measures that tap the more automatic evaluations associated with objects, issues, and people. Measures that assess automatic associations without a person's knowledge of what is being assessed are often referred to as *implicit measures,* and assessments that tap a person's more deliberative and acknowledged evaluations are referred to as *explicit measures.*

In describing changes in attitudes measured with explicit and implicit techniques, we also examine the nature (explicit or implicit) of the psychological processes that underlie those changes. We define an *implicit process* as one in which the persuasion elements tend to operate automatically and often outside of awareness. In contrast, we refer to an *explicit process* as involving persuasion elements that require some deliberation and of which people are more likely to be aware. This distinction is, of course, not perfect, and most persuasion techniques will use elements of both.

Our specific goals in this chapter are to (a) briefly note the dominant persuasion finding that explicit measures are affected by deliberative processes, (b) describe how explicit measures also can be affected by automatic processes requiring little thought, (c) examine research revealing that implicit measures can assess changes brought about through both low and high deliberative processes, (d) explore strength-related consequences associated with those changes, and (e) identify cases in which deliberative and automatic processes are jointly activated and what their impact is on explicit and implicit measures.

Single-Process Changes

Explicit Measures: Changes by Deliberative Processes

By far, most work in attitude change has focused on relatively deliberative processes affecting explicit measures of attitudes. There are a number of persuasion theories suggesting that deliberative processes can produce change in explicitly assessed attitudes (see reviews by Eagly & Chaiken, 1993; Petty & Wegener, 1998). For example, one of the earliest deliberative theories argued that message learning was an important precursor to opinion change (Hovland, Janis, & Kelley, 1953). According to this framework, for example, distracting someone from the message was predicted to reduce persuasion because it would interfere with comprehending and learning the message. Similarly, providing a person with a credible source would increase the impact of a communication on persuasion because it would motivate people to learn the message.

Another of the influential deliberative theories of persuasion, cognitive response theory (Greenwald, 1968; Petty, Ostrom, & Brock, 1981), similarly postulated a relatively thoughtful mechanism. This theory contended that persuasion depended on the extent to which individuals articulated and rehearsed their own idiosyncratic thoughts to the information presented. Consistent with this framework, extensive research has shown that aspects of the source (e.g., credibility), message (e.g., quality of arguments), recipient (e.g., mood), and context (e.g., presence of distraction) can influence persuasion by affecting the explicit and measurable thoughts people generate in response to persuasive appeals (for a review, see Petty, Ostrom et al., 1981).

In addition to these two approaches, many other classic theories of persuasion proposed deliberative mechanisms to account for changes on explicitly measured attitudes. For example, according to dissonance theory (Festinger, 1957), explicit attitudes can change due to effortful cognitive reorganization stemming from the psychological tension induced by engaging in a discrepant action. Although people are not necessarily aware of their dissonance reduction efforts, our assumption is that dissonance reduction is facilitated by cognitive effort and inferential reasoning (see also Gawronski & Strack, 2003; Petty & Cacioppo, 1986; Wilson, Lindsey, & Schooler, 2000). Early research on role-playing (e.g., Janis & King, 1954) also showed that active generation of a message, which involves an effortful process of biased scanning (Janis, 1968), can be a successful strategy for producing explicit change. The probabilogical (e.g., McGuire, 1981) and the expectancy/value (e.g., Fishbein & Ajzen, 1975) approaches to attitude change also provide examples of thoughtful change because they imply that people deliberatively assess the likelihood and desirability of attributes of the attitude object and then integrate this information into a coherent impression (for a review, see Petty & Wegener, 1998).

Explicit Measures: Change by Less Thoughtful and Automatic Processes

Although many early theories of persuasion focused on deliberative processes and provided considerable evidence for the fact that these processes could produce change on explicit measures, according to other early theories of persuasion, attitude change need not require much thinking. For example, one of the most primitive means of changing attitudes involves the direct association of affect with objects through *classical conditioning*. Thus, people's evaluations of words, other people, political slogans, products, and persuasive communications have been modified by pairing them with a variety of stimuli about which people already feel positively or negatively (e.g., Staats & Staats, 1958). Explicit measures of attitudes also can be changed through other processes that require relatively little thinking. Some inference-based approaches, such as self-perception theory (Bem, 1972), illustrate this possibility by demonstrating that people sometimes infer their attitudes directly, and perhaps even automatically, in a manner similar to that by which they infer the attitudes and traits of others (i.e., from observed behavior and the context in which it occurred; Uleman, 1987).

Also consistent with the idea that attitude change can occur when thinking is low, explicitly assessed attitudes have been affected as a result of mere exposure (Zajonc, 1968) and the use of simple heuristics (Chaiken, 1980). For example, when objects are presented—even sub-

liminally—to an individual on repeated occasions, this mere exposure is capable of making the person's explicit attitude toward the objects more positive (Kunst-Wilson & Zajonc, 1980). In addition, people can base acceptance of a message on the expertise of the message or the mere number of arguments it contains by retrieving the heuristic "Experts are usually correct." (e.g., Chaiken; Petty, Cacioppo, & Goldman, 1981) or "The more arguments, the better." (Petty & Cacioppo, 1984).

Thus, the accumulated work on persuasion reveals that a variety of low deliberation processes can produce attitude change on explicit measures. Taken together with the high deliberation processes described earlier, it seems clear that explicit attitudes can be modified by both high and low thinking processes. For expository purposes, we have described persuasion processes as if they can be neatly categorized into high versus low thought mechanisms. However, it is important to note that the various persuasion processes fall along a thinking continuum and are not invariably at the extremes (Petty & Cacioppo, 1986). For example, at the low end of the thinking continuum are relatively pure automatic processes (e.g., subliminal mere exposure) as well as some other processes (e.g., use of simple heuristics) that could require at least some controlled reflection.

The Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1981) and the Heuristic-Systematic Model (HSM; Chaiken, Liberman, & Eagly, 1989) of persuasion were proposed to establish the conditions under which relatively thoughtful versus nonthoughtful processes would affect explicit change.[1] Furthermore, these theories noted that although persuasion can occur when thinking is relatively high or low, the consequences of the attitude change induced are different in each situation. In particular, the ELM holds that the process by which an attitude is formed or changed is consequential for the strength of the attitude (see Petty & Cacioppo, 1986; Petty & Wegener, 1999). For example, when a variable such as source credibility produces persuasion through a relatively low thinking process (e.g., by serving as input to an expertise heuristic; e.g., Petty, Cacioppo et al., 1981), the attitude formed is less persistent, resistant to change, and predictive of behavior than when the same amount of change is produced by credibility because of a relatively high thinking process (e.g., biasing the thoughts generated; e.g., Chaiken & Maheswaran, 1994). Thus, understanding the processes by which variables have their impact on attitude change has been essential because it is informative about the immediate and long-term consequences of persuasion (Petty, Haugtvedt, & Smith, 1995).

Implicit Measures: Change by Automatic Processes

To summarize so far, throughout the history of persuasion work, theories of attitude change focused on processes that varied in the extent of deliberative thought they required to operate (low to high). Theories of persuasion such as the ELM and HSM attempted to integrate both high and low thought processes into one conceptual framework. Regardless of the amount of thinking, however, a common feature of most prior work is that attitude change was assessed with deliberative measures because that was all there was. In the last decade, however, there have been a growing number of new measures of automatic attitudes available (e.g., evaluative priming; Fazio, Jackson, Dunton, & Williams, 1995; Implicit Association Test, or IAT; Greenwald, McGhee, & Schwartz, 1998).

Fazio's MODE model (Fazio & Towles-Schwen, 1999) provided an influential early account of the relationship between deliberative and automatic measures. According to the MODE model, automatic measures of attitudes are more likely to reflect the true attitude than are explicit measures because deliberative measures also tap any downstream cognitive activity in addition to the stored evaluative association (see Chapter 2, this volume). One important downstream consideration is the perceived validity of the activated evaluation. This validity assessment is sometimes assumed to be conducted entirely on-line (e.g., Gawronski & Bodenhausen, 2006). In other approaches, however, such as the Meta-Cognitive Model (MCM) of attitudes (Petty & Briñol, 2006; Petty, Briñol, & DeMarree, 2007), people are assumed to store validity assessments—at least for some attitude objects—that can be retrieved with additional cognitive effort. These validity assessments are important in determining the attitudes reported on explicit measures (see Chapter 5, this volume).

Early assumptions about the nature of automatic evaluations suggested that such attitudes would be very difficult to change, in part because the underlying object-evaluation associations were assumed to be learned over a long period of time. For example, automatic evaluations reflecting prejudice have been viewed as resulting from passive, long-term exposure to negative portrayals in the media (Devine, 1989) and longstanding status differences between groups. In accord with this view, Wilson et al. (2000) argued that "explicit attitudes change relatively easily, whereas implicit attitudes, like old habits, change more slowly" (p. 14). As a result of this assumption, a common proposal was that automatic evaluations were more enduring and resistant to change than were deliberative attitudes (i.e., attitudes reported on explicit mea-

sures; e.g., Banaji, 2004; Bargh, 1999; Greenwald et al., 1998; Rydell, McConnell, Strain, Claypool, & Hugenberg, 2007).

Given these considerations, how should automatic attitudes be changed? If anything, based on their origin and nature, measures of automatic evaluation have been assumed to be sensitive to automatic, implicit processes that can require multiple exposures for success (e.g., Rydell & McConnel, 2006). Classical conditioning and mere exposure are two relatively low thought or automatic processes that rely on multiple exposures. Consistent with the idea that automatic attitudes can be changed with these mechanisms, Olson and Fazio (2001) showed that automatic evaluations were sensitive to classical conditioning procedures that used 20 pairings of the target attitude objects and CS. Using a similar paradigm, Dijksterhuis (2004) found that automatic evaluations of the self can be affected by subliminal evaluative conditioning trials (15 pairings) in which the word *I* is repeatedly associated with positive or negative trait terms (see also Petty, Tormala, Briñol, & Jarvis, 2006; Walter, 2002).

Also consistent with this approach, research on automatic prejudice has shown that implicit measures can change through other paradigms that involve exposing individuals repeatedly to either positive or negative information about outgroup members. For example, automatic evaluations of Blacks have been shown to be affected by exposure to admired Black individuals (Dasgupta & Greenwald, 2001), to a Black professor (Rudman, Ashmore, & Gary, 2001), to a Black experimenter (Lowery, Hardin, & Sinclair, 2001), or to a Black partner who occupied a superior task role (Richeson & Ambady, 2003; for reviews, see Blair, 2002; Fazio & Olson, 2003; Gawronski & Bodenhausen, 2006).

Thus, the accumulated research is generally consistent with the idea that automatic measures of attitudes can be affected by relatively low thought and automatic attitude change processes. In fact, implicit measures of attitudes have sometimes been assumed to change *only* as a result of low thought processes (cf. Smith & DeCoster, 1999). In other words, just as automatic attitudes have been postulated to predict more automatic behaviors than controlled attitudes (e.g., Dovidio, Kawakami, & Beach, 2001), so too has it been assumed by some theorists that automatic attitudes should be changed by more automatic processes than deliberative attitudes (e.g., Rydell & McConnell, 2006). For example, Dasgupta and Greenwald (2001) expressed that "it is conceivable that whereas explicit attitudes may be best tackled with techniques that involve deep cognitive processing, automatic prejudice may benefit from the frequent use of techniques that involve shallower processing" (see Rudman et al., 2001, for a similar view).

In another illustration of this view, Gawronski, Strack, and Bodenhausen (Chapter 4, this volume) have argued that automatic evaluations are sensitive to associative processes that are fast and require little cognitive capacity but not to propositional thinking that often requires a large amount of cognitive capacity. In contrast with low effort associative processes, propositional thinking is assumed to require more extensive thinking because it implies an evaluation of declarative knowledge as true or false (see Gawronski & Bodenhausen, 2006, for a review). According to Gawronski and Strack (2003), for example, dissonance-related phenomena are inherently propositional, with inconsistency between two or more propositions being resolved either by explicitly rejecting one proposition as being false or by finding an additional proposition that resolves the inconsistency (Kruglanski, 1989). Based on these considerations, Gawronski and Strack predicted and found that counterattitudinal behavior under conditions of low situational pressure affected deliberative but not automatic attitudes. Although the null effect on automatic measures across conditions is open to multiple interpretations, this finding was explained as a matching effect between the extent (and type) of thinking in the attitude change induction and the nature of the measure. According to Gawronski and Strack, controlled attitudes changed as a result of counterattitudinal behavior because the process of dissonance reduction requires a thoughtful consideration of the propositional representation of cognitive elements. In contrast, automatic attitudes would not change as a function of counterattitudinal behavior unless dissonance reduction processes were operating through a low effort mechanism such as self-perception (Bem, 1972) or the activation of simple counterattitudinal associations (e.g., Blair, Ma, & Lenton, 2001).

Implicit Measures: Change by Deliberative Processes

Although there is now considerable agreement that automatic and low thought attitude change processes—especially those involving multiple trials—can affect automatic attitudes, it is less clear if deliberative processes can affect those same measures. As noted above, some theorists have argued that this should be rather difficult.

The general notion of the need to match certain change strategies with attitude measures has received considerable theoretical attention and some empirical support. However, a variety of findings call

into question the general idea that automatic and deliberative measures respond only to matched persuasion techniques. For example, as described previously, extensive research has shown that low effort (relatively nonthoughtful) processes such as classical conditioning and mere exposure can influence both deliberative (e.g., Zajonc, 1968; Staats & Staats, 1958) and automatic (Olson & Fazio, 2001) measures of attitudes. However, it is possible that although deliberative attitudes are affected by both high and low thought processes, perhaps automatic attitudes are influenced only (or primarily) by low thought processes. Or, if deliberative processes have an impact on automatic measures, then it must be that this effect is mediated by deliberative attitudes (Gawronski & Bodenhausen, 2006).

Some evidence against strict matching effects for automatic attitude measures comes from research on attitude accessibility. That is, it is well known that mere rehearsal and repetition of an attitude without thinking can increase its accessibility (Fabrigar, Priester, Petty, & Wegener, 1998; Fazio, 1995; Judd & Brauer, 1995). However, it is less well known that attitudes changed as a result of highly thoughtful processes can be more accessible than attitudes changed to the same extent by less thoughtful processes (see Petty et al., 1995). For example, Bizer and Krosnick (2001, Experiment 3) manipulated extent of thinking by varying the personal importance of a topic (i.e., participants were led to believe that the proposed new policy would affect them personally or not; Petty & Cacioppo, 1979) and found a significant effect on attitude accessibility, such that those in the high (vs. low) thinking condition had more accessible attitudes. Because attitude accessibility is a dimension that operates automatically and outside conscious awareness (Fazio, 1995), it suggests that perhaps measures of attitudes assessing automatic associations can similarly be affected by deliberative processes.

To examine this issue more directly, we conducted a series of studies to test whether automatic evaluations can be affected by thoughtful processing of persuasive messages (Briñol, Petty, & Horcajo, 2008). In all experiments participants received a persuasive message, and in some the extent to which they were motivated to think about these messages was also manipulated. We assessed if extensive message processing can change an implicit measure of attitudes related to the proposal. Different IATs (Greenwald et al., 1998) were used to approximate the strength of association between the attitude object and an evaluation.

Pilot test of implicit change from deliberation. In a pilot test, participants read a persuasive message composed of compelling arguments in favor of consuming vegetables. In a control condition, they read a neutral message. An example argument in favor of vegetable consumption was that vegetables have more vitamins than most supplements on the market, making them particularly beneficial during exam and workout periods. The neutral topic was an editorial related to interior design and decoration in which the word *vegetable* was also mentioned explicitly to control for the accessibility of the attitude object itself. All participants were asked to think carefully about the message. After thinking about the message, participants had to complete an apparently unrelated task (an IAT) that was designed to assess automatic evaluations relevant to the proposal of the message. In the IAT (Greenwald et al., 1998), participants classified target concepts (represented by *vegetable* or *animal*) and attributes (represented by *good* or *bad*).

Consistent with the idea that deliberative processes can influence implicit measures, we found automatic evaluations toward vegetables to change as a result of the persuasive message. These findings are consistent with some prior research showing that automatic evaluations as measured by the IAT can sometimes change in response to advertisements (Czyzewska & Ginsburg, 2007; Park, Felix, & Lee, 2007; Maio, Haddock, Watt, & Hewstone, this volume), and other treatments involving verbal information (e.g., Petty et al., 2006; Teachman & Woody, 2003; see Gawronski & Bodenhausen, 2006, for a review). Although this research demonstrates that automatic evaluations can be influenced by traditional persuasive messages, it is unclear what the psychological processes were underlying the obtained effects.

In our pilot study, because we asked participants to read the content of the arguments, we argue that the observed changes on automatic evaluations were likely due to the careful consideration of their merits. However, it is also possible that participants just counted and relied on the number of arguments presented in favor of the proposal (e.g., Petty & Cacioppo, 1984), or they might have followed some other low effort process, such as mere exposure or classical conditioning. For example, just by looking at the message superficially (e.g., simply attending to the advocated position of the message without reading the content of the arguments), a person might have reasoned that the culture favors vegetables (e.g., Olson & Fazio, 2004). Because the findings of our pilot study, like other research in this domain, do not allow us to examine whether (and how much) participants elaborated the information received, we designed a second study in which the extent of thinking and argument quality were manipulated.

Experiment 1: Manipulating extent of thinking and argument quality. This study was designed to provide evidence that thoughtful process-

ing can impact automatic evaluations and do so in a way that is not subject to the most salient alternative explanations. Participants in this second study received a persuasive message in favor of a new policy to integrate more African-American professors into the university. This message was composed of either strong or weak arguments in favor of the proposal. The gist of one of the strong arguments was that because the number and quality of professors would increase with this program (without any tuition increase), the number of students per class could be reduced by 25%. Examples of the gist of weak arguments, on the other hand, included that implementing the program would allow the university to take part in a national trend, and that with the new professors, current professors might have more free time to themselves. By manipulating argument quality, we aimed to examine the role of elaboration on the malleably of automatic evaluations because the relative effect of strong versus weak arguments on attitudes is reflective of the amount of thinking devoted to the content of the message (Petty, Wells, & Brock, 1976). That is, if people are not thinking carefully about the message, the quality of the arguments will not influence their attitudes, but if they are thinking carefully about the message content, it will (Petty & Cacioppo, 1986). Importantly, any effects of argument quality on automatic evaluations should indicate the extent of thinking rather than the use of any other low thought associative mechanisms. This is because the strong and weak messages are equivalent in terms of the aspects of the message to which simple associative mechanisms are presumably sensitive (e.g., direction of the message, number of arguments, and mere repetition of the attitude object).

Furthermore, in this study the extent of thinking was manipulated directly by making the message personally relevant (or irrelevant; e.g., Petty & Cacioppo, 1979) and by enhancing (or undermining) personal responsibility to think about the proposal (e.g., Petty, Harkins, & Williams, 1980). Participants in the high elaboration condition were told that the integration policy was being considered for implementation at their own (vs. a remote) university and in the next academic year (vs. in 10 years), and they were in a small (vs. a large) group of participants who were being asked to complete this survey (see Tormala, Petty, & Briñol, 2002, for successful use of this combined manipulation). After reading the message, participants were asked to complete an automatic measure related to the program to hire more African-American professors.[2]

The implicit measure consisted of a race IAT, in which participants classified target concepts (represented by White or Black) and attributes (represented by pleasant or unpleasant categories of words). Just as prior

research had shown that mere exposure to positive Black exemplars could modify automatic racial attitudes (e.g., Dasgupta & Greenwald, 2001), we aimed to show that processing a message about Black professors could modify these attitudes. Importantly, if the mere activation of the Black professor subtype is sufficient to modify attitudes, those exposed to both the strong and weak arguments should show similar levels of favorability toward Blacks. Similarly, if the IAT was simply responding to an expressed "cultural" opinion regarding integration, then the IAT would show more favorable attitudes even in the weak arguments condition (see Han, Olson, & Fazio, 2006). However, if careful elaboration and acceptance (or rejection) of the idea based on its merits is capable of affecting automatic attitudes, then argument quality should have an impact on automatic evaluation, with strong arguments producing more favorable evaluations than weak ones.

Consistent with previous literature on traditional message-based attitude change (see Petty & Wegener, 1998), we expected and found argument quality to influence automatic evaluations depending on the extent of message processing. That is, under high elaboration conditions, automatic evaluations were found to be more positive toward Blacks for the strong than the weak message. In contrast, for low elaboration conditions, we did not find as much attitudinal responsiveness to the manipulation of argument quality. This is presumably because when not processed carefully, the strong and weak message conditions are comparable in terms of the persuasive cues that are present (e.g., number of arguments, length, complexity, number of stereotype related words, and use of positive language) and also equivalent in terms of the opinion expressed and the mere activation of the Black professor subtype.

Although not directly tested in this study, we argue that the effect of argument quality obtained under high elaboration on automatic evaluations is due to the fact that the strong message led to many favorable thoughts associated with the integration program and Blacks, whereas the weak message led to many unfavorable thoughts associated with the integration program and Blacks. We speculate that, at least in this persuasion paradigm, the generation of each positive (negative) thought provides people with the opportunity to rehearse a favorable (unfavorable) evaluation of Blacks, and it is the rehearsal of the evaluation allowed by the thoughts (not the thoughts directly) that are responsible for the effects on the implicit measure. Thus, the automatic change might involve just getting the link between the attitude object and good (bad) rehearsed by each favorable (unfavorable) thought. Thus, automatic measures would reflect the valence of the thoughts generated.

Experiment 2: The effect of thoughts on implicit change. We conducted another study in order to examine the role of thoughts in response to the message on implicit measures. All participants in this experiment received a persuasive message composed of strong or weak arguments in favor of including more vegetables in their diet (adopted from Briñol, Petty, & Wheeler, 2006). The strong arguments were the same as those used in the pilot study described previously. The gist of one of the weak arguments in favor of vegetables was that vegetables are becoming more popular for wedding celebrations because they are colorful and look beautiful on plates. As described earlier, the greater the thinking about the information presented, the bigger the difference strong versus weak messages should have on people's attitudes.

As in the previous study, the extent of thinking was manipulated by making the message personally relevant or irrelevant. Thus, the message was introduced as part of an article about personal habits with potential consequences for academic performance (personally relevant frame) or as part of an article about plant properties (personally irrelevant frame). Importantly, after reading the message framed as relevant or irrelevant, participants were asked to list their thoughts about the proposal. After the thought-listing, and as part of an ostensibly unrelated study, participants were then asked to complete the IAT used in our pilot study to assess automatic evaluations of vegetables.

The results of this study were consistent with our previous experiments in showing that automatic evaluations (as assessed by the IAT) can change as a result of processing persuasive messages. We first found that elaboration increased the impact of argument quality on automatic evaluations just as past research has shown this pattern for deliberative evaluations (e.g., Petty & Cacioppo, 1979). That is, under high elaboration conditions, automatic evaluations of vegetables were more impacted by argument quality than they were under low elaboration conditions. More importantly, under high elaboration conditions, the obtained changes on automatic evaluations from argument quality were mediated by the valence of the thoughts (i.e., positive or negative) that participants generated in response to the message.

Thus, this study provides preliminary evidence for thoughtful mediation of changes on implicit measures. As noted earlier, it seems plausible that the generation of thoughts (positive or negative) in the high elaboration conditions allowed participants to rehearse their evaluative links repeatedly, leading to the obtained changes on the automatic measure. In contrast, participants in the low elaboration conditions presumably did not think about the merits of the arguments in the message and thus did not have many valenced thoughts that would allow for attitude rehearsal.

Processes underlying explicit and implicit change. Taken together, our experiments reveal that automatic evaluations as assessed with an IAT can be affected by deliberative forms of persuasion. That is, just as explicit attitudes have been more affected by the quality of message arguments when conditions foster elaboration, so too were automatic attitudes more affected by argument quality when the likelihood of thinking was high. Given that the available research clearly indicates that implicit and explicit measures are both sensitive to similar deliberative (and automatic) processes of persuasion, an important question is to what extent are automatic and deliberative measures related to each other? Although the present studies focused on automatic measures, there are several possibilities for this relationship that we outline next.

On the one hand, changes on implicit and explicit measures might be related to each other because they plausibly respond to some of the same mediators. That is, the valence of the thoughts generated in response to a persuasive message has been found to determine both automatic changes (in Experiment 2 above) and deliberative changes (as described earlier in this chapter and illustrated by two decades of research). If changes on implicit and explicit measures are related, then it is possible that changes in one determine the other. For example, according to the APE model (Chapter 4, this volume), any change on implicit measures obtained through deliberative (i.e., propositional) processes should be a function of changes in explicit measures (Gawronski & Bodenhausen, 2006; see Case 4). Applied to the present research, this would suggest that the obtained changes on the automatic measure due to argument quality under high elaboration conditions must be mediated by the changes that presumably first occurred in explicit attitudes.

Alternatively, according to the MODE model (Chapter 2, this volume), changes on automatic measures that result from deliberative processes should be due to the creation of an evaluative association with the attitude object. That is, automatic changes do not depend upon or require any changes in a deliberative attitude to occur. In fact, according to this view, change in the stored evaluative association is precisely what serves as the basis of the deliberative response (in addition to other downstream cognitive activities). Applied to the present research, this view suggests that changes in the automatic measure would mediate any change that was observed in the explicit measure. Although to our knowledge it has not been tested experimentally in a traditional persuasion paradigm, it seems quite plausible that automatic changes can

potentially mediate deliberative changes in many situations. Thus, in contrast to some theorists who would not expect deliberative processes to impact automatic measures, the MODE and APE models agree with the idea that change on implicit measures through deliberative processes is possible, though these two models postulate different mediating sequences.

It is also possible to speculate about a third possibility. That is, the automatic and deliberative changes that result from deliberative treatments might be unrelated to each other. This implies that deliberation about message arguments can produce change in both implicit and explicit measures, but neither would mediate the other. If true, then thinking about message arguments is leading to the same outcome on implicit and explicit measures, but by different processes. Although early theories of persuasion held that any one variable (e.g., an expert source, a happy emotional state) was likely to have just one effect on persuasion (i.e., either enhancing or reducing it), through just one single process, within contemporary multiprocess models of persuasion such as the ELM and HSM, there is recognition that the same outcome for any one variable can be due to very different processes (see Petty, 1997; Petty & Briñol, 2008).

Consider, for example, persuasion research on source credibility that has uncovered a number of different mechanisms by which this variable can produce attitude change. Depending on the extent of thinking, source credibility has been found to produce changes in deliberative measures of attitudes by serving as a simple cue or heuristic (e.g., Petty, Cacioppo, et al., 1981), by affecting the direction (e.g., Chaiken & Maheswaran, 1994) and the amount (e.g., Priester & Petty, 1995) of thoughts generated, by influencing the confidence people have in those thoughts (Briñol, Petty, & Tormala, 2004), and by serving as a piece of evidence relevant to the merits of an issue (Kruglanski & Thompson, 1999; for a review, see, e.g., Tormala, Briñol, & Petty, 2007). Source credibility is only one of the factors that can produce changes through different processes in different situations. According to the elaboration likelihood model, many variables serve in these same roles. To take one more example, consider the emotional state of the communication recipient. Depending on elaboration and other conditions, a person's emotions have been found to serve in the same diverse roles as observed for source credibility (for reviews, see Briñol, Petty, & Rucker, 2006; Petty, Fabrigar, & Wegener, 2003).

Note that according to the ELM, both external (e.g., source credibility) and internal (e.g., one's emotions) information can be processed as cues or arguments or serve in other roles depending on the elaboration likelihood. Thus, we speculate that a person's own thoughts can also serve in these different roles as well. The most simplistic treatment of one's thoughts would only consider their number and valence: two qualities that are relatively easy to extract (e.g., see Betsch, Plessner, & Schallies, 2004). As described earlier, it is possible that when processing a persuasive message, a person generating mostly positive thoughts would rehearse mostly positive evaluative associations to the attitude object, and a person generating mostly negative thoughts would rehearse mostly negative evaluative associations. This would lead strong arguments to show more positive evaluations on an implicit measure than weak arguments. Thus, when the measurement conditions involve low thinking, as is the case with measures of automatic evaluation, thoughts might have an impact on attitudes because of the relatively low effort extraction of their evaluative information.

Importantly, when conditions foster more thinking, as is the case with deliberative measures, it is possible to extract additional information (besides valence) from one's thoughts. For example, in addition to the desirability (valence) involved in a thought about a persuasive proposal, a person can consider other aspects of that thought, such as the likelihood of the consequence it implies (e.g., Fishbein & Ajzen, 1975), and the overall confidence one has in the thought (see Petty, Briñol, & Tormala, 2002; Briñol et al., 2004). These additional features of thoughts should be less likely to emerge in an automatic measure of attitudes. Thus, when the measurement conditions involve high thinking, not only the valence of a thought, but other information associated with that thought, should be more likely to have an impact. In this analysis we note that there are similarities between how variables have an impact on attitudes when thinking is varied during response to the attitude measure and when thinking is varied during processing of the persuasive message.[3]

In brief, our speculation is that when deliberation at the time of attitude responding is low (as is the case with automatic measures), the valence of thoughts is most critical, but as responding allows more thinking, other aspects of one's thoughts come into play. This is analogous to saying that thoughts are treated as simple evaluative cues when the likelihood of thinking is low, but are analyzed more fully as arguments when thinking is high. These different processes can sometimes lead to different outcomes, but sometimes the outcome can be the same. For example, under low elaboration conditions a negative emotion is likely to reduce persuasion because it serves as a negative evaluative cue, but under high elaboration, the same negative emotion can pro-

duce a favorable outcome depending on how it is evaluated (e.g., sadness induced by a sad movie leads one to like the movie). The same is true with respect to thoughts. Thus, under low thinking conditions (automatic measure), a negative thought, like a negative emotion, will lead to more unfavorable attitudes, but under high thinking conditions (deliberative measure), a negative thought will not necessarily lead to negative attitudes. It will also depend on the perceived likelihood of the negative consequence and the overall confidence in the thought (see also Chapter 5, this volume). If the thoughts are clearly favorable (or unfavorable), the likelihood of the consequences is high, and people have high confidence in their thoughts, both implicit and explicit measures will show the same outcome, but the process underlying each will be different (i.e., the explicit measure taps more aspects of the thoughts than does the implicit measure). Because the processes underlying change on implicit and explicit measures might not be identical, it may not be the case that the implicit measure mediates the explicit, or vice versa.

Experiment 3: The effect of thought-confidence on implicit change. As described above, we propose that thoughts generated in response to a message can influence automatic measures of attitudes by providing the opportunity to rehearse the evaluative link (e.g., object-good) repeatedly. Consistent with this view, the automatic measure used in Experiment 2 was sensitive to the valence of the thoughts generated. We further speculated that automatic measures might not reflect the confidence that people have in the validity of newly generated thoughts, as this is a unique feature reflected in deliberative measures. We conducted another study in order to examine the assumption that automatic measures are affected by the valence of the thoughts (primary cognition) but not by the confidence people have in those thoughts (secondary, meta-cognition; see Petty, Briñol, Tormala, & Wegener, 2007, for a review of meta-cognition and persuasion).

All participants in this experiment were placed in a high elaboration condition and received a persuasive message composed of strong or weak arguments on the topic of including more vegetables in the diet. Importantly, after listing their thoughts in response to the proposal, and before measuring automatic responses toward it, we manipulated the confidence with which participants held their thoughts by asking them to remember past events in which they felt confidence or doubt in their thinking. Previous research has established that recalling past episodes of confidence or doubt can influence thought-confidence and, therefore, affect deliberative measures of attitudes by affecting use of one's thoughts (Petty et al., 2002).

As expected, participants generated more favorable thoughts toward the proposal of the message and showed more positive automatic evaluations for the strong than for the weak message. Also replicating Experiment 2, changes on automatic evaluations were mediated by the valence of the thoughts generated. Importantly, the manipulation of thought-confidence, which significantly affected an explicit manipulation check on the perceived validity of the thoughts, did not influence automatic evaluations. These findings thus suggest that the IAT, and perhaps other implicit measures, might reflect only the valence but not the confidence people have in their newly generated thoughts. Providing further support for this idea is recent research showing that implicit measures are sensitive to the valence of persuasive treatments but not to correction processes (Forehand & Perkins, 2005) or the subjective ease associated with one's thoughts (Gawronski & Bodenhausen, 2005).[4]

Summary. Taken together, these studies demonstrated that automatic evaluations as assessed with an IAT can be affected not only by relatively simple associative processes (as amply documented in prior research) but also by traditional elaborative forms of rhetorical persuasion. Across several different studies, manipulations, topics, and messages, we found automatic evaluations to be sensitive to the direction and the quality of the persuasive arguments contained in the message. Furthermore, the changes on automatic evaluations were more evident for situations of high rather than low elaboration. These findings qualify previous views, which suggested a need to match experimental treatments and measures such that automatic measures would only be malleable to the extent to which the induction was also relatively unconscious or nonpropositional (e.g., Gawronski & Strack, 2003; Dasgupta & Greenwald, 2001). Finally, changes in automatic evaluations were independent of properties of the thoughts other than valence. These findings open the possibility that changes in implicit measures produced by deliberative processes might differ from changes in explicit measures produced by the same persuasive treatments.

Finally, our approach might also provide a new avenue to reinterpret some of the earlier findings about the malleability of automatic evaluations. For example, in the context of the classic contact hypothesis in the domain of prejudice (Allport, 1954), Rudman et al. (2001) studied the automatic and controlled attitudes of people who participated in a seminar on diversity training. Interestingly, compared to controls, participants changed their self-reported attitudes (but not their automatic evaluations) after learning during the seminar that they might possess prejudicial attitudes and deciding that they would like to

become more egalitarian. Automatic evaluations only changed for participants in the conflict seminar who also evaluated the professor and the course positively, who made friends with outgroup members, and who reported feeling less threatened by outgroup members. Rudman et al. (p. 866) interpreted these findings in terms of the matching hypothesis in stating that "the present findings, although speculative, suggest that explicit intergroup orientations may be linked more to cognitive or direct processes, whereas implicit intergroup orientations may be linked more to affective or indirect processes." The current research suggests another possibility, namely that liking the professor and making friends enhanced the motivation of participants to think carefully about the information received, leading to changes in both deliberative and automatic measures associated with the outgroup.

Implicit Measures: Consequences of Deliberative and Automatic Processes

The research we have reviewed suggests that deliberative and automatic measures of attitudes can change through low thought (e.g., subliminal classical conditioning; Dijksterhuis, 2004) and deliberative (e.g., biasing the thoughts generated) processes. As noted earlier, traditional research on explicit measures of change has shown that although both high and low thought attitude change processes are possible, the consequences of those processes are different. According to the ELM, attitudes formed or changed through low thinking processes are less persistent, resistant to change, and predictive of behavior than attitudes changed via high thinking processes. This is because elaboration typically involves accessing relevant information from both external and internal sources, making inferences, generating new arguments, and drawing new conclusions about the merits of the attitude object (Petty & Cacioppo, 1986). These mental activities involve people adding something of their own to the information available and are likely to lead to the integration of all relevant information into the underlying structure for the attitude object, therefore making the adopted evaluation not only stable, but also coherent and resistant. Thus, deliberative attitudes based on high amounts of thinking are stronger than attitudes based on little thought (see Petty et al., 1995, for a review).

It is important to distinguish between strength-like consequences that result from relatively high versus low thought processes. For example, because elaboration strengthens the object-evaluation associations, the more thinking a person does, the more likely the evaluation is not

only to persist over time and have an impact on judgment and behavior, but also to be resistant when challenged. On the other hand, a large number of conditioning trials would also produce a stronger evaluative association than would a small number of trials in the absence of any issue-relevant thinking. Thus, pairing an attitude object with positive stimuli 20 times would result in more accessible and consequential attitudes than pairing those stimuli one or two times (e.g., Fazio, 1995). These evaluations would also be stable and resistant to extinction in the absence of compelling challenges. However, because these attitudes are based only on mere association rather than substantive information, they are not likely to be resistant when challenged with cogent evidence. Similarly, presenting 20 attractive sources endorsing a proposal would likely produce stronger attitudes (e.g., in terms of accessibility) than using just one attractive source. However, compared with attitudes based on issue-relevant thinking, those resulting attitudes would still be relatively weak when challenged. Thus, people who possess accessible attitudes bolstered by considerable attitude-congruent knowledge are better able to defend their attitudes compared to those who have equally accessible attitudes that resulted from low thinking processes.

Although considerable research has demonstrated that extensive thinking enhances the strength of explicit attitudes, it is less clear that the same consequences would hold for automatic attitudes. Thus, just as understanding the nature of the processes by which explicit measures of attitudes change has been essential because it is informative about the immediate and long-term consequences of these changes, so too might it also be relevant for understanding the consequences associated with changes in automatic measures of attitudes. A preliminary question to explore would be the extent to which the changes in implicit measures obtained as a result of deliberative processes show evidence of strength. As noted, attitude strength can be demonstrated in many different ways, ranging from enhanced accessibility to influence on related thought processes and behavior.

We conducted a number of studies to test whether automatic attitudes might show some properties associated with strength when changed through high elaboration processes (Horcajo, Briñol, Petty, & Wheeler, 2007). For example, we noted earlier that attitude change processes that require thinking deeply about the attitude object are likely to result in attitude representations that are well integrated and connected with other relevant material in memory (see, e.g., McGuire, 1981; Tesser, 1978). Because of the strong linkage among constructs associated with high thinking, activating one mental representation should acti-

vate related cognitive elements easily. Indeed, within the literature on explicitly assessed attitudes, there is some suggestive evidence that it is easier to activate related constructs for high than low need for cognition (NC) individuals (Petty, DeMarree, Briñol, Horcajo, & Strathman, 2008; Smith, Haugtvedt, & Petty, 1994). An important question to examine would be to what extent this argument holds for automatic attitudes. As a first step in examining this issue, we tested whether changes on automatic attitude measures induced by deliberative processes showed evidence of spreading activation to related constructs.

Experiment 1: Spreading automatic activation as a function of measured thinking (need for cognition). The main goal of this study was to test whether deliberative attitude change processes would be consequential in terms of spreading activation when assessed with measures of automatic evaluation. Participants were told that they were helping out with research designed to assess possible changes in the institutional color of their university. Half of the participants were randomly assigned to receive a persuasive message containing strong arguments in favor of using green as the institutional color for the university. The other half of the participants, who composed the control group, received an irrelevant message (also containing the word *green*, but not advocating it). Participants' need for cognition (Cacioppo & Petty, 1982) was measured in order to assess the participants' preferences and motivation to process the information provided. Then, instead of assessing the impact of this persuasive induction directly on automatic evaluations of the color green, we assessed the impact of the treatment on an automatic measure that was only indirectly related to that concept.

Specifically, to assess indirect (associated) change, we constructed an IAT on the brand *Heineken* (because the logo of that brand is green and uses the slogan "Think in green" in many of its marketing campaigns). In this implicit measure, participants classified target concepts, represented by Heineken (e.g., *Heineken*, *Dutch*, *European*, *Amsterdam*, and *regular*) or Corona (e.g., *Mexican*, *lemon*, *Coronita*, *Mexico*, and *mild*), and attributes, represented by *good* and *bad*. We predicted and found that implicitly measured attitudes toward Heineken were significantly affected by the message for participants high in NC (but not for those low in NC). Thus, high NC individuals not only presumably changed their automatic responses toward green, but also their automatic responses to other objects related to green. That is, for individuals with high motivation to think, we found more favorable automatic evaluations of Heineken for the group that received the arguments in favor of the color green than for the control group. These findings provide

preliminary evidence that suggests that for implicit measures, deliberative processes can lead to associated changes on automatic measures though a process of spreading activation (from green to Heineken).

As discussed in the earlier section, it seems plausible that the generation of thoughts allowed high NC participants to rehearse their evaluative links to green repeatedly, leading to changes in evaluation of this color that spread to related constructs such as Heineken. In contrast, the automatic evaluations of participants low in NC did not reveal any impact of the manipulation. This finding suggests that participants in the low elaboration conditions did not think about the merits of the arguments contained in the message (i.e., did not generate thoughts that allowed them to rehearse their attitudes) and therefore did not show any indirect automatic changes.[5] The present findings are interesting in showing that automatic changes that result from deliberative thinking are consequential in terms of spreading activation. The next study replicates and extends this finding to a different generalization target.

Experiment 2: Spreading automatic activation to the self as a function of thinking. As noted previously, within the literature on explicitly assessed attitudes, there is some preliminary evidence for easier related construct activation under high than low thinking conditions (Petty, DeMarree et al., 2008; Smith et al., 1994). The above study suggests that receiving a persuasive treatment can affect automatic attitudes toward a construct that is only indirectly related to the focal construct in the message for relatively high thinking individuals. The main purpose of our next study was to provide further evidence for this strength-related consequence but using a different attitude object. In this study, we asked participants to generate arguments in favor of or against including more vegetables in their diet. Need for cognition was measured in this study as in the prior one to assess the extent of thinking. Following the argument generation task, instead of measuring automatic attitudes toward vegetables, however, we measured the automatic link between vegetables and the self. As would be expected if deliberative processes lead to changes that are consequential, those with high NC showed more automatic self-vegetable associations after thinking about the benefits (rather than the negative consequences) of consuming vegetables. Because most people like themselves, if vegetables are good rather than bad, they would be more likely to be linked to the self.[6]

In this study, individuals with high NC generated more issue-relevant thoughts than individuals low in NC. The difference in the number of thoughts might have led to more automatic change toward vegetables for high than low NC individuals (i.e., because it allows for more oppor-

tunities to rehearse the evaluative link), which in turn might explain the differences observed in the indirect, automatic measure toward the self. Even in the case that participants high and low in NC were engaging in the same amount of thinking, however, the spreading activation effect might still be due to other differences between these individuals.[7] For example, it might be easier to activate links between mental constructs among high (vs. low) NC individuals because of their well-developed knowledge structures (e.g., Petty, 2001). Alternatively, individuals high in NC are more likely to translate their thoughts into judgments and their judgments into behaviors because judgments formed through careful thought tend to be better represented in memory and are more stable and impactful (Petty et al., 1995; for reviews, see Briñol & Petty, 2005; Cacioppo, Petty, Feinstein, & Jarvis, 1996). In order to rule out some of these structural differences between high and low NC individuals, we conducted another study in order to replicate the preliminary findings on spreading activation that results from elaboration by manipulating (rather than measuring) the extent of thinking.

Experiment 3: Spreading automatic activation as a function of group status. Consider the classic paradigm on minority influence in which participants receive persuasive information that is endorsed by either a minority or a majority source. The traditional result for this paradigm is that although minorities do not tend to produce change on explicit measures directly linked to the attitude object, they can sometimes produce change on explicit measures indirectly related to the proposal (e.g., changing on birth control when the message is on abortion; see Alvaro & Crano, 1997; Mugny & Perez, 1996). Among other possible alternatives, this finding has been interpreted in terms of elaboration differences with minority sources leading to more deliberative processing of the information compared to majority sources (Baker & Petty, 1994; Moscovici, Mucchi-Faina, & Maass, 1994; Tormala, DeSensi, & Petty, 2007). If participants exposed to minority sources engage in greater message processing, then change on indirect topics becomes more likely.

To examine the implications of these findings for automatic attitudes, we conducted a number of experiments in which strong and weak arguments were presented by sources of different majority/minority status and then assessed automatic attitudes with respect to an attitude object only indirectly related to the target object. For example, in one study (Horcajo, Tormala, Petty, & Briñol, 2007), participants received a strong or weak message in favor of the color green endorsed by either a majority or a minority status source. We measured the indirect automatic change (IAT toward Heineken) and found that only the minority

source condition was associated with spreading automatic activation from green to Heineken.

Summary. In sum, in cases of high elaboration (i.e., high need for cognition individuals, minority source) indirect change on automatic measures was observed. These findings are conceptually similar to those obtained with explicit measures when attitude changes were induced with deliberative processes. Although our preliminary studies have focused exclusively on the examination of the spreading activation effect, future studies should also explore other potential consequences of the strength of automatic attitude changes as a function of extensive thinking. It seems plausible to argue that automatic changes, like explicitly assessed changes (Petty et al., 1995), induced through relatively deliberatively processes might also be particularly stable, resistant, and impactful on information processing and behavior.

Finally, the studies described in this section not only might have implications for automatic attitudes, but also might provide some potential insights for the study of explicit persuasion. For example, recent research has demonstrated that when people appear to have resisted persuasion on traditional measures, there might be some potentially important, yet previously hidden, persuasive effects on the confidence with which people hold those apparently unaffected attitudes (e.g., Tormala & Petty, 2002; Rucker & Petty, 2004; Rucker, Petty, & Briñol, 2008). It is plausible to imagine that under some circumstances, although participants were not influenced by persuasive messages on explicit self-report measures (e.g., as a result of demand characteristics, evaluation apprehension, impression management, social judgeability concerns, and self-awareness limitations), automatic evaluations might still be affected (Tormala, Briñol, & Petty, 2004). Thus, when people appear to have resisted persuasion on explicit measures, there might still be some potentially hidden, persuasive effects on the automatic evaluative associations that exist with respect to the attitude object (e.g., see Forehand & Perkins, 2005). If true, then researchers might sometimes be able to use automatic measures as researchers have used attitude confidence as a way of indicating that a message has had some hidden persuasive effect.

Dual-Process Changes

We have now reviewed evidence that both relatively high and low thought processes appear to be capable of affecting both automatic

and deliberative measures of attitudes. Despite the volume of research demonstrating cross-domain effects that we have already mentioned, it is still the case that a number of models and supporting empirical evidence have emerged recently that suggest that such cross-domain effects should be difficult or impossible to obtain (e.g., Rydell, McConnell, Mackie, & Strain, 2006; DeCoster, Banner, Smith, & Semin, 2006) or should only be found if change in either explicit or implicit attitudes mediates change in the other (Gawronski & Bodenhausen, 2006). According to these theories, the evaluations captured by implicit and explicit measures reflect the operation of two different, independent systems of reasoning. After briefly outlining this dual-systems view, we review evidence in favor of it and then our own studies that challenge common derivations from this approach.

Dual-Systems Models

Drawing on evidence from studies on learning, memory, and judgment, a number of psychologists have proposed different dual-systems models of cognition. Each of these models posits the existence of two distinct information processing systems: a relatively automatic system and a more consciously deliberative one. The nomenclature used to differentiate one system from the other varies from model to model (e.g., System 1 vs. System 2, Kahneman & Frederick, 2005; associative vs. rule-based systems, Sloman, 1996; slow-learning vs. fast-learning, Smith & DeCoster, 2000; impulsive vs. reflective, Deutsch & Strack, 2006; experiential vs. rational, Epstein, 1991), but the description of the fundamental features of these systems is similar across theories (Carver, 2005). In a general dual-systems view, the automatic system is characterized by associative or heuristic processing that occurs rapidly, spontaneously, and with little (or no) conscious awareness or cognitive effort. In contrast, the deliberative system controls more complex processing involving symbolic or logic-based thinking. This system functions at the conscious level but requires both the motivation and ability to process to perform its mental operations. Although some associative processes may take time and repetition to produce evaluative change and some propositional processes can occur very quickly, in general the associative processes will require less mental effort than the deliberative ones. Notably, the new dual-systems approaches share features with the dual-process models of judgment proposed earlier (e.g., ELM; Petty & Cacioppo, 1986; HSM; Chaiken et al., 1989). One difference is that the latter theories focus on a continuum approach to information processing (i.e., variations in the extent of thinking), whereas the former postulate discrete systems of judgment. Second, the more recent systems theories highlight differences in mental architecture (i.e., brain systems), whereas the earlier theories focus on mental processes.

When the dual-systems approaches are applied to implicit versus explicit attitudes (e.g., Rydell et al., 2006), implicit (automatic) attitudes are presumed to be formed and changed through the *impulsive system*, in which simple associations based on similarity and contiguity develop gradually (and with little effort) as more information about the attitude object is acquired over time. Explicit (deliberative) attitudes, on the other hand, are thought to be the products of a *reflective system* that relies on rule-based thinking and symbolic representation to quickly (but effortfully) generate or modify self-reported evaluations (see also Chapter 4, this volume). Because implicit and explicit attitudes are believed to stem from orthogonal systems of information processing, some dual-systems theorists have claimed that it is possible for an individual to concurrently hold two very different independent attitudes about the same attitude object that are stored in separate brain regions (e.g., DeCoster et al., 2006; Rydell et al., 2006; see also Wilson et al., 2000). Indeed, in this view, a single persuasion treatment can in some cases elicit opposite responses on implicit and explicit measures.[8]

To test the idea that a single persuasion treatment can produce opposite effects on implicit and explicit measures, Rydell and colleagues (2006) conducted an experiment in which participants were simultaneously exposed to deliberative and associative information about a target person named *Bob*. Note that in all of the prior research on implicit and explicit change summarized earlier, participants were exposed to either only deliberative (e.g., traditional persuasive message; Hovland et al., 1953) or only nonthoughtful (e.g., classical conditioning; Staats & Staats, 1958) persuasion treatment, or if exposed to both the treatments, they were administered sequentially with separate measures after each (e.g., Petty et al., 2006; Gregg, Seibt, & Banaji, 2006). In contrast to this, Rydell et al. exposed participants to both types of treatments simultaneously prior to assessing deliberative and automatic attitudes.[9]

In the Rydell et al. (2006) research, the deliberative information was presented by having participants read 100 statements describing a positive or negative behavior performed by Bob. After reading each sentence, participants were given information about whether the behavior described was characteristic of Bob or not. For half the participants, positive behaviors were labeled as characteristic and negative behaviors were designated as uncharacteristic of Bob (positive deliberative infor-

mation). For the remaining participants, Bob's positive behaviors were said to be uncharacteristic, and his negative behaviors were identified as characteristic (negative deliberative information). In addition, prior to the presentation of each sentence, participants received associative information in the form of a subliminal word prime that had a valence opposite that of the deliberative statements. That is, participants who received positive deliberative information about Bob were primed with negative words, and those who were presented with negative deliberative information were primed with positive words. In this way, the information about Bob requiring high versus low amounts of thinking to process was always opposite in valence.

In line with their view that implicit and explicit attitudes are the products of independent systems of reasoning, Rydell et al. (2006) hypothesized that the deliberative information would only influence responses on explicit self-report measures, whereas the associative information would only produce effects on an implicit measure (IAT). Just as predicted, Rydell et al. found that explicit self-reports reflected the valence of the behavioral sentences, and IAT responses were affected only by the valence of the associative information. The authors interpreted these results as clear evidence for the existence of two dissociated attitudinal representations of the same attitude object in accord with their strict dual-systems approach.[10]

Limitations of a Strict Dual-Systems Perspectives

Although the work of Rydell et al. (2006) and the data from other dual-systems theorists (e.g., DeCoster et al., 2006) appear to offer a strong case for the predictions derived from the two-systems framework, this approach does not appear to account well for the wealth of literature reviewed earlier documenting cross-domain effects. In a strict orthogonal dual-systems approach, it would not be possible for associative information to influence an explicit measure or for deliberative information to impact an implicit measure. Nevertheless, such effects have been shown in a number of studies, as illustrated above. So, how can this discrepancy be resolved?

A potential solution to this quandary begins to emerge when one considers the precise nature of the information available in each attitude change scenario. As described earlier, when only one kind of information or process (associative or deliberative) is present, cross-domain attitude change effects appear to be relatively easy to obtain. Specifically, nondeliberative persuasion treatments, such as classical conditioning

or subliminal mere exposure in the absence of explicit information to deliberate upon, have effects on explicit as well as implicit measures. Furthermore, as was the case in our research reviewed earlier, deliberative persuasion treatments, such as processing verbal messages in the absence of strong associative cues, can have effects on implicit as well as explicit measures. On the other hand, when associative and deliberative information are of comparable strength, opposite in valence, and jointly at hand, the typical pattern of results appears to support the predictions derived from a dual-systems approach, such that associative information only has an impact on implicit measures and deliberative information seems to only affect explicit measures.

Why did cross-domain effects emerge when people were exposed to either associative or deliberative persuasion treatments alone, and why did cross-domain effects not occur when deliberative and associative treatments were combined? One possible explanation for the latter question resides in the particular methodological designs used in tests of the strict dual-systems approach. For example, Rydell et al. (2006) found that presenting participants with oppositely valenced associative and deliberative information produced opposing implicit and explicit attitudes. However, it is not entirely clear from this research whether the implicit measures were completely uninfluenced by the deliberative information and the explicit measures were uninfluenced by the associative information, because no experimental conditions were included where the associative and deliberative information were of the same valence.

In a strict dual-systems approach, the content of the deliberative information at hand is irrelevant when forming implicit evaluations, just as the content of the associative information present is irrelevant when making explicit evaluations. Adding congruent conditions where the associative and deliberative information are matched in valence to the design used by Rydell et al. (2006) would allow for a more definitive test of the dual-systems hypotheses. Specifically, if fully independent systems exist that do not influence each other, one would predict that in a 2 × 2 fully crossed design (associative information: positive vs. negative × deliberative information: positive vs. negative), an implicit measure would only show a main effect of the associative information, and an explicit measure would only show a main effect of the deliberative information. However, if implicit and explicit measures of attitudes are multiply determined, this full design should reveal a main effect of both the associative and deliberative information on both implicit and explicit responses.

Experimental Test of the Dual-Systems Hypothesis

To investigate these possibilities, McCaslin, Loersch, and Petty (2007) conducted a conceptual replication of Rydell et al. (2006) that included two additional conditions where the associative and deliberative information was of the same valence (positive-positive, negative-negative). In this experiment, participants were given deliberative information by reading a 108-word paragraph that described a target person named *Paul* in either a positive or negative way. The paragraph was presented on a computer screen one word at a time with each new word of the paragraph added to the preceding text. To manipulate the associative information related to Paul, participants were subliminally shown a positive or negative image after the presentation of each new word of the paragraph.[11] This resulted in the individual presentation of either 108 positive or 108 negative images. By presenting the subliminal images alongside the deliberative information about Paul in this manner, it was expected that the positivity (or negativity) primed by the images would condition participants to hold positive (or negative) associations toward Paul. Once this procedure was finished, participants completed both implicit (IAT; Greenwald et al., 1998) and explicit (semantic differential) measures of their attitudes.

It was predicted that using a more complete design would reveal an effect of both associative and deliberative processing on participants' implicit attitudes. In contrast to the dual-systems approach by Rydell et al. (2006), it was expected that both the deliberative statements about Paul and the subliminal images would shape participants' implicit evaluation of him. Results confirmed this hypothesis, such that participants' IAT scores reflected significant main effects of both the associative (implicit) and the deliberative (explicit) information (see Figure 10.1).[12]

A different pattern of results was expected to emerge on the explicit measure. Like implicit attitudes, we expected that explicit evaluations would also be multiply determined. That is, both deliberative and associative information would inform participants' self-reported attitudes. However, self-reported attitudes can also be affected by momentary considerations (e.g., see Chapter 2, this volume). In particular, with respect to forming evaluations of people, according to the social judgeability model (Yzerbyt, Schadron, Leyens, & Rocher, 1994) individuals only use information that they feel is of socially acceptable quality and quantity. To determine if the information they possess can be used, people will refer to known social rules about what is and is not appropriate for making judgments about others in a particular situation. If

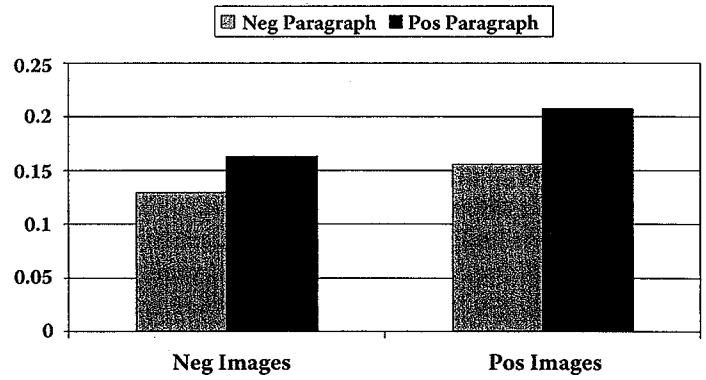

FIGURE 10.1 Effects of positive and negative explicit information and positive and negative subliminal images on attitudes as assessed with an IAT. More positive values reflect more positive standardized attitude scores (data from McCaslin, Loersch, & Petty, 2007).

the information available is deemed acceptable, it will be incorporated into the impression. If the information is determined to be inappropriate, it will be considered unusable (Croizet & Fiske, 2000) and will not influence explicit judgments about the target. In the McCaslin et al. (2007) study, it was thought that participants might be reluctant to use any evaluative reactions that stemmed from the subliminal images in their explicit assessments of Paul because they would be unaware of any valid source of these reactions (because they were elicited by consciously unavailable images). Furthermore, it seemed quite possible that participants would hold the lay belief that judging another person based on a vague sense of positivity or negativity would be inappropriate especially in light of the very explicit information provided (Yzerbyt et al.). As a result, participants were expected to focus their explicit judgments only on the evaluative implications of the consciously available statements about Paul and not any reaction to the subliminal images.

However, even though social judgeability concerns were predicted to inhibit participants' use of the associative information in their explicit judgments, we hypothesized that perhaps the subliminal images would still affect deliberative responses in an indirect way. Thus, similar to the minority influence literature, where minorities do not show any effects on attitude measures obviously related to the advocacy, but the impact of minorities is nonetheless observed on more indirect (but still deliberative) assessments (e.g., Crano & Chen, 1998; Perez & Mugny, 1996), we expected that the associative information would influence explicit mea-

sures that assessed Paul in a less direct manner. To test this possibility, McCaslin et al. (2007) had participants complete two items (averaged into one index) typically used to tap subjective ambivalence (i.e., "To what extent is your reaction toward Paul one-sided or mixed?" and "To what extent are your reactions towards Paul conflicted?"). Importantly, because the associative information was presented subliminally and previous research has shown that individuals tend to be unaware of any conflict between their implicit and explicit evaluations (Petty, Tormala et al., 2006; Briñol, Petty, & Wheeler, 2006), it was predicted that these items would not reflect any explicit ambivalence toward Paul for those who received mismatched (i.e., positive-negative, negative-positive) associative and deliberative information. On the other hand, it seemed plausible that any negativity participants experienced regarding their feelings toward Paul would be captured by these items. Indeed, prior research has shown a positive correlation between measures of negativity and ambivalence (Cacioppo, Gardner, & Berntson, 1997), suggesting that ambivalence measures may be sensitive to negativity as well as explicit conflict. Thus, we reasoned that even if participants did not use the associative information in their self-reported attitudes, the ambivalence items would tap negativity in an indirect way because the items did not ask about participants' feelings toward Paul directly, but assessed their evaluations of their attitude toward Paul (an assessment that would not be bound by the explicit Paul-relevant information provided).

As expected if our reasoning was correct, participants' explicit attitudes about Paul were influenced only by the deliberative information presented about Paul. This result was consistent with that obtained by Rydell and colleagues (2006). In contrast, both the associative and deliberative information impacted participants' responses on the ambivalence index. In particular, those who read the negative paragraph reported higher scores on this index than those who read the positive paragraph, and those who had been shown negative subliminal images reported higher scores than those who had seen the positive images.

The results of this experiment show that even when associative and deliberative information are simultaneously presented, cross-domain effects can occur. First, by adding two new conditions in a conceptual replication of Rydell et al. (2006), it was possible to see an effect of both the associative and deliberative information on participants' implicit evaluations. Second, by including measures of subjective ambivalence (which in the absence of explicit conflict were expected to only capture negativity), it was shown that associative (as well as deliberative) information can influence explicit judgments, albeit indirectly. Furthermore, it seems possible that the absence of a direct effect of associative information on explicit evaluation is due to social judgeability concerns. In addition, such concerns might also explain the results of a similar experiment by Rydell and McConnell (2006, Experiment 5), where participants were simultaneously exposed to positive or negative word primes along with many neutral behavioral statements about Bob. As the authors predicted, participants' implicit evaluations reflected the valence of the primes, but their explicit attitudes were neutral regardless of the kind of associative information they received.[13] The authors viewed these results as evidence in support of their dual-systems perspective, but it is also possible that the participants in this experiment relied solely on the neutral behavioral information about Bob to form their explicit judgments because they did not feel it was appropriate to make use of the positive or negative reactions elicited by the word primes because there was no explicit basis for a valenced judgment.[14]

Conclusion

In sum, it seems that perhaps implicit and explicit measures of attitudes are not independently impacted by different processes, as suggested by a number of recent papers. Instead, it appears that regardless of whether one or both types of information are available, implicit and explicit evaluations have the potential to be influenced by multiple sources. Based on classic and contemporary studies, the presence of only one (associative or deliberative) kind of information seems to facilitate the occurrence of cross-domain effects. When both types of information are present, however, the picture becomes more complicated, but both implicit and explicit evaluations still are capable of being multiply determined. In particular, we showed that implicit measures of attitudes can be impacted by both associative and deliberative information even when both are presented together. In addition, both kinds of information were also shown to influence explicit responses, though it appears that social judgeability concerns (and other downstream consequences) have the potential to eliminate any direct effect that associative information has on explicit measures of attitudes. Based on the existing evidence, it seems clear that the different kinds of evaluative processing are interrelated, and future research should further examine the nature of this relationship. In the meantime, researchers should exhibit caution before assuming that implicit and explicit measures only capture certain kinds of information or access certain processing systems.

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Endnotes

1 The ELM and the HSM are early examples of what became an explosion of dual-process and dual-systems theories that distinguished thoughtful from non-thoughtful determinants of judgment (see Chaiken & Trope, 1999).

2 Extensive prior literature has already demonstrated that explicit measures of attitudes are sensitive to argument quality manipulations (see Eagly & Chaiken, 1993; Petty & Wegener, 1998), and thus these measures were not of interest in this line of research.

3 For example, just as source attractiveness is more likely to impact an explicit measure as a simple cue when thinking during the message is low than high, when thinking is high during the message, source attractiveness might impact an implicit but not an explicit measure because of the positive associations with the message topic.

4 Using a classic ease-of-retrieval paradigm (Schwarz et al., 1991) in which people have to generate either a few (easy) or many (difficult) thoughts, Gawronski and Bodenhausen (2005) found that implicit measures based on stimulus compatibility processes (e.g., semantic priming with a lexical/decision task) were affected exclusively by the valence of the thoughts generated but not by the ease associated with those thoughts (a meta-cognitive property of the thoughts that can affect attitudes by increasing thought-confidence; Tormala, Petty, & Briñol, 2002). In contrast, implicit measures based on response compatibility processes (e.g., IAT; see Chapter 12, this volume) were affected by the subjective sense of ease. Although the finding of a significant ease effect on an IAT might seem to contradict our reasoning, it is important to note that in the classic ease-of-retrieval paradigm, ease and valence are confounded; that is, the cognition that one's thoughts are easy to generate is a positive one, whereas difficulty is a negative one (Briñol, Petty, & Tormala, 2006). Furthermore, when people generate a small number of requested thoughts, they also generate even more thoughts in the opposite direction, which can, in part, account for the ease effect (see Tormala, Falces, Briñol, & Petty, 2007). Thus, automatic measures could be sensitive to these aspects of the ease of manipulation.

5 Because we did not measure automatic evaluation of the color green, it is not clear if low need for cognition individuals did not show change to this color or if, as hypothesized, they did show change to this color but it did not spread to related concepts such as Heineken.

6 Indeed, in another study in this line of research we found that these results were moderated by implicit self-esteem, such that only those with high (but not low) implicit self-esteem showed the automatic spreading activation effect as a function of thinking. This finding is consistent with the idea that automatic spreading activation responds to balance principles (for similar examples, see Gawronski, Bodenhausen, & Becker, 2007; Greenwald, Banaji, Rudman, Farnham, Nosek, & Mellott, 2002; Walter & Trasselli, 2002).

7 High and low NC individuals might have engaged in the same degree of thinking if situational constraints to think were operating or other factors encouraged thinking (e.g., see Axson, Yates, & Chaiken, 1987).
8 It is also possible to explain discordant explicit and implicit attitudes from a single, integrated systems approach (e.g., see Chapter 2 and Chapter 5, this volume).
9 In some research guided by the dual-process perspective, deliberative information has also been paired with associative information of opposite valence (e.g., strong arguments are paired with an unattractive source or weak arguments are paired with an attractive source; e.g., see Petty, Wegener, & White, 1998). In this research, the associative (simple cue) information affects deliberative attitudes when it is processed under low deliberation conditions (versus affecting low deliberation measures even when processed under high deliberation conditions).
10 After the implicit and explicit measures of attitudes toward Bob, the authors exposed participants to another 100 experimental trials where the valence of the associative and deliberative information was flipped (i.e., positive to negative and vice versa). Implicit and explicit evaluations of Bob were then collected a second time. As before, implicit measures reflected only (the most recent) associative information, and explicit measures reflected only (the most recent) deliberative information.
11 Each image appeared onscreen for 13 ms and was followed by a 52-ms presentation of a pattern mask. The images were randomly drawn from a bank of either 75 positive or 75 negative pictures (see Petty et al., 2006, Study 1).
12 The fact that the informational sentences affected responses on the IAT is consistent with the idea that both cognitively and affectively based attitudes can have an impact on automatic measures. Furthermore, the earlier studies reviewed on cognitive responses mediating the impact of persuasive messages on implicit measures of attitudes are also consistent with this idea.
13 Corresponding results were found following a change manipulation similar to that used in Rydell et al. (2006).
14 A similar experiment was conducted in our lab where participants were repeatedly exposed to subliminal positive or negative images while they read a neutral paragraph about Paul on the computer screen. Participants were asked to form an impression of Paul and to "go with their gut" when doing so (see also Jordan, Whitfield, & Zeigler-Hill, 2007). In this case, explicit attitudes toward Paul were affected by the associative information presented. It was presumed that this was because the special instructions alleviated social judgeability concerns about using the reactions elicited by the subliminal images to judge Paul.