CHAPTER 21

IMPLICIT ATTITUDES

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Attitude research has a long and venerable history that began in the early 20th century (e.g., Allport, 1935; Bogardus, 1925; Thurstone, 1928) and continues today as a central theme in social psychology (Albarracin, Johnson, & Zanna, 2005; Banaji & Heiphetz, 2010). The breadth and depth of this work is apparent in reviews of the literature in every major handbook on social psychology (see Banaji & Heiphetz, 2010).

In its most basic form, an attitude is a psychological tendency to view a particular entity (called an *attitude object*) with some degree of favor or disfavor (Eagly & Chaiken, 1993; Zanna & Rempel, 1988). The attitude object may be specific (e.g., this bowl of granola or my friend Pete) or more general (e.g., recent immigrants, daily exercise, or global warming). The attitude itself may include affective (emotion), cognitive (beliefs), or behavioral components (Breckler, 1984; Hilgard, 1980; Ostrom, 1969). Some of the most intriguing aspects of attitudes are what they reveal about the people who hold them, their effects on actions, and their broader implications. Knowing a person's attitude ought to provide some insight into the person's judgments and actions in relation to the attitude object (e.g., liking Candidate A indicates a greater probability of voting for that candidate). At the aggregate level, consensually held attitudes can be important indicators of higher level outcomes (e.g., the winner of the election).

Over the past century, attention has waxed and waned around various issues, including attitude measurement (Bogardus,1925; Guttman, 1944; Likert, 1932; Osgood, Suci, & Tannenbaum, 1957; Thurstone, 1928), attitude structure (Breckler, 1984; Eagly & Chaiken, 1998; Hilgard, 1980; McGuire, 1989), attitude change (Chaiken, 1980; Chaiken & Eagly, 1983; McGuire, 1968, 1985; Petty & Cacioppo, 1984, 1986), and the consistency between attitudes and behavior (Ajzen, 1989; Ajzen & Fishbein, 1977; Fazio & Zanna, 1981). In the latter part of the 20th century, attention became concentrated on a debate about the very nature of attitudes. Must people be aware of their attitudes? How are people to understand discrepancies between self-reported attitudes and other attitude indicators?

As a case in point, the notion that group-based prejudice[1] is illegitimate and unethical has become an increasingly mainstream norm in U.S. society. These changes in public opinion are reflected in national surveys that reveal a steady decline in prejudiced attitudes over the past few decades, especially toward African Americans (Brigham, 1972; Karlins, Coffman, & Walters, 1969; Maykovich, 1971, 1972; Schuman, Steeh, Bobo, & Krysan, 1997),

Work on this chapter was supported by Grant HL088198 awarded to Irene V. Blair from the National Heart, Lung, and Blood Institute of the National Institutes of Health and by grant GSE 1132651 awarded to Nilanjana Dasgupta from the National Science Foundation.

[1]There is a theoretical distinction between prejudice and stereotype (Ashmore & Del Boca, 1981; Fiske & Pavelchak, 1986; Greenwald & Banaji, 1995; Hamilton & Trolier, 1986), with prejudice historically more closely aligned with affect and stereotype more closely aligned with cognition. For the purposes of this chapter, we refer to both prejudice and stereotype (or, more generally, both affect and cognition) as an attitude when there are approach–avoid implications for behavior.

http://dx.doi.org/10.1037/14341-021
APA Handbook of Personality and Social Psychology: Vol. 1. Attitudes and Social Cognition, M. Mikulincer and P. R. Shaver (Editors-in-Chief)

women (Huddy, Neely, & Lafay, 2000; Kleugel & Smith, 1986), and gays and lesbians (Herek, 1991, 2002; Yang, 1997). Despite such changes, other evidence has continued to show group-based inequality in several domains of life—health care, housing, education, employment, and the justice system (Badgett, 1996; Daniels, 2001; Ellis & Riggle, 1996; Leonhardt, 2002; Portwood, 1995; Raudenbush & Kasim, 1998; Ridgeway, 1997; Rubenstein, 1996; Sidanius & Pratto, 1999; Stohlberg, 2002). The discrepancy between increasingly tolerant self-reported (explicit) attitudes in the face of enduring and glaring disparities in people's lived experience prompted some researchers to urge the development of alternative, less obtrusive measures of attitudes that do not rely as heavily on people's willingness and ability to accurately report their thoughts and feelings, especially with regard to socially sensitive issues such as prejudice (Crosby, Bromley, & Saxe, 1980; Gaertner & Dovidio, 1977; Jones & Sigall, 1971; also see Nisbett & Wilson, 1977).

Serendipitously, at about the time that social psychology was searching for new ways to capture sensitive attitudes, cognitive psychology was witnessing the evolution of new theories and methods of measuring nonconscious or implicit memory (Jacoby, 1991; Richardson-Klavehn & Bjork, 1988; Roediger, 1990; Roediger & McDermott, 1993; Schacter, 1987; see also work on semantic memory by Meyer & Schvaneveldt, 1971; Neely, 1977; Posner & Snyder, 1975). These theories and methods were eagerly adapted by social psychologists for the study of nonconscious or implicit social cognition (Banaji, Hardin, & Rothman, 1993; Bargh & Pietromonaco, 1982; Devine, 1989; Dovidio, Evans, & Tyler, 1986; Fazio, Jackson, Dunton, & Williams, 1995; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Gaertner & McLaughlin, 1983; for more detail on the history of implicit attitudes, see Banaji, 2001; Bazerman & Banaji, 2004), beginning a long and productive line of research leading to methodological and theoretical sophistication in the study of implicit attitudes. The empirical findings confirmed the existence of related but distinct types of attitudes (Cunningham, Preacher, & Banaji, 2001; Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Hofmann, Gschwendner, Nosek, & Schmitt, 2005; Nosek, 2005; Nosek & Smyth, 2007), commonly referred to as implicit and explicit attitudes.

IMPLICIT AND EXPLICIT ATTITUDES

Most theoretical models consider implicit and explicit attitudes as two qualitatively different modes of psychological processing (e.g., Devine, 1989; Fazio, 1990; Fazio et al., 1995; Gawronski & Bodenhausen, 2006; Greenwald & Banaji, 1995; Smith & deCoster, 2000; Strack & Deutsch, 2004; see Chaiken & Trope, 1999). An in-depth review of these models is beyond the scope of this chapter. Instead, we briefly outline one model that has recently gained prominence and contains suitable explanatory power for present purposes. The associative–propositional evaluation model contends that attitudes may arise from two different processes, one associative and the other propositional in nature (Gawronski & Bodenhausen, 2006). Associative processes—the primary basis of implicit attitudes—are simple, spontaneous reactions that occur in response to a relevant stimulus on the basis of the match between the (external) stimulus and the individual's (internal) preexisting network of stimulus–attribute associations. These reactions require little cognitive capacity, intention, or even awareness. Of critical importance, the likelihood of an association being activated is independent of its perceived truth value, meaning that associations can be activated even when the perceiver would consider them invalid. For example, many White Americans appear to have spontaneous negative associations with Black Americans, even when they regard that negativity as invalid or false (Devine, 1989; Nosek, Banaji, & Greenwald, 2002a).

When people are asked directly about their feelings toward Black Americans, however, the associative–propositional evaluation model proposes that an entirely different process is set in motion (Gawronski & Bodenhausen, 2006). For this explicit attitude judgment, an individual is believed to engage in an effortful inferential process to consider all of the propositions or statements that come to mind and are considered relevant for this judgment. These propositions may reflect specific exemplars of a category ("I really like my friend

Martin who is Black," "I really like Bill Cosby") but may also include other sources, such as one's values (e.g., "I believe that all people are fundamentally good; I should not evaluate people based on race or ethnicity"), other relevant knowledge ("Disadvantaged groups really have a rough time in society"), or self-presentational concerns ("I don't want other people to think I have negative feelings toward minority groups"). The individual could even consider propositions based on spontaneous associations ("I initially feel uncomfortable when I think about Blacks"). The most important aspect of this inferential process is a determination of the propositions' perceived truth value: Which thoughts and feelings are considered valid and which ones are considered invalid for the judgment at hand? The end result is an explicit judgment based on a logically consistent (subjectively valid) set of propositions.

As implied in the foregoing example, a determination that one's spontaneous reactions are inconsistent with other propositions, and thus perceived as invalid, will result in the exclusion of those reactions from the explicit attitude and a discrepancy between the implicit and explicit attitudes. However, when a spontaneous reaction (implicit attitude) is consistent with other propositions that are considered, the reaction will be integrated into the explicit attitude and the likelihood that implicit and explicit attitudes will correspond is higher (e.g., a person with both spontaneous positive feelings and explicit positive beliefs about owning a BMW). Note that even in the latter case, implicit and explicit attitudes may not be entirely congruent because the explicit attitude will likely include other propositions that could alter it (e.g., my parents think that a BMW is extravagant). In sum, explicit attitudes are a result of the process of considering different propositions that come to mind, weighing them against each other, and creating consistency among them, with implicit attitudes playing a variable role in this process (Gawronski & Bodenhausen, 2006).

MEASUREMENT

Readers are likely familiar with standard measures of explicit attitudes, which are typically self-reports on Likert scales, feeling thermometers, semantic differential scales, or structured interviews. Implicit attitudes, in contrast, require that the spontaneous associations be quantified without involving respondents' deliberation or introspection. This requirement has led to the development of a number of techniques (see Gawronski & Payne, 2010), most of which rely on the speed or accuracy of responses rather than the content of the response itself to reveal underlying associations. For example, the widely used Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998; demonstrations available at https://implicit.harvard.edu) measures the strength with which concepts (e.g., Black and White people) are associated with attributes (e.g., good and bad). Stimulus items from four categories appear one at a time on a computer screen, and participants are asked to sort them by pressing the one of two available computer keys that corresponds to the correct category. During one block of trials, for example, participants are asked to press one particular key when either a Black face or a "good" word (e.g., *heaven*) appears on the screen, but to press a different key when a White face or a "bad" word (e.g., *hell*) appears on the screen. In another block of trials, the response pairings are reversed such that participants must sort Black faces and bad words using the same key and White faces and good words using the other key. The IAT exploits the likelihood that if concepts and attributes are associated in the mind, participants ought to complete the task faster when the two share a response key than when they do not. An inference is made about the strength of association between the concepts and attributes on the basis of the relative facility in sorting them together. The larger this performance difference is, the stronger the implicit association (attitude) for a particular person. Table 21.1 lists several of the more widely used measures of implicit attitudes, along with some of the pros and cons to consider (see Bar-Anan & Nosek, 2013; Gawronski & Payne, 2010; Nosek, Hawkins, & Frazier, 2012, for reviews of the usage of these measures).

As noted in the table, measures of implicit attitudes vary greatly in their obtrusiveness, or the degree to which respondents are aware of what is being measured. An implicit attitude measure that is relatively obtrusive (e.g., the IAT) may be desirable

TABLE 21.1

Common Implicit Attitude Measures

Attitude measure	Potential pros and cons
Evaluative or sequential priming (Fazio, Jackson, Dunton, & Williams, 1995; Fazio, Sanbonmatsu, Powell, & Kardes, 1986): On each of multiple trials, an initial prime stimulus appears followed very quickly (e.g., 200–400 ms) by a target stimulus. Participants ignore the prime and make a simple judgment about the target (e.g., good vs. bad word). An implicit attitude is revealed by faster responses to certain prime–target pairings than to others. For example, faster responses to negative than to positive words after pictures of cigarettes would indicate a negative implicit attitude toward cigarettes.	■ Can be used to measure attitudes toward a single attitude object (e.g., cigarettes or beer) without comparing it with another object ■ Minimally obtrusive, even to the point of using subliminal primes and using a judgment that is unrelated to evaluation (e.g., merely reading target words aloud; lexical decisions) ■ Requires many trials and precise timing parameters to constrain deliberation
Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998): On multiple trials, participants are asked to sort—as quickly and as accurately as possible—stimulus items from four categories that represent two dimensions (e.g., Black vs. White race, and good vs. bad words). An implicit attitude is indicated by the speed with which a person can accurately sort the stimuli in two different conditions. An implicit race attitude is shown, for example, if a person is significantly faster when Black faces and negative words require the same response and White faces and good words require another response, compared with the reverse pairing.	■ Popular, with a lot of supporting data ■ Easy and relatively fast to complete, particularly with the development of a brief version (Sriram & Greenwald, 2009) ■ Produces statistically large effects for many attitudes ■ Designed for comparative attitudes (e.g., Whites vs. Blacks, dogs vs. cats) ■ More obtrusive than other measures
Go–No-Go Association Task (Nosek & Banaji, 2001): On multiple trials, participants are asked to press a key ("go") if a stimulus belongs to one of two defined categories (e.g., Black or good) and to refrain from pressing the key ("no-go") if a stimulus does not belong to either category. The decision to go or no-go must be made very quickly (e.g., within 500 ms), and errors are common. Signal detection analysis is used to determine whether there is greater sensitivity (d) in making correct responses when the attitude object is paired with positive versus negative words.	■ Can be used to measure attitudes toward a single attitude object without comparing it to another object ■ Produces statistically large effects for many attitudes ■ Moderately obtrusive ■ Requires precise timing parameters to constrain deliberation
Affect Misattribution Procedure (Payne, Cheng, Govorun, & Stewart, 2005): On each of multiple trials, an initial prime stimulus appears followed by an ambiguous target stimulus (e.g., Chinese ideograph). Participants are told to ignore the prime and make a guess on whether the target is positive or negative. An implicit attitude is shown by the frequency with which the targets are judged as good (vs. bad) when they follow a certain attitude object (e.g., Black faces).	■ Can be used to measure attitudes toward a single attitude object without comparing it to another object ■ Minimally obtrusive; even more so if priming stimuli are made subliminal

if part of the goal for those taking the test is to learn something about their own implicit attitudes. Such obtrusiveness is tolerable if features of the task evoke an automatic gut response and prevent participants from controlling or modifying that initial response despite their awareness. Other tasks that are less obtrusive (e.g., evaluative priming) are useful when researchers want to disguise the purpose of the measure to prevent participants from attempting to modify their responses on that or other subsequent tasks. There appears to be an interesting trade-off between the unobtrusiveness of the implicit measure and its effect size such that implicit measures that are relatively more obtrusive yet difficult to control (e.g., IATs) tend to reveal attitude effects with larger and more reliable effect sizes than

implicit measures that are less obtrusive (e.g., evaluative priming; Greenwald, Draine, & Abrams, 1996; Wittenbrink, 2007).

CHAPTER ROADMAP

In light of the many excellent reviews on the more traditional concept of explicit attitudes, we focus on implicit attitudes, with reference to explicit attitudes for comparison purposes only. Our goal in this chapter is to emphasize translational research on implicit attitudes and beliefs—research that connects basic questions about the nature of implicit attitudes to its applications and relevance in the real world. To that end, we seek to provide the reader with scientific knowledge on several important issues:

1. the potential role of implicit attitudes in important life domains, such as education, employment, health, medicine, law, and politics;
2. the relation between implicit attitudes and behavior and the conditions under which implicit attitudes do and do not predict behavior;
3. the relation between implicit and explicit attitudes and the dimensions that distinguish between these different types of attitudes; and
4. the extent to which implicit attitudes are malleable and the conditions under which they may be changed.

These issues form the backbone of this review, and they speak to questions that we routinely encounter in conversation with professional colleagues and laypeople alike: Why should I concern myself with implicit attitudes? In what situations might my perceptions, judgments, and behavior be more influenced by implicit than explicit attitudes? What can people do if they want to change implicit attitudes?

IMPLICIT ATTITUDES IN EVERYDAY LIFE

We begin our review by highlighting studies on implicit attitudes in important life domains, specifically education, employment, health, and politics. We focus on this work because it reveals the potential role that implicit attitudes may play in a wide swath of social life and it allows readers to consider the topic of implicit attitudes from a variety of perspectives. The breadth and depth of the research evidence shows that implicit attitudes may have profound effects and deserve serious attention from practitioners, policymakers, and laypeople, as well as researchers.

Education and Employment

A growing number of studies have shown that students' implicit academic attitudes are associated with how they view their own intellectual ability and their actual academic achievement (Dasgupta, 2011; Nosek & Smyth, 2011; Stout, Dasgupta, Hunsinger, & McManus, 2011). For example, Nosek and Smyth (2011) found that college women who had stronger implicit gender bias about math (i.e., associating math more strongly with men than with women) also expressed greater negativity toward math, were less likely to participate in math classes, viewed themselves as possessing less ability in math, and displayed lower math achievement. Moreover, the students' implicit gender bias was associated with their achievement over and above their explicit attitudes toward math (see also Nosek, Banaji, & Greenwald, 2002b).

A longitudinal, quasi-experimental study showed that female (but not male) college students enrolled in sections of a calculus class taught by male math professors expressed less positive implicit attitudes toward math, less implicit identification with the discipline, and lower self-efficacy in math than other female students who were enrolled in sections taught by female math professors (Stout et al., 2011). Even though the women's implicit sentiments about math varied as a function of their instructor's gender, their objective performance (final course grade) was significantly higher than that of their male peers across all sections regardless of instructor gender, demonstrating these women's objective math ability despite the lability of their subjective perceptions. Interestingly, students' explicit positive attitudes about math and explicit positive identification with the field did not vary as a function of either instructor or student gender (Stout et al., 2011). As a whole, this study showed that women's implicit perceptions of mathematics were sensitive to cues in

the classroom (instructor gender), but their explicit perceptions were not. From a methodological standpoint, this study comes close to suggesting that instructor gender influenced students' implicit attitudes about mathematics. Because the students had registered for classes before specific instructors had been assigned to each section, the possibility of students' self-selection on the basis of instructor gender can be ruled out. Other companion studies (Stout et al., 2011, Studies 1 and 2) used controlled experimental designs and found results similar to this study: Female engineering students who had been randomly assigned to read biographies of successful female engineers showed more positive implicit attitudes toward engineering than students who read about successful male engineers or about engineering innovations with no mention of gender (control conditions). In the successful female engineer condition, the more positive women's implicit attitudes toward the field were, the more confidence they expressed in their own ability, which in turn mediated and predicted their subsequent aspirations in engineering. This mediational pattern between implicit attitudes, self-confidence, and career aspirations was not obtained for women who were exposed to successful male engineers.

Another recent study focused on adolescent children's aspirations in science (Dasgupta, Hunsinger, & McManus Scircle, 2013). This study found that implicit gender bias linking science to boys more than girls emerges early in school and varies according to the gender of science teachers, with adolescents in middle school showing an implicit male–science bias if they had a male science teacher but not if they had a female science teacher. This study was a longitudinal one in which eighth-grade students had been randomly assigned to sections of the same science class; half of these sections were taught by women and half were taught by men. By the first month of the academic year, adolescent girls and boys showed the implicit gender bias if their science teacher was male but not if their science teacher was female. Girls in science class taught by male teachers expressed the implicit bias substantially more than their male peers. This implicit bias—and differences by teacher gender—remained significant 9 months later, at the end of the academic year.

Teacher attitudes. Considering the other side of the classroom, van den Bergh, Denessen, Hornstra, Voeten, and Holland (2010) found that elementary school teachers' implicit attitudes toward ethnic minorities (Turks and Moroccans) in the Netherlands were associated with their differential expectations of minority versus majority children in their classrooms, as well as differential achievement in the students' math and reading. That is, the stronger the teachers' implicit bias against ethnic minorities was, the lower their academic expectations were for students of Turkish or Moroccan origin and the higher their expectations were for students of Dutch origin. Also, the stronger the teachers' implicit bias was, the lower the academic achievement of their ethnic minority students was relative to the achievement of their majority students. Another study found that teachers' implicit attitudes toward dyslexia was associated with their evaluations of dyslexic students' achievement on a writing task and also to the students' actual achievement on a standardized spelling test (Hornstra, Denessen, Bakker, van den Bergh, & Voeten, 2010). In neither of these studies did the teachers' explicit attitudes relate to students' outcomes.

In a striking demonstration of how implicit attitudes may become embedded in the cultural fabric, Nosek et al. (2009) analyzed the implicit gender biases of more than half a million individuals across 34 countries, along with levels of national achievement in eighth-grade science and math. Countries whose citizens tended to exhibit stronger implicit gender bias linking science with men rather than with women had larger gender gaps in science and math achievement that favored boys over girls. Citizens' explicit attitudes about gender and science were not similarly associated with national levels of achievement.

Employer attitudes. Careful audit studies of employers have demonstrated pronounced biases on the basis of race and ethnicity (e.g., Bertrand & Mullainathan, 2004; Segrest Purkiss, Perrewé, Gillespie, Mayes, & Ferris, 2006). Research on implicit attitudes has provided insight into such employment bias. In two studies by Rooth (2010), Swedish employers were sent (fake) applications

that matched on all qualifications and differed only in the implied ethnicity of the applicant—native Swede or Arab. Rooth found that employers who implicitly favored native Swedes over Arabs were more likely to have called back Swedish than Arab applicants for job interviews, despite the applicants' equal qualifications. The employers' explicit ethnic attitudes were only weakly associated with callback discrimination, and not surprisingly, their implicit attitudes were associated with discrimination over and above their explicit attitudes (Rooth, 2010).

Human resources managers with greater implicit bias against obese people were also found to have called back obese job applicants less frequently than normal-weight applicants with matching credentials. Again, the managers' explicit attitudes were only weakly related to discrimination and did not affect the relation between implicit attitudes and discrimination (Agerström & Rooth, 2011).

Summary. Three themes stand out in this research on implicit attitudes in education and employment. First, this research shows that implicit attitudes are associated with meaningful educational and employment outcomes. Students' implicit attitudes toward academic disciplines are associated with their educational views and outcomes. Relatedly, teachers' implicit attitudes toward students' social characteristics (e.g., race or disability) are associated with teachers' expectations and students' own performance in those domains; potential employers' implicit group attitudes are associated with whom they call back for job interviews. Second, in all of these studies, the teachers', students', and prospective employers' implicit attitudes were more strongly associated with outcomes than were their explicit attitudes, the latter being mostly uncorrelated with outcomes. Because group disparities in academic achievement as well as employment discrimination are socially sensitive topics, it is likely the case that social desirability in explicit responses suppressed their predictive ability. Finally, the education studies demonstrate the malleability of implicit attitudes by showing how social environments (micro environments such as classrooms and macro environments such as national cultures) may influence those attitudes. Take, for instance, the findings that teacher gender appears to affect students' implicit attitudes about the specific academic fields. Having female rather than male teachers in math and science classes erases implicit gender bias in these domains, suggesting its malleability and responsiveness to situational cues.

Health and Medicine

The potential role of implicit attitudes in health and well-being has been extensively investigated over the past decade. Of particular interest are behaviors, such as alcohol abuse and the consumption of unhealthy foods, in which rational decision making may conflict with automatic tendencies.

There is now wide agreement that implicit attitudes play a role in the use of alcohol, tobacco, and marijuana (for reviews, see Reich, Below, & Goldman, 2010; Rooke, Hine, & Thorsteinsson, 2008; Stacy & Wiers, 2010). Substance users demonstrate more positive implicit attitudes toward the substance than nonusers, and the level of implicit positivity is consistently correlated with the level of substance use that individuals report. Moreover, these associations have been found even after explicit attitudes and other risk factors were taken into account, suggesting a unique role for implicit attitudes in substance use (Ames et al., 2007; De Houwer & De Bruycker, 2007; de Jong, Wiers, van De Braak, & Huijding, 2007; Houben, Rothermund, & Wiers, 2009; Houben & Wiers, 2007a, 2007b, 2008; Houben, Nosek, & Wiers, 2010; Jajodia & Earleywine, 2003; McCarthy & Thompsen, 2006; Ostafin & Palfai, 2006; Sherman, Chassin, Presson, Seo, & Macy, 2009; Thush & Wiers, 2007; Wiers, vanWoerden, Smulders, & de Jong, 2002).

Cause and effect can be difficult to tease apart in addiction, particularly because substance use is typically measured retrospectively (e.g., timeline follow-back over the past month or an estimate of average lifetime use). Prospective studies are beginning to emerge, however, that suggest implicit attitudes may serve as a valid predictor of substance use. Wiers et al. (2002) found that implicit alcohol attitudes predicted adults' reported alcohol use a month later (for exercise, see Conroy, Hyde, Doerksen, & Ribeiro, 2010). A study of adolescents showed that implicit alcohol attitudes predicted binge drinking a

year later, over and above explicit attitudes and, to a somewhat weaker extent, after controlling for baseline levels of drinking (Thush & Wiers, 2007). Another study of adolescents found that their implicit smoking attitudes predicted smoking initiation 18 months later, over and above the effects of explicit attitudes (Sherman et al., 2009).

Intervention research has also begun to shed light on the effects of changing implicit attitudes. Houben, Havermans, Nederkoorn, and Jansen (2012) randomly assigned heavy drinkers to complete a series of computerized training trials in which they responded to pictures of beer with either a go response (press a key) or a no-go response (refrain from pressing the key). Drinkers who had withheld responses to beer pictures in the training session subsequently showed reduced positivity in implicit beer attitudes, and this reduction was shown to mediate changes in drinking behavior over the following week. In another study, this time on attitudes toward unhealthy snack foods, participants were randomly assigned to an intervention condition in which the unhealthy foods were paired with either negative body images (e.g., obesity or arterial disease) or control images (Hollands, Prestwich, & Marteau, 2011). Participants in the intervention condition subsequently showed more negative implicit attitudes toward the unhealthy foods and were more likely to choose fruit over unhealthy snacks to take with them. More important, changes in implicit attitudes partially mediated food choice, with stronger mediation observed for individuals with stronger baseline levels of implicit preferences for unhealthy snacks. Although explicit snack attitudes were unaffected by the intervention, both explicit and implicit attitudes were unique predictors of food choice in this study.

Psychopathology. Research on the role of implicit attitudes in psychopathology has been propelled by theories that many disorders have a cognitive component (e.g., dysfunctional schemas; for reviews, see Roefs et al., 2011, and Teachman, Joormann, Steinman, & Gotlib, 2012). Implicit attitudes have been found to consistently covary as expected for several conditions: Individuals with spider phobia show more negative implicit attitudes against spiders than do individuals without the phobia (Ellwart, Rinck, & Becker, 2006; Huijding & de Jong, 2005, 2007, 2009; Teachman, 2007; Teachman, Gregg, & Woody, 2001; Teachman & Woody, 2003); individuals incarcerated for pedophilia are more likely to have implicit attitudes relating children with sex than individuals incarcerated for other crimes (Gray, Brown, MacCulloch, Smith, & Snowden, 2005); individuals who have attempted suicide show stronger implicit attitudes relating self with death (Nock & Banaji, 2007; Nock et al., 2010; Randall, Rowe, Dong, Nock, & Colman, 2013). Other conditions, such as depression, social phobia, and body dysmorphic disorder have produced less consistent results (Roefs et al., 2011).

Implicit attitudes have also been found to provide incremental prediction, over and above explicit attitudes, of relevant behavioral outcomes, such as approaching spiders (Ellwart et al., 2006; Huijding & de Jong, 2005; Rinck & Becker, 2007; Teachman, 2007; Teachman & Woody, 2003), sitting close to a mirror (Clerkin & Teachman, 2009), expression of spontaneous fear responses (e.g., startle reflex; Huijding & de Jong, 2006), and, after a stressful event, cognitive performance and both objective ratings and behavioral indicators of anxiety (Egloff & Schmukle, 2002). A handful of studies have shown that implicit attitudes may also have longer term predictive utility. For example, a series of studies by Nock and colleagues (Nock & Banaji, 2007; Nock et al., 2010; Randall et al., 2013) found consistent evidence that implicit attitudes associating self with death predicted suicide ideation and suicide attempts 6 months later (Nock & Banaji, 2007; Nock et al., 2010), as well as engaging in self-harm 3 months later. The success of implicit attitudes predicting suicide or self-harm outcomes was obtained in these studies over and above other known clinical predictors, such as frequency of prior self-harm and suicide attempts, diagnosed depression, and the patients' and clinicians' predictions of the likelihood of a suicide attempt.

The causal role of implicit attitudes in psychopathology is indicated most strongly in a study by Teachman, Marker, and Smith-Janik (2008), in which the implicit attitudes and symptoms of individuals with panic disorder were measured multiple times across the course of a 12-week treatment program. Dynamic bivariate latent difference score

modeling showed that over time, changes in the participants' implicit attitudes significantly predicted changes in panic symptom severity, whereas the reverse effect (symptoms predicting implicit attitudes) was much smaller and nonsignificant.

Medicine. Implicit attitudes have also been implicated in the delivery of health care, most significantly with regard to clinicians' ethnic and racial bias (for other biases among clinicians, see Brener, von Hippel, & Kippax, 2007; Peris, Teachman, & Nosek, 2008; Teachman & Brownell, 2001; von Hippel, Brener, & von Hippel, 2008). Several studies have shown that clinicians display the same substantial levels of implicit ethnic or racial bias—favoring Whites over African Americans or Latinos—as are found among other community groups (Blair, Havranek, et al., 2013; Cooper et al., 2012; Green et al., 2007; Haider et al., 2011; Moskowitz, Stone, & Childs, 2012; Sabin, Rivara, & Greenwald, 2008). At the same time, the clinicians report little to no explicit ethnic or racial bias, and the relations between their implicit and explicit biases are generally low.

Clinician implicit bias is theorized to affect minority patients' treatment and health outcomes in two ways (Blair, Steiner, & Havranek, 2011; Dovidio et al., 2008; van Ryn & Fu, 2003). It may directly influence clinicians' medical decisions, thereby compromising minority patients' treatment and health outcomes. Implicit bias may also indirectly affect care processes and health outcomes by affecting the quality of clinical interactions and communication. Evidence for the first, more direct route has been mixed and is entirely derived from surveys using hypothetical clinical vignettes. A widely cited report by Green et al. (2007) found that resident clinicians with greater implicit bias were less likely to recommend thrombolytic therapy for a hypothetical Black patient with myocardial infarction, but this did not occur when the patient was described as White. However, research by Sabin and colleagues (Sabin & Greenwald, 2012; Sabin et al., 2008) with pediatricians showed that some hypothetical decisions were associated with implicit bias but other decisions were not. Finally, a study with medical students failed to find any relation between hypothetical clinical decisions and implicit bias (Haider et al., 2011).

Evidence on the second, communication-based route has been more consistent. Several studies have found associations between clinician implicit bias and poorer clinical interactions with Black patients (Blair, Steiner, et al., 2013; Cooper et al., 2012; Penner et al., 2010). In one multisite study, Blair, Steiner, et al. (2013) used the IAT to measure implicit ethnic and racial attitudes of 134 primary care doctors and then surveyed a randomly selected sample of their Black, Latino, and White patients who received regular care from these doctors. In individual telephone interviews, these patients were asked a series of questions about their doctor's interpersonal treatment, communication, trustworthiness, and knowledge of the patient. A multilevel analysis of the relation between doctors' implicit racial attitudes and their patients' perceptions showed that the greater the doctors' race bias, the lower they were rated by their African American patients on nearly every dimension (controlling for ratings made by the doctors' White patients). A similar pattern was not observed among the Latino patients, who generally rated their doctors lower regardless of the doctors' implicit ethnic attitudes.

Summary. The research evidence has shown that implicit attitudes may play important roles in health and medicine. People's implicit attitudes toward substances predict their use and abuse of those substances, implicit attitudes about oneself predict mental health outcomes, and doctors' implicit group attitudes predict communication patterns with patients from those groups. More important, the research in this domain provides some of the clearest evidence that implicit attitudes have a causal influence on behavior. Clear evidence has also been found for the distinctiveness of implicit and explicit attitudes, with each predicting unique aspects of behavior. Finally, implicit health attitudes have been shown to be malleable, responding to direct manipulation (e.g., evaluative conditioning) as well as certain therapeutic programs.

Politics

One of the most important and, ostensibly, deliberative acts of citizens in a democracy is voting. Recent investigations have demonstrated that measures of

implicit attitudes toward public policies and political candidates are effective predictors of voting, over and above explicit attitudes. For example, Arcuri, Castelli, Galdi, Zogmaister, and Amadori (2008) found in a sample of Italian voters that an IAT measure of candidate preference (positive vs. negative associations with the actual candidates) obtained 1 month before the general election predicted individuals' vote choices reported after the election, both for voters who had been decided and those who had been uncertain at Time 1. In a second study of local elections, Arcuri et al. found that undecided voters ended up voting in a manner consistent with their implicit preferences for candidates assessed a month earlier. The IAT measure even served to differentiate people who voted for the two major candidates (featured in the IAT) from those who voted for minor party candidates. Roccato and Zogmaister (2010) included two IATs—one measuring attitudes toward the two major coalitions (right wing and left wing) and another measuring attitudes toward the respective leaders of those coalitions—in a large, nationally representative Italian sample before national elections. They found the IAT measures to be as effective as the explicit measure, and more effective than a voting intention measure in predicting the actual vote outcome, in the aggregate. The IAT measure contributed a small but statistically significant amount of unique variance to predicting actual vote choice, controlling for explicit preference and voting intention. Additionally, respondents whose implicit and explicit attitudes were relatively congruent were less likely to be undecided in the preelection survey. These findings indicate that implicit measures relate meaningfully to voting behavior, even well in advance of it, and explain variance beyond explicit measures of attitudes and intentions (see also Friese, Bluemke, & Wänke, 2007; Friese, Smith, Plischke, Bluemke, & Nosek, 2012).

Galdi, Arcuri, and Gawronski (2008) provided compelling evidence for a causal effect of implicit preferences on subsequent voting behavior. Attempting to predict vote choice of residents of Vicenza, Italy on a policy referendum, Galdi et al. showed that among undecided voters, implicit preferences (single-category IAT; Karpinski & Steinman, 2006) predicted vote choices a week later. The time course of the study rules out reverse causation and the most likely third variable (explicit preferences) was eliminated as an explanation for the effect (see also Arcuri et al., 2008; Finn & Glaser, 2010; Payne et al., 2010). Furthermore, the relative obscurity and specificity of the issue would be less likely to be influenced by other variables than, say, presidential vote choice would be.

Perhaps more remarkable are findings that very general implicit racial attitudes prospectively predict vote choice, even when statistically controlling for the most influential predictors of voting such as party identification, ideology, voter race, and explicit candidate preference (e.g., Finn & Glaser, 2010; Greenwald, Smith, Sriram, Bar-Anan, & Nosek, 2009; Knowles, Lowery, & Schaumberg, 2010; Moss-Racusin, Phelan, & Rudman, 2010; Payne et al., 2010). In 2008, the inclusion of an African American major party candidate, Barack Obama, in the U.S. presidential election afforded the opportunity to assess the effects of implicit and explicit racial attitudes on presidential vote choice. Fortunately, the American National Election Studies included a measure of implicit racial bias, the affect misattribution procedure (AMP; Payne, Cheng, Govorun, & Stewart, 2005), in its longitudinal survey of a large, nationally representative sample. Two AMPs were administered to each respondent (at different phases of the panel study). One AMP measured positive and negative affective associations with Blacks and Whites generally and the other measured these associations with the two major candidates, Barack Obama and John McCain, specifically. The American National Election Studies included AMPs in two of their large longitudinal surveys, and a third large national sample was surveyed repeatedly in the election period by Yahoo! and the Associated Press. Payne et al. (2010) examined the effects of the earlier AMP measures of implicit racial preference on voters' ultimate decisions to vote for Obama, McCain, others, or not at all. Recognizing that a major part of voting behavior is the decision to vote at all (turnout), Payne et al. calculated the magnitude of the implicit bias effects on voting for Obama (or not) and voting for McCain (or not) separately. A proclivity to respond negatively after Black face primes significantly predicted a subsequent

vote against Obama or for McCain across all three samples. Responses to White face primes yielded a consistent pattern of results (positive associations with White related to voting for McCain and against Obama), but the effects were weaker, and not all were statistically significant. When implicit and explicit measures' effects on voting were assessed in the same model, consistently significant effects of the AMP measure on voting for McCain were reduced to nonsignificance with the introduction of the explicit measure. However, when examining effects on voting for Obama, even when controlling for the explicit measure the implicit measure significantly predicted vote (those with more negative implicit attitudes toward Blacks were less likely to vote for Obama).

Testing a highly saturated regression model with the large, nationally representative Associated Press–Yahoo! data set, Pasek et al. (2009) found that although the AMP-indexed implicit bias did not uniquely account for decisions to vote for McCain or not to vote, it did remain a statistically significant predictor of the decision to vote for a non–major-party candidate instead of Obama. Specifically, even when controlling for explicit bias (modern racism), age, sex, education, income, voter race, party identification, ideology, perceptions of the state of the nation, specific perceptions of both candidates, and other known predictors of voting, implicit bias correlated significantly with voting for a third party candidate. Pasek et al. offered this as an explanation for why Obama's margin of victory over McCain did not meet politico-economic projections for a generic Democratic–Republican matchup in 2008 (see also Finn & Glaser, 2010; Greenwald, Smith, et al., 2009).

Summary. For a number of reasons, findings of relations between implicit measures and voting behavior are particularly important in considering the construct and ecological validity of implicit attitudes. First, voting in government elections is an indisputably important human social behavior. Even if any particular single vote is of little consequence, many elections, particularly U.S. presidential elections, are won by very small margins. The aggregate effect of implicit preferences could, therefore, sway the course of history. Second, because voting is a time-fixed, predictable behavior, studying it allows for highly reliable and meaningful temporal predictions. Similarly, because most voters remember for whom they voted, voting is a real behavior that can be accurately identified with self-report. Finally, there is a long-standing tradition in political science of rigorous studies of elections, particularly presidential elections. As a result, the American National Election Studies uses very-high-quality methods to draw a large representative national sample and obtains measures for hundreds of variables. The large, multivariate modeling this affords promotes robust causal inference. Specifically, implicit bias measures have been shown to predict voting behavior in advance, even after controlling for explicit candidate preference, party identification, ideology, voter race, and other variables that typically account for most of the variance. Consequently, the evidence that implicit attitudes have a causal effect on important, ostensibly deliberative behavior is compelling.

Lessons Learned From the Study of Implicit Attitudes in Everyday Life

The research reviewed in the foregoing sections has shown that implicit attitudes have been investigated in a number of important life domains. Implicit social group attitudes (e.g., ethnic, racial, or gender bias) were some of the first to have been investigated, and it is thus not surprising that such attitudes have received the most attention across the domains of education, employment, medicine, and politics. Implicit attitude research has, however, moved far beyond bias against social groups and now routinely appears in more general investigations of attitudes in health, psychopathology, politics, and consumer behavior, with evidence in these domains of significant effects of implicit attitudes on meaningful outcomes. As a whole, this research sheds light on many of the central issues confronting research on implicit attitudes, to which we now turn.

IMPLICIT ATTITUDES AND BEHAVIOR

The relation between attitudes and behavior has never been simple or straightforward. The infamous crisis of confidence within the field of social

psychology in the second half of the 20th century was based in part on demonstrations that measures of (explicit) attitudes were not strongly related to behavior. In a highly cited study by LaPiere (1934), for example, respondents reported much more biased racial attitudes than they expressed in their behavior; many decades later, the tables seemed to turn with racial attitudes reported to be much more positive even as behavioral outcomes continued to show large disparities on the basis of race (Bertrand & Mullainathan, 2004; Daniels, 2001; Leonhardt, 2002; Segrest Purkiss et al., 2006; Sidanius & Pratto, 1999; Stohlberg, 2002). As described earlier, such findings led to refinements in both theory and measurement, with a large component being the development of theories and measurement of implicit attitudes.

As we have reviewed, implicit attitudes have been associated with many types of behavior, including teacher evaluations, classroom performance, employment decisions, the use of alcohol and tobacco, suicide attempts, patients' evaluations of physicians, and political decisions. These examples show that implicit attitudes do relate to behavior—often accounting for variance over and above explicit attitudes—but many examples in which implicit attitudes do not relate to measured outcomes also exist (e.g., Dovidio, Kawakami, & Gaertner, 2002; Fazio et al., 1995; Haider et al., 2011; Houben et al., 2009, 2010; Larsen, Engels, Wiers, Granic, & Spijkerman, 2012). Similar to the much earlier research on explicit attitudes and behavior, the central issue is not whether implicit attitudes relate to behavior but when this is more or less likely to occur.

Opportunity and Motivation

One of the earliest and most influential theories in this regard is the MODE model developed by Fazio (1990; Fazio et al., 1995). MODE stands for *m*otivation and *o*pportunity as *de*terminants of the attitude–behavior relation and accordingly proposes that implicit attitudes are more likely to influence behavior when people do not have the motivation (e.g., countervailing explicit attitudes) or the opportunity to direct their responses to be inconsistent with those attitudes. In the intergroup domain, for example, implicit racial attitudes have been shown to be more predictive of spontaneous or less controllable behavior (e.g., nonverbal friendliness), whereas explicit racial attitudes were more predictive of deliberate racial behavior (e.g., verbal statements; Dovidio et al., 2002; Fazio et al., 1995; McConnell & Leibold, 2001). This distinction in behavior may help to explain why there are more consistent findings of implicit race attitudes predicting clinicians' interpersonal behavior with patients (Blair, Steiner, et al., 2013; Cooper et al., 2012; Penner et al., 2010) than clinicians' implicit attitudes predicting more deliberate medical decisions (Haider et al., 2011; Sabin et al., 2008; Sabin & Greenwald, 2012).

Similar findings have been found in other domains. In a series of studies by Friese, Hofmann, and colleagues (Friese, Hofmann, & Wänke, 2008; Hofmann & Friese, 2008), situational manipulations of cognitive resources determined whether health-related choices were based on implicit or explicit attitudes. When participants were low in resources (owing to demands of a secondary task, self-regulation depletion, or the influence of alcohol), the consumption of potato chips, candy, or beer was better predicted by their implicit than their explicit health attitudes. When cognitive resources were not so constrained, these same behaviors were guided more by the participants' explicit attitudes than their implicit attitudes. In these cases, the behavior was exactly the same but the surrounding conditions altered the opportunity for deliberate processes (e.g., explicit attitudes) to influence responses.

In addition to situational changes in the engagement of deliberative responses, there are also individual differences in people's capacity to engage in these processes, which again constrains their opportunity to do so. For example, implicit attitudes appear to be even stronger predictors of smoking and alcohol use in adolescents and young adults who score relatively poorly on tests of executive functions (Grenard et al., 2008; Houben & Wiers, 2009), whereas among individuals with relatively strong executive functions, explicit attitudes are better predictors of alcohol use (Thush & Wiers, 2007).

In a series of studies, Hofmann, Gschwendner, et al. (2008) showed that people with lower working memory capacity had stronger implicit attitude–behavior relations with regard to viewing erotic pictures, consuming candy, or giving retaliatory negative feedback to another person. In contrast, more controlled dispositions (explicit attitudes or self-regulatory goals) were more predictive of behavior for people with high working memory capacity. Thush and Wiers (2007) showed similar effects of working memory capacity for implicit versus explicit attitudes predicting alcohol use a month later.

Additional Moderators of the Implicit Attitude–Behavior Relation

In addition to motivation and opportunity to control behavior, Friese et al. (2008) have proposed that other factors may also alter the relation between implicit attitudes and behavior, including uncertainty, habit, and emotion. Consider, for example, the finding that just before an election many voters report that they have yet to make up their minds about their vote. Consistent with the argument that uncertainty allows implicit attitudes to play a stronger role in behavior, Galdi et al. (2008) showed that among voters who were undecided 1 week before an election, their ultimate vote was predicted by their implicit but not explicit attitudes, whereas for voters who were decided before the election, their vote was better predicted by their explicit attitudes. Galdi et al. (2008; Galdi, Gawronski, Arcuri, & Friese, 2012) then showed that undecided voters were more likely to obtain information in line with their implicit attitudes than their explicit attitudes, and this selection mediated changes in attitude over time. For decided voters, their explicit attitudes predicted their selection of information and subsequent shifts in attitudes.

There is also intriguing evidence that implicit attitudes relate to behavior when situational cues suggest the attitudes are relevant. For example, Yogeeswaran and Dasgupta (2010) found that people who harbored implicit attitudes associating American with White were less likely to recommend hiring Asian American candidates for national security jobs, but this bias did not extend to corporate jobs for candidates with identical qualifications. A subsequent study confirmed that the relation between implicit attitudes and hiring bias in national security was mediated by participants' doubts about Asian Americans' loyalty to the United States. Similarly, Ziegert and Hanges (2005) found that implicit racial attitudes predicted hiring discrimination in a simulation, but only if the participants had received information that suggested the company encouraged decisions based on race.

Finally, the research in substance abuse and psychopathology should encourage researchers to consider the strength of the (automatic) impulse or feelings involved. Avoiding spiders or mirrors, attempting suicide, smoking, or binge drinking are not ordinarily considered automatic behaviors, yet the underlying impulses for some individuals may make these behaviors difficult to control, strengthening the relation between implicit attitudes and such actions.

Implicit Attitudes as a Cause of Behavior

Much of the research on implicit attitudes and behavior does not allow for a determination of the causal direction of their association. Consider, for example, the many studies cited earlier that have shown a relation between implicit health attitudes and behavior (e.g., drinking beer, smoking, or eating unhealthy snacks), but have measured the behavior concurrently or through retrospective self-reports. Although it may seem intuitive that unhealthy attitudes lead to unhealthy behavior, these correlational studies can be interpreted in other ways. People's unhealthy behavior may create supportive implicit attitudes, or, equally plausible, one or more third variables (e.g., social norms, motivation, personality traits, or even biological processes) could be responsible for producing both implicit attitudes and behavior.

As we have highlighted in the foregoing sections, stronger evidence for implicit attitudes serving as predictors or even causes of behavior has come from studies that measure behavior prospectively or, even better, longitudinally. As described earlier, a number of studies have obtained such evidence in the domains of health behavior (Conroy et al., 2010; Sherman et al., 2009; Thush & Wiers, 2007; Wiers

et al., 2002), psychopathology (Nock & Banaji, 2007; Nock et al., 2010; Randall et al., 2013; Teachman et al., 2008), and politics (Arcuri et al., 2008; Galdi et al., 2008; Roccato & Zogmaister, 2010).

Even stronger evidence on the causality of implicit attitudes is provided by experiments in which implicit attitudes are created and then shown to predict behavior or experiments that manipulate existing implicit attitudes and the resulting attitudes mediate differences in behavior. Strick, van Baaren, Holland, and van Knippenberg (2009) created implicit attitudes through an evaluative conditioning procedure and showed that these attitudes mediated the effect of the conditioning on product choice and, within the same product class, brand choice. Using similar techniques, Dempsey and Mitchell (2010) created implicit attitudes that were at odds with the stated product attributes. Participants who did not form an explicit brand attitude were still influenced by the created implicit attitude in their brand choice even though they were able to accurately report the (contradictory) attribute information.

Evaluative conditioning has also been used to alter existing implicit attitudes in research conducted by Hollands et al. (2011). As described earlier, this research showed that changes in implicit food attitudes partially mediated food choice later in the session. Using a different intervention technique, Houben et al. (2012) found that experimental changes in implicit alcohol attitudes mediated reported changes in drinking behavior over the following week. Two laboratory studies on implicit gender bias have produced similar findings. Davies, Spencer, Quinn, and Gerhardstein (2002) randomly assigned some women to view traditional, gender-stereotypic advertisements (vs. control ads) and then measured their implicit gender bias and performance on a math test. Davies et al. found that the women in the gender stereotype condition had stronger implicit gender bias and this mediated a reduction in math performance. Following up on this finding, Rudman and Phelan (2010) randomly assigned women to read about traditional gender roles (vs. control) and found that this increased the women's implicit gender bias and decreased their preferences for masculine jobs, with implicit gender bias mediating the effect on preferences.

Together, these findings indicate that implicit attitudes can have a causal influence on behavior. Additional research is needed to better delineate the conditions under which implicit attitudes are a cause rather than a predictor or even just a correlate of behavior.

RELATIONS BETWEEN IMPLICIT AND EXPLICIT ATTITUDES

As described earlier, dual-process models of attitudes propose that implicit and explicit attitudes are conceptually and functionally distinct (e.g., Gawronski & Bodenhausen, 2006); many of the studies described in earlier sections have also demonstrated the utility of each type of attitude in predicting behavior under different sets of conditions. Furthermore, high-powered studies have systematically investigated the relations between implicit attitude measures such as the IAT and questionnaire measures of explicit attitudes toward the same attitude object, finding them to be consistently positively correlated and the strength of their correlations to be readily explicable (Hofmann, Gawronski, et al., 2005; Hofmann, Gschwendner, et al., 2005; Nosek, 2005; Nosek & Smyth, 2007). Of particular note, Nosek and colleagues (Nosek, 2005; Nosek & Hansen, 2008; Nosek & Smyth, 2007) have used unusually large samples from a web-based study site (Project Implicit) to examine correlations between IAT and self-report measures of attitudes in comparisons ranging from Coke versus Pepsi to Al Gore versus George W. Bush. The correlations are consistently positive; Nosek and Smyth (2007) reported a median correlation of .48 among 95 implicit–explicit attitude measure pairings. They also found the implicit and explicit measures to be distinct constructs, loading on separate dimensions in a factor analysis.

Perhaps most interesting, Nosek and others (Hofmann, Gschwendner, et al., 2005; Nosek, 2005; Nosek & Smyth, 2007) have found that the strength of implicit–explicit correlations appears to be moderated by several predictable variables, including self-presentation (the social desirability or undesirability

of expressing the attitude, as with racial bias; see Fazio et al., 1995, for an early demonstration), the importance of the attitude, the distinctiveness of the attitude (i.e., holding the attitude distinguishes one from others), and clear conformance to a bipolar structure (e.g., Democrats–Republicans). Payne, Burkley, and Stokes (2008) similarly found with the AMP that implicit–explicit correlations were stronger when the measures were more similar (higher "structural fit"; see also Hofmann, Gschwendner, et al., 2005). Attitudes that are important to the individual or that have been well rehearsed also exhibit stronger implicit–explicit correlations (Payne et al., 2008; see also Karpinski, Steinman, & Hilton, 2005). Consistent with this is Choma and Hafer's (2009) finding that correlations between implicit and explicit measures of political orientation were stronger among those relatively high in political sophistication. Furthermore, when implicit and explicit attitudes converge, they both tend to be better predictors of behavior (Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

In summation, implicit and explicit attitudes are related but distinct constructs that explain different portions of variance in decisions and behaviors but are hardly disassociated. Implicit and explicit attitude measurement methods vary considerably within and between those categories, and these differences, whether by design or not, reflect construct differences that should not be overlooked. Measures of implicit attitudes are necessarily indirect but can be obtrusive in the sense that research subjects can infer what is being measured or at least the general topic of study. Both implicit and explicit attitudes reflect life experiences that have formed preferences. They should therefore be correlated, and they generally are. But as with any psychological construct, other factors influence variability in these constructs and in the scores on their measurement. Measuring these potential moderators (e.g., Devine, 1989; Fazio et al., 1995; Nosek, 2005) provides greater understanding of the true nature of and relation between implicit and explicit attitudes.

MALLEABILITY AND CHANGE

Early assumptions were that implicit attitudes would be harder (if not impossible) to change than explicit attitudes, because the former were thought to be acquired slowly over a long period of time. As with old habits, any change in implicit attitudes would be difficult and would occur slowly as new associations formed and replaced the old ones, whereas explicit attitudes were assumed to be more amenable to immediate change driven by conscious motivation and effort (e.g., Bargh, 1999; Devine, 1989; Wilson, Lindsey, & Schooler, 2000). A later, related proposition by some dual-process theories of attitudes was that implicit attitude change requires the passive accrual of new associations, whereas explicit attitude change requires conscious deliberation and reflection (DeCoster, Banner, Smith, & Semin, 2006; Rydell & McConnell, 2006; Rydell, McConnell, Strain, Claypool, & Hugenberg, 2007; Smith & DeCoster, 2000; Wilson et al., 2000). Both of these views have not been entirely supported by the data (for reviews, see Blair, 2002; Dasgupta, 2009).

Collectively, empirical data have thus far suggested that implicit attitudes can change through two types of processing pathways: (1) in response to fairly passive information processing that requires minimal deliberation and awareness and (2) in response to more active information processing with deliberation and awareness. In many ways, this parallels classic models of explicit attitude change (Petty & Cacioppo, 1984, 1986; Chaiken, 1980).

Altering Implicit Attitude With Minimal Deliberation and Awareness

Increasing the salience of group membership strengthens preexisting implicit attitudes associated with those groups (Bohner, Siebler, González, Haye, & Schmidt, 2008; Kühnen et al., 2001; Macrae, Bodenhausen, Milne, & Calvini, 1999; Macrae, Bodenhausen, Milne, Thorn, & Castelli, 1997; Mitchell, Nosek, & Banaji, 2003; Sassenberg & Wieber, 2005). By the same token, increasing the salience of counterstereotypic cues weakens preexisting implicit attitudes (Asgari, Dasgupta, & Stout, 2012; Barden, Maddux, Petty, & Brewer, 2004; Blair et al., 2011; Dasgupta & Asgari, 2004; Dasgupta & Greenwald, 2001; Dasgupta & Rivera, 2008; Rudman & Phelan, 2010; Wittenbrink, Judd, & Park, 2001). For example, in a classic study by Dasgupta and Greenwald (2001), participants who had viewed

photos and brief biographies of positively regarded African Americans (along with negatively regarded White Americans) subsequently demonstrated weaker implicit bias against African Americans. Even subtle changes in cues can alter implicit attitudes, such as the background of a picture (Wittenbrink et al., 2001), clothing worn by the target (Barden et al., 2004), or words in a rap song (Rudman & Lee, 2002).

Classical conditioning—pairing the target object or category with an unconditioned stimulus—has also been shown to change implicit attitudes in a single session (Olson & Fazio, 2006). As discussed previously, for example, implicit attitudes toward unhealthy snacks or alcohol have been altered by repeated exposure to pairings of the target with negative stimuli (e.g., pictures of potato chips paired with gross obesity; Hollands et al., 2011; see also Dijksterhuis, 2004; Petty, Tormala, Briñol, & Jarvis, 2006; Walther, 2002).

Situationally induced (incidental) emotion is another means of altering implicit attitudes heuristically. DeSteno, Dasgupta, and their colleagues (Dasgupta, DeSteno, Williams, & Hunsinger, 2009; DeSteno, Dasgupta, Bartlett, & Cajdric, 2004) showed that the incidental activation of anger or disgust increased implicit intergroup bias against both real and fictitious groups. In the case of real groups, the effect of incidental emotion was specific to the motivations typically aroused by the group—activation of disgust increased implicit bias against gays and lesbians but not Arabs, whereas anger had the opposite effect by increasing implicit bias against Arabs but not gays and lesbians.

Situationally induced motivation also exerts a powerful influence on implicit attitudes. Perceived threats to one's self or social identity can increase implicit group bias (Gonsalkorale, Carlisle, & von Hippel, 2007; Sinclair & Kunda, 1999; Spencer, Fein, Wolfe, Fong, & Dunn, 1998). Conversely, hearing that one's attitudes are incongruent with those of peers (Sechrist & Stangor, 2001), being placed in a subordinate role relative to a minority group member (Richeson & Ambady, 2001, 2003), or even just interacting with an out-group member—presumably with the desire to get along (Lowery, Hardin, & Sinclair, 2001; Sinclair & Kunda, 1999)—have all been shown to reduce implicit bias. Being placed in superior versus subordinate roles relative to a task partner also influences implicit self-perceptions (McCall & Dasgupta, 2007).

Of some interest is that analogous changes have also been demonstrated with explicit attitudes. Exposure to admired, credible, and likeable messengers alters explicit attitudes (Chaiken & Maheswaran, 1994; Petty & Cacioppo, 1984, 1986); classical conditioning alters explicit attitudes (Kunst-Wilson & Zajonc, 1980; Staats & Staats, 1958; Zajonc, 1968); emotions alter explicit attitudes and judgments (see reviews by Bodenhausen, Mussweiler, Gabriel, & Moreno, 2001; Clore & Huntsinger, 2009); and salient social norms and interactions with out-group members alter explicit attitudes (e.g., Blanchard, Lilly, & Vaughn, 1991; Kinder & Sanders, 1996; McConahay, Hardee, & Batts, 1981; Schuman et al., 1997).

Altering Implicit Attitudes Deliberately

Some forms of deliberate information processing change implicit attitudes, whereas other forms have no effect (or have the opposite effect). For example, elaborating on a strongly valenced message (positive vs. negative) has substantial effects on implicit attitudes, moving them in the direction of the message (Briñol, Petty, & McCaslin, 2008; Czyzewska & Ginsburg, 2007; Forehand & Perkins, 2005; Park, Felix, & Lee, 2007; Teachman & Woody, 2003). Other aspects of message processing, however, such as subjective confidence, increasing propositional knowledge, simple negation or correction of prior information, and pointing out the likely consequences of information, have no effects on implicit attitudes, although these processes do affect explicit attitudes (Briñol et al., 2008; Gawronski & Bodenhausen, 2006; Gawronski, Deutsch, Mbirkou, Seibt, & Strack, 2008; Gregg, Seibt, & Banaji, 2006; Petty, Briñol, & Tormala, 2002; Petty et al., 2006; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). These findings led Briñol et al. (2008) to suggest that when deliberation is low, the valence of thoughts drives implicit and explicit attitude change. When deliberation is high, however, other aspects of thinking beyond valence alone drive

explicit attitudes but not implicit attitudes (see also Gawronski & Bodenhausen, 2006).

Another type of systematic processing that is capable of changing implicit attitudes has to do with affirming a belief or idea through specific strategies (e.g., repetition, mental imagery). Interestingly, however, simply disagreeing with a belief or idea—without additional strategic processing—has little effect on implicit attitudes (Blair et al., 2011; Correll, Park, Judd, & Wittenbrink, 2007; Gawronski, Deutsch, et al., 2008; Gregg et al., 2006; Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Moskowitz, Gollwitzer, Wasel, & Schaal, 1999). Another strategy that has no effect and sometimes even has the opposite effect is giving individuals global nonspecific instructions (e.g., "don't be biased"; Banse, Seise, & Zerbes, 2001; Frantz, Cuddy, Burnett, Ray, & Hart, 2004; Galinsky & Moskowitz, 2000; Kim, 2003; Macrae, Bodenhausen, Milne, & Jetten, 1994).

Self-relevant messages (e.g., learning about an in-group member who is similar to the self) change implicit attitudes, but analogous messages that are not self-relevant (e.g., learning about an in-group member who is very different from the self) do not have any effect on implicit attitudes (Asgari, Dasgupta, & Gilbert Cote, 2010; Asgari et al., 2012; Stout et al., 2011; also see Briñol et al., 2008; Gawronski, Strack, & Bodenhausen, 2008). These findings suggest that some deliberate or strategic processing of the message alters its effect on implicit attitudes.

Summary

Classic theories of attitude change such as the elaboration likelihood model (Petty & Cacioppo, 1984, 1986) and the heuristic–systematic model (Chaiken, 1980) argue that although persuasion can occur via systematic and heuristic processes, the consequences of one versus another on induced attitude change are quite different. Heuristic pathways lead to shallow persuasion for which attitude change is less persistent and less predictive of behavior than for systematic pathways (see also Petty, Haugtvedt, & Smith, 1995). However, it is not clear whether this conclusion applies to implicit attitude change because there is no empirical evidence that rigorously compares heuristic versus systematic processing effects on implicit attitudes and then examines its longevity.

CONCLUSIONS AND FUTURE DIRECTIONS

Implicit attitudes appear to be an integral part of human activity. As we have reviewed, implicit attitudes have been associated with a wide variety of meaningful life outcomes, from students' academic performance to substance abuse, health choices, suicide attempts, patient satisfaction, and voting for political leaders. In nearly all of these cases, the implicit attitude measures explained variance in outcomes beyond what could be explained by more traditional (self-report) measures of attitudes.

Taken as a whole, the research suggests that implicit attitudes are part of a complex system that incorporates aspects of the immediate situation, the person, and even broader cultural forces. These forces may combine in different ways that researchers are just beginning to understand. Although research has suggested that implicit attitudes can serve as significant indicators and even drivers of behavior, it is also the case that people with the same implicit attitude do not always behave the same, and the behavior even of one person may vary across situations. In other words, implicit attitudes are not destiny and are best considered as only one of multiple potential sources of influence on a person's behavior.

This chapter focused on research conducted in significant life domains. The breadth and depth of the work is impressive and provides an excellent example of translational research (or "full cycle psychology"; see Mortensen & Cialdini, 2010) that synthesizes basic and applied research, with each contributing important insights on the phenomenon. Nonetheless, research in laboratory settings with homogeneous samples (White college students) is still the norm. Greater diversity in research settings would provoke new questions. Implicit attitudes can cause behavior, but little is known about the conditions under which this does occur; implicit attitudes can be altered by a variety of conditions and manipulations, but little is known about how often this occurs outside of the laboratory, what the necessary and sufficient conditions might be, and,

most important, the effects of such alterations on long-term outcomes.

Considering many of the social issues addressed by implicit attitudes—bias in educational achievement and employment, mental and physical health, and political leadership—solving social problems may require an understanding of the role of implicit attitudes, how they affect actions and decisions, and the conditions under which they can be changed.

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