

Implicit Methods in Social Psychology

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If social psychology were concerned merely with the impact of the social situation on individual behavior, social psychologists would have no interest in people's mental states. They would be concerned solely with measuring various features of the social environment and various aspects of people's behavior within that environment. But long before the cognitive revolution in psychology, social psychologists believed that social behavior was determined by the person's *mental representation* of the situation in which that behavior took place. The central role of mental states, in turn, explains why, almost from the beginning, social psychologists have relied on self-reports of attitudes, stereotypes and other beliefs, preferences, values, goals, and motives. Self-report questionnaires and other survey instruments have not been merely a convenient and inexpensive way of collecting information about people's behavior (although they have been that, too).

Rather, the questionnaire method has been central to social psychology because social psychologists have embraced the twin assumptions that people were aware of the attitudes, beliefs, and values that guided their behavior, and that they would be willing to reveal them if asked appropriately.

Of course, social psychologists were not stupid. They fully understood that some of the mental states in question were highly charged, and perhaps even embarrassing, and that people might not be willing to talk about them with strangers. Consider, for example, the lengths to which Alfred Kinsey and his associates went to get people to talk about their sex lives—as well as the difficulties encountered in today's climate of political correctness in getting people to talk frankly about their views with respect to gender, race, and ethnicity. Social psychologists also understood that the investigative situation itself was problematic. By virtue of demand characteristics

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(Kihlstrom, 2002; Orne, 1962; also see Haslam & McGarty, Chapter 11, this volume), experimenter bias (Rosenthal, 1963), evaluation apprehension (Rosenberg, 1965), reactance (Brehm, 1966), and a host of other factors, research designs might not possess the kind of external validity that would permit us to conclude that people actually thought or felt what they seemed to think and feel. Accordingly, social psychologists have exercised a great deal of ingenuity in getting around these problems, from unobtrusive or nonreactive behavioral measures (see Wegener & Fabrigar, Chapter 7, this volume) to psychophysiological recordings (see Cacioppo, Lorig, Nusbaum, & Berntson, Chapter 17, this volume).

Beginning in the 1980s, a new dimension was added to the problem of self-reports by the increasing recognition that people's experiences, thoughts, and actions could be influenced by percepts and memories of which they were unaware (Kihlstrom, 1984, 1987). If unconscious thoughts, feelings, and desires exist and can influence social behavior while remaining unconscious, then even the most sophisticated questionnaires and surveys will not succeed in tapping the mental states that underlie what we do when we interact with other people. This chapter surveys a number of methods recently introduced for assessing people's unconscious, or implicit, attitudes, beliefs, and other mental states relevant to social interaction (for alternative coverage of this material, see Fazio & Olson, 2003). Although there is some overlap between these "implicit" methods and those generally called "unobtrusive," there is an important conceptual distinction. Unobtrusive methods are used to assess attitudes, beliefs, and values of which people are aware, but that they may be unwilling to reveal to the investigator. By contrast, implicit methods are used to assess attitudes, beliefs, and values of which people are unaware. This creates additional methodological problems for the investigator.

THE PSYCHODYNAMIC HERITAGE

Of course, the notion of unconscious determinants of behavior was not entirely new, given that it lies at the roots of Freud's psychoanalytic theory of the mind and behavior. According to Freud, conscious experience, thought, and action were determined by unconscious sexual and aggressive motives, as well as defense mechanisms unconsciously deployed against these primitive drives in order to reduce the anxiety caused by their conflict with the constraints of the real and social world. If Freud was right—and many personality and social psychologists working in the first half of the 20th century thought he was—then a variety of new techniques was needed to go beyond self-report to tap people's unconscious beliefs, feelings, and desires.

Projective Tests

In Freud's own work, these unconscious motives were ostensibly discovered, and brought to the light of conscious awareness, by means of the clinical technique of free association. But very quickly a number of formal tests were developed for this purpose, beginning with Jung's adaptation of Freud's own technique of free associations to serve as a "complex indicator" (Jung, 1918/1969). Standardized versions of Jung's procedures, accompanied by rudimentary norms, were quickly developed (Kent & Rosanoff, 1910; Rapaport, Gill, & Schafer, 1968; Rapaport, Schafer, & Gill, 1944-1946); these in turn led to the development of word-association norms for purposes of research with normal individuals (e.g., Russell & Jenkins, 1954). A number of other techniques were soon added (Lindzey, 1959), including the Rorschach Inkblot Test, the Thematic Apperception Test (TAT) (see King, Chapter 8, this volume), and the Draw-a-Person Test. Even the Wechsler-Bellevue Intelligence Scale (WBIS), forerunner to the Wechsler Adult Intelligence Scale and perhaps

the prototypical example of a performance-based test of cognitive ability, was co-opted for the purposes of projective personality assessment, both in the clinic (Rapaport, Gill, et al., 1968) and by the United States Central Intelligence Agency (Bem, 1983; Marks, 1979; Marks & Greenfield, 1984a, 1984b).

All of this work was predicated on the projective hypothesis (Frank, 1939a, 1948; Rapaport, 1942), in which the subject is given the opportunity "to reveal his way of organizing experience by giving him a field (objects, materials, experiences) with relatively little structure and cultural patterning, so that the personality can project upon that plastic field his way of seeing life, his meanings, significances, patterns, and especially his feelings" (Frank, 1939b, p. 403). Although the use of projective techniques does not necessarily mean that the affects, drives, and other mental states revealed by the test are unconscious, that is the general assumption behind their use. As Rapaport, Gill, et al. wrote:

The use of projective tests assumes that the examiner is after something in the subject which the subject *does not know about* or is *unable to communicate*; otherwise the examiner would ask him about it directly. . . . By means of projective tests we discover tremendous aggressions in persons who appear meek, or great dependent needs in suspicious and manly-appearing [*sic*] persons who deny having any such inclinations. If taken seriously, these tests therefore refer to unconscious *motivation* of action and behavior, and necessitate a personality theory that assumes the existence of, and accounts for, these motivations. (Rapaport, Gill, et al., 1968, pp. 227-228)

Despite their continued popularity among many clinical psychologists, it is now generally understood that projective techniques are not satisfactory psychometric instruments (Lilienfeld, Wood, & Garb, 2001). Even in the few instances where projective techniques

proved to have some validity, there is no evidence that the scores in question actually represented a subject's *unconscious* mental state. Consider, for example, the recent literature promoting the TAT as a measure of implicit, or unconscious, motivation (McClelland, Koestner, & Weinberger, 1989). The low correlation between TAT and questionnaire measures of achievement motivation is often interpreted as a reflection of the independence of unconscious and conscious motivation, but it could simply mean that TAT measures lack convergent validity. Similarly, the fact that implicit and explicit measures of motivation predict different classes of behavior is often taken as evidence of a pattern of discriminant validity, but the same pattern of correlations could be interpreted as a result of method variance. If the TAT, Rorschach (Bornstein, 2001), and other projective methods are to acquire the status of "implicit" methods, more is needed than evidence for their reliability, validity, and utility. What is needed is convincing evidence that they tap *unconscious* mental states.

The Subtle and the Obvious

Running parallel with the psychodynamic literature on projective techniques, some hint of the unconscious also can be found in the distinctions between *samples* and *signs*, and between *subtle* and *obvious* items, in the psychometric literature on objective tests of personality. Most personality and attitude questionnaires assume, at least tacitly, that the test items represent *samples* of the respondent's actual behavior—that is, that there is some degree of isomorphism between the person's performance on the test and what he or she thinks and does in the real world outside the testing situation. In such tests, face validity is very high. Other tests, however, assume no such isomorphism. From this point of view, test items are intrinsically interesting units of behavior that are *signs* of some underlying

disposition. The original versions of the Minnesota Multiphasic Personality Inventory (MMPI) and its "normal" offspring, the California Psychological Inventory (CPI), were both constructed under the sign assumption. As a result, they contain many "subtle" scale items that lack face validity, even though they correlate with some empirical criterion (Goldberg & Slovic, 1967; Seeman, 1952). Ironically, then, the prototypical "objective" tests of personality make the same assumption as do the Rorschach and other projective techniques—that test responses are signs of underlying dispositions, not samples of behavior (Meehl, 1945).

The preference for empirically valid signs over face-valid samples reached its apex in Berg's *deviation hypothesis*, which held that even preferences for random drawings could be used as personality scale items, so long as people with different dispositions expressed different preferences (Berg, 1955). In fact, however, most empirically derived personality scales (including those of the MMPI and CPI) contain a mix of face-valid items that are obviously related to the substantive domain under consideration, and "subtle" items that do not appear to relate to the domain. Although an early analysis by Seeman found that subtle and obvious items were equally good predictors of criterion behavior (Seeman, 1952), later studies found that obvious MMPI items performed better than subtle items (Duff, 1965; Goldberg & Slovic, 1967). In addition, a study by Hase and Goldberg (1967) showed that questionnaires constructed by "rational" means, such that each scale item possessed face validity, performed better than questionnaires constructed by "empirical" means that resulted in a mix of obvious and subtle items (see also Ashton & Goldberg, 1973; Jackson, 1975).

Scales consisting entirely of subtle items have been advocated in some corners on the ground that subjects who approach personality questionnaires with a defensive attitude

will not see through them, and thus will be tricked into self-disclosure. Similarly, at least in principle, subtle items might be useful with subjects who are appropriately motivated toward self-disclosure but are simply unaware of their traits and other mental characteristics. However, it appears that personality tests are disguised in this way at the expense of validity (Mischel, 1968, 1972). Of course, the reply to this weak evidence for the empirical validity of subtle questionnaire items might be the same as for the TAT: that subtle items, reflecting unconscious tendencies, should not be expected to correlate with obvious items that reflect conscious awareness, and that as such, subtle items might predict different criteria than do obvious items. However, there is no evidence for the discriminant validity of subtle versus obvious items. Nor—and this is the central point—is there any evidence that subtle items tap traits, attitudes, and the like of which the subject is unaware. The first lesson of 100 years of personality assessment is this: If you want to know what people can tell you, you should ask them.¹ If you want to know what people *cannot* tell you, unfortunately, subtle questionnaire items, like projective techniques, would appear to be risky choices for the assessment of unconscious mental states.

THE PRIMING SOLUTION

If not projective tests, or inventories of subtle items, then *what?* One answer to this question is provided by research in implicit memory (Schacter, 1987). Neurological patients with bilateral lesions to the hippocampus and associated structures in the medial temporal lobe characteristically are unable to remember the events and experiences that have transpired since the onset of their brain damage. However, it is now known that this anterograde amnesia affects only conscious recollection. When patients are tested with techniques

that do not require conscious recollection, they typically show that some traces of post-morbid experience have been encoded, remain in storage, and interact with ongoing experience, thought, and action—albeit outside conscious awareness. To take a familiar example, patients who have studied a list of words often show various *priming* effects, as on tests of word-stem and word-fragment completion, perceptual identification and lexical decision, and free association or category generation—even though they cannot recall or recognize the items they studied. Because the list items are not accessible to conscious recollection, priming evidently is an effect of *unconscious* memory. The dissociation between explicit and implicit memory also can be observed in neurologically intact subjects who are not particularly amnesic, as when explicit memory is affected by an experimental manipulation, such as level of processing, that has little or no effect on implicit memory.

These two examples, taken together, give us the definition of implicit memory as unconscious memory: In the amnesic patients, priming occurs in the *absence* of conscious recollection; in the normal subjects, priming occurs *independently* of conscious recollection. Note that the mere fact that a subject completes the stem *mar*_____ with *market* rather than *marble* is not enough to qualify a behavior as an implicit or unconscious expression of memory. The word *market*, or at least some item plausibly related to it, has to have been on the study list—if not, there is no sense in talking about memory. But note, too, that the mere fact of priming is not sufficient to permit discussion of *unconscious* memory. Priming occurs in nonamnesic controls, and for deeply processed items as well. To qualify as unconscious, priming has to occur *in the absence of*, or *independently of*, conscious recollection.

The implicit-explicit distinction in memory can be extended to other domains as well, including perception (Kihlstrom, 1996;

Kihlstrom, Barnhardt, & Tataryn, 1992), thinking and problem solving (Dorfman, Shames, & Kihlstrom, 1996; Kihlstrom, Shames, & Dorfman, 1996), learning (Kihlstrom, 1996; Reber, 1967), emotion (Berridge & Winkielman, 2003; Kihlstrom, Mulvaney, Tobias, & Tobis, 2000); and motivation (Kihlstrom, Mulvaney, et al., 2000; McClelland et al., 1989). Along the same lines, it should be possible to use priming as a measure of the sorts of implicit, unconscious attitudes, beliefs, and values of interest to social psychologists. In a sense, deriving measures of individual beliefs, attitudes, feelings, values, and motives represents a revival of Jung's (1918/1969) use of response latencies on a word-association test as a "complex-indicator."

The Importance of Matching Tasks

In all of this, it is critical that explicit and implicit expressions of memory be assessed with comparable tasks. Consider, for example, an experiment in which explicit memory is assessed with free recall but implicit memory is assessed with priming on stem completion. Such an experiment might well find that more target items are produced on the priming task than on the free recall task, but this would not be evidence of a dissociation between explicit and implicit memory. The reason is that stem completion is a variant on cued recall, in that the stem serves as a cue for recall of the whole word, and it is well known that cued recall typically is superior to free recall. The same consideration would apply to a comparison of free recall with priming on perceptual identification: Perceptual identification is a variant on recognition, in that the entire study item is represented on the memory test, and it is well known that recognition is superior to recall.

In psychometric terms, then, recognition is an "easier" test of memory than cued recall, which in turn is an "easier" test of memory than free recall. And in statistical terms,

“dissociation” is just neuropsychological jargon for statistical interaction: Dissociations occur when one variable, such as population (e.g., amnesic vs. nonamnesic) or experimental manipulation (e.g., level of processing), interacts with another variable (e.g., explicit vs. implicit test) to affect performance. It is well known that spurious interactions can occur as artifacts of task difficulty (e.g., Chapman & Chapman, 1973, 2001). Accordingly, in any study of dissociations between explicit and implicit measures, it is important that the tasks be matched as closely as possible on relevant psychometric characteristics.

To clinch the case for a dissociation between explicit and implicit memory, we must show not just that implicit memory occurs in the absence of, or independently of, explicit memory. We must also show that the cues available to the subject remain constant across tasks. Thus, the appropriate explicit comparison for stem completion is stem-cued recall. In stem-cued recall, the subject is asked to fill in a stem with an item from a previously studied word list, thus requiring conscious recollection; in stem completion, the subject is asked to fill in the stem with any appropriate word, thus obviating conscious recollection. Similarly, the appropriate explicit comparison for perceptual identification is recognition. In recognition, the subject is presented with a copy of a previously studied word and asked whether it was on a previously studied word list; in perceptual identification, the subject is presented with the word and asked to identify what it is. In the best comparisons, different items are tested explicitly and implicitly, so that performance on one test does not contaminate performance on the other.

The importance of test matching is illustrated by a classic experiment on “repression” performed by Weinberger and his colleagues (Weinberger, Schwartz, & Davidson, 1979). In this experiment, the investigators were interested in a group of subjects, labeled *repressors*, who reported low levels of trait anxiety on the

Taylor Manifest Anxiety Scale (MAS) but high levels of defensiveness on the Marlowe-Crowne Social Desirability Scale (SDS). In other words, they reported low levels of distress, but their high levels of social desirability suggested that they might be repressing distress that they were actually experiencing unconsciously. Other groups showing different patterns of MAS and SDS scores, such as non-defensive nonanxious (low MAS, low SDS) and nondefensive anxious (high MAS, low SDS) subjects, served as comparison subjects (for alternative classification schemes, see Mulvaney, Kihlstrom, Figueredo, & Schwartz, 1992; Weinberger & Schwartz, 1990). In the experiment, Weinberger et al. asked their subjects to read phrases with sexual and aggressive content. Despite their general denial of distress, “repressors” showed increased response latencies and elevated levels of physiological response during the task (see also Asendorf & Scherer, 1983). Weinberger et al. concluded that the “repressors” were repressing after all: Although they denied being in distress, they clearly were disturbed by what they were asked to read. Put another way, repressive style entails a dissociation between explicit and implicit expressions of anxiety (Kihlstrom, Mulvaney, et al., 2000)—at least in principle.

The Weinberger et al. (1979) study is very provocative and deserves its status as a minor classic in the experimental study of psychodynamics and defense, but it is not definitive evidence of unconscious emotion. Setting aside the question of whether repressors really were repressing anxiety or instead merely denying felt distress to the investigators, the study did not properly test for the dissociation between explicit and implicit emotion. For such a test to be valid, the cues presented to the subject would have to be the same for both explicit and implicit conditions. For example, subjects might have to rate their emotional response to each phrase in the explicit condition, and rate the difficulty of reading the phrase in the implicit condition. But in the Weinberger

et al. experiment, the “explicit” measure was reports of generalized distress on the MAS, whereas the “implicit” measure was behavioral or physiological response to specific sexual and aggressive phrases. There was no assessment of explicit emotional response to the phrases, so in the final analysis we don’t know whether the “repressors” were repressing anything at all. To validate the concept of repression, we need evidence of a dissociation between explicit and implicit measures of emotional response to *the same stimulus*. To validate the concept of “repressive style” as an individual-difference, we need evidence that this dissociation is greater in individuals identified as repressors, as opposed to nondefensive subjects who truly are high or low in anxiety.

Priming as a Measure of Implicit Attitudes

Of course, the Weinberger et al. study of repression was performed before the criteria for explicit-implicit dissociations had been formulated, but the lesson holds. More recently, Banaji and Greenwald applied the explicit-implicit distinction to the central social psychological concept of attitude and other constructs, such as stereotypes and prejudice (Banaji & Greenwald, 1994; Blair, 2001; Brauer, Wasel, & Niedenthal, 2000; Greenwald & Banaji, 1995; Greenwald, Banaji, Rudman, et al., 2002; see also Wilson, Lindsey, & Schooler, 2000). Although social psychology traditionally has assumed that people are aware of their attitudes, these authors have suggested that people may possess positive and negative *implicit attitudes* about themselves and other people, attitudes that can affect ongoing social behavior outside of conscious awareness.

An early example of the use of priming to study implicit attitudes is research by Gaertner and McLaughlin on racial stereotypes (Gaertner & McLaughlin, 1983). In this

experiment, subjects were presented with pairs of letter strings and were asked to judge simply whether both were words. On some trials, the first word was *black* or *white*, and the second word was associated with the racial stereotypes of whites or blacks, such as *smart* or *lazy*. In such a situation, the first word can be considered as a prime for processing the second word. Note that the subject’s task had nothing to do with social judgment. Nevertheless, white subjects responded more quickly when the stimulus paired a positive word such as *smart* with the prime *white* than when it was paired with the prime *black*; there was no difference with negative words such as *lazy*. Wittenbrink and colleagues, in a similar study, found that *white* primed lexical decisions concerning positive trait terms, whereas *black* primed lexical decisions concerning negative characteristics (Wittenbrink, Judd, & Park, 1997). Similarly, Blair and Banaji had subjects make lexical decisions about words such as *doctor* and *nurse* that were primed by male or female first names, such as *Jack* or *Jill* (Blair & Banaji, 1996). The general finding of their research was that response latencies were shorter when there was a congruence between the gender of the name and the gender-role connotations of the word, as in *Jack-doctor* vs. *Jill-doctor*. On the basis of results such as these, we might conclude that the lexical decision task reveals people’s implicit, or unconscious, stereotypes concerning race and gender.

Another priming-based approach to implicit attitudes is represented by a series of studies by Banaji and her colleagues of the “false fame” effect documented by Jacoby (Jacoby, Kelley, Brown, & Jasechko, 1989; Jacoby, Woloshyn, & Kelley, 1989). Jacoby has interpreted this effect in terms of priming: Priming increases familiarity, which is incorrectly interpreted as evidence of fame. In their experiments, Banaji and Greenwald adapted Jacoby’s procedure by dividing the study and test lists into equal numbers of male and

female names (Banaji & Greenwald, 1995). They found that the false fame effect was greater for male than for female names, and a signal-detection analysis indicated that subjects adopted a lower criterion for judging male names as famous than they did for female names. Because the average subject was more likely to associate fame with males than with females, Greenwald and Banaji concluded that the paradigm of false fame provided evidence for “implicit gender stereotypes that associate male gender, more than female gender, with achievement” (Greenwald & Banaji, 1995, p. 16).

Critique of Priming

By this point in time, a fairly large number of such studies have been published, too many to be reviewed comprehensively in this chapter (for comprehensive coverage, see Fazio & Olson, 2003). However, before we interpret such studies as providing evidence of unconscious racism and sexism on the part of subjects, a few questions need to be addressed. First, it is not entirely clear that the performance of subjects in these sorts of experiments is indicative of their personal attitudes, as opposed to the structure of the social environment. For example, perhaps doctors *really are* more likely to be named Jack and nurses more likely to be named Jill; and given the hegemony of the patriarchy, it may well be that an unfamiliar male is more famous (at least in some quarters) than an unfamiliar female. And although whites are no smarter than blacks, and blacks are no lazier than whites, it may be that the subjects’ behavior was influenced by their knowledge of this common social stereotype, rather than their personal endorsement of it. This is especially a problem because the experimental task does not require subjects to make statements about themselves, but only to make judgments about language.

Moreover, many studies of implicit social cognition fail to test for differences between in-groups and out-groups, or other stakeholders

with respect to the belief or attitude in question. A finding that whites, but not blacks, are more likely to associate whiteness with smartness, and that males, but not females, were more likely to associate maleness with fame, might well support the attribution of subjects’ experimental behavior to their social attitudes rather than the structure of the society in which they live. Of course, it could also happen that blacks and women adopt prevailing social stereotypes concerning race and gender, but an in-group vs. out-group difference would at least provide some converging evidence that priming was a measure of individuals’ actual social attitudes rather than something more generic, such as their abstract knowledge of stereotypes and prejudice found in their society.

More important in the present context, most ostensible studies of implicit social cognition either fail to make a comparison with an explicit measure of the same attitude or employ an explicit measure that is inadequate to the task. From the point of view of *implicit* social cognition, it is not interesting if subjects betray, by their performance in a priming task, attitudes, stereotypes, and prejudices that they are fully aware of harboring. Priming effects that are congruent with a subject’s conscious beliefs and attitudes may well be interesting unobtrusive or nonreactive measures, but more is required to make the inference that people’s unconscious attitudes, beliefs, and values actually are different from their conscious ones. In addition to the indirect assessment of implicit attitudes, beliefs, and values, there must be a comparative direct assessment of their explicit counterparts, and the correlation between explicit and implicit measures of the same attitude must be low—certainly nonsignificant, preferably zero.

Many studies simply fail to provide this sort of comparison, in which case they stand as little more than demonstrations that attitudes, beliefs, and values can be displayed in priming effects. When studies do provide this comparison, they often give contradictory

results. For example, Gaertner and McLaughlin (1983) found that implicit racial stereotyping occurred regardless of subjects' scores on a questionnaire measure of racial prejudice, whereas Wittenbrink et al. (1997) found many positive correlations between explicit and implicit measures. As it happens, the Gaertner and McLaughlin (1983) and Wittenbrink et al. (1997) studies used different questionnaires to assess implicit racial prejudice, but perhaps the most important problem is that they used questionnaires at all. As noted earlier, the most compelling demonstrations of the dissociation between explicit and implicit memory are provided by studies in which the stimuli presented to the subjects are the same, but the task demands are different. In memory studies, the explicit task refers to a past event, whereas the implicit task does not. Following this example, future attempts to use priming tasks to demonstrate a dissociation between explicit and implicit attitudes, beliefs, and values should keep the stimuli presented to the subject constant, and vary whether the experimental task refers expressly to the subject's mental state.

A final problem is that although implicit attitudes, beliefs, and values should function as individual difference variables, they are not always treated as such. In the Gaertner and McLaughlin (1983) study, for example, priming scores were the dependent variables in an experiment in which individual differences in racial prejudice served as a blocking variable in an analysis of variance design, and there was no attempt to take account of individual differences in priming. In the Wittenbrink et al. (1997) study, by contrast, both explicit and implicit measures of prejudice were construed as individual-difference variables entered into a multivariate analysis. Historically, of course, social psychologists have been allergic to individual differences (Bowers, 1973; Cronbach, 1957), but it may also be that priming scores are not well suited to being treated as individual-difference measures. For example, their distributions are naturally

skewed, sometimes highly so, and often characterized by substantial within-subject variability, requiring large numbers of trials to achieve satisfactory levels of reliability.

These considerations underscore the point that the study of implicit attitudes, beliefs, and values described in this chapter reverses the role of priming in experiments, from that of *dependent variable* to that of *independent variable*. That is to say, we wish to use priming not merely as an expression of attitudes, beliefs, and values that are already known from people's responses on paper-and-pencil questionnaires, but as an alternative measure of these attitudes, beliefs, and values that will predict people's behavior in a way that their self-reports will not. The two roles may work at cross-purposes. In experimental work, where the goal is to determine how minds work in general, the best dependent variables are those that show relatively little between-subjects variance. In individual-differences work, where the goal is to predict what different people will do in a particular situation, the best independent variables are those that show relatively wide dispersion across the population. To the extent that response latencies measure how minds work in general, rather than how particular individual minds work, they may simply not present enough variance to make them useful measures of individual differences.

THE IMPLICIT ASSOCIATION TEST

Although priming studies of implicit social cognition remain popular, Greenwald and his colleagues recently have introduced another procedure, the Implicit Association Test (IAT), for the measurement of implicit attitudes, beliefs, and values (Greenwald, McGhee, & Schwartz, 1998).² Based on the general principle of stimulus-response compatibility (DeHouwer, 2001), the IAT requires subjects to make a series of dichotomous

judgments about instances of various concepts, such as black and white American names (e.g., *Alonzo* or *Adam*, *Amanda* or *Aiesha*) and positive and negative words (e.g., *caress* or *abuse*, *freedom* or *crash*). These responses are made by pressing different keys on a keyboard or button box. When the two concept sets are combined, Greenwald and his colleagues found that response latencies are faster when associated concepts share a response key, compared to when they do not. Accordingly, in the example cited, the observation of faster latencies when a subject has to make the same response to white names and positive words, compared to white names and negative words, reveals an implicit association between white and positivity. By the same token, observation of faster latencies when a subject has to make the same response to black names and positive words, compared to black names and negative words, reveals an implicit association between black and positivity.

Using this procedure, Greenwald, McGhee, et al. (1998) showed that subjects implicitly associate flowers with pleasantness and insects with unpleasantness (Experiment 1); that Korean subjects implicitly associate Korean names with pleasantness and Japanese names with unpleasantness, and that Japanese subjects do the opposite (Experiment 2); and that white subjects implicitly associate white names with pleasantness and black names with unpleasantness. In the latter two experiments, the IAT proved to be more sensitive to individual differences in ethnic or racial prejudice (or, if you will, more discriminating) than explicit measures such as the feeling thermometer or the semantic differential (see also Greenwald & Farnham, 2000). In the Korean-Japanese study, the IAT correlated significantly with the feeling thermometer but not with the semantic differential. In the black-white study, which also included three standard questionnaire measures of racist beliefs, the correlations were uniformly non-significant. Taken together, these findings suggest not only that the IAT can measure

people's racial or ethnic prejudices, but also that it reveals prejudices of which the subjects themselves are unaware.

The IAT as a Psychometric Device

Since its formal introduction in 1998, the IAT has become extremely popular as a method for measuring implicit attitudes, beliefs, and values in a number of domains. A search of the PsycINFO database (keyword: "IAT") identified at least eight studies using the IAT published in 1999 and 2000, and as many as 20 published in 2001 alone. Given the inevitable delays of the scholarly publication process, this record of adoption is quite remarkable. Of particular interest is a multi-method psychometric study comparing three implicit measures of racial prejudice, including a priming procedure and two versions of the IAT, in which all tests were completed in each of four testing sessions separated by two weeks (Cunningham, Preacher, & Banaji, 2001). Treating each individual trial as if it were an item on a test, the two versions of the IAT yielded acceptable if not outstanding estimates of internal consistency, perhaps reflecting the inherent instability of response latency measures noted earlier—as well as the fact that IAT measures of prejudice are calculated as difference scores. Raw test-retest correlations for the IAT were relatively low, but after correction for measurement error these rose considerably. And although the bivariate correlations among the implicit measures were quite low, first- and second-order confirmatory factor analyses revealed substantial convergence among them. Although these findings still must be confirmed in other domains, taken together they suggest that the IAT is a promising psychometric instrument for the evaluation of implicit social attitudes, beliefs, and values.

However, if utility (or efficiency) of measurement is considered as an important property of a psychometric device (Mischel, 1968), it is not clear that the IAT is superior to a

standard priming procedure. In the Cunningham et al. (2001) study, the two versions of the IAT correlated .30 and .48, respectively, with the Modern Racism Scale, while the corresponding correlation for the priming procedure was only .26. By any reasonable standard, a priming procedure is easier to construct, administer, and interpret than the IAT. If a *low* correlation with explicit measures is a desirable characteristic of an implicit measure (and it must be desirable, if the implicit measure is to be truly implicit), then this status is achieved far more economically by a standard priming procedure than by the IAT. Of course, for any psychometric procedure there are always trade-offs between reliability and validity of measurement, on one hand, and utility, on the other. Investigators may be willing to sacrifice some utility in the service of increased reliability and validity. Further comparative studies probably are in order.

Of course, these psychometric analyses are purely internal. What about the relation with external factors? To establish their validity, all psychological tests, like the constructs they purport to measure, must relate in significant ways to reasonable external criteria (Cronbach & Meehl, 1955; Loewinger, 1957). One very interesting finding is that IAT measures of bias and prejudice toward an out-group occur even following a minimal group manipulation (Ashburn-Nardo, Voils, & Monteith, 2001). In successive experiments, the IAT revealed prejudice by white American subjects against names ostensibly associated with *Surinam* (a real but unfamiliar country), *Marisat* (a nonexistent country), and members of artificial groups (*Quans* and *Xanthies*) created by random assignment. Such a finding strengthens the inference that the IAT really measures prejudice after all. Another supportive finding is that IAT measures of anti-black prejudice predict the quality of white subjects' actual behavioral interactions (e.g., body openness, eye contact, and friendly laughter) with black targets (McConnell & Leibold, 2001). Similarly, IAT measures of self-esteem predicted subjects' response to task failure,

such as buffering (Greenwald & Farnham, 2000). In fact, the implicit measure of self-esteem was somewhat more strongly predictive of buffering than the explicit measures employed. Finally, Greenwald, Banaji, Rudman, et al. (2002) have shown that the IAT gives more satisfactory results than explicit measures such as an attitude thermometer or standard questionnaires, when compared against the predictions of a variant on Heider's (1946) balance theory.

Critique of the IAT

More studies of this sort are needed, especially in light of the fact that responses on the IAT, and perhaps measures of priming as well, are subject to the influence of a number of nuisance variables. For example, in their original paper, Greenwald, McGhee, et al. (1998) noted that response latencies are affected by differences in the familiarity of the stimuli to which subjects respond, as well as by differences in evaluation. More recently, Brendl, Markman, and Messner (2001) argued that IAT indices of anti-black attitudes could be obtained not only from subjects who actually held negative attitudes toward blacks but also from subjects who held neutral or positive attitudes toward blacks, so long as they were less favorable than their attitudes toward whites. Preferring white over black names is not necessarily evidence of racism: It may be no different from any other forced "choice" between two positively valued objects, such as favoring Stravinsky over Schoenberg or *tiramisu* over *zabaglione*. More important, Brendl et al. (2001) showed through computational modeling that "evidence" of prejudice on the IAT could emerge not only from differences in familiarity of the targets being evaluated, as Greenwald, McGhee, et al. (1998) had also suggested, but also from differences in task difficulty, which can induce subjects to shift their response criterion between the response-compatible and response-incompatible blocks

of the IAT procedure. Differences in target familiarity can be controlled for, at least in principle; but because response-incompatible judgments are inherently more difficult than response-compatible ones, this problem will remain. Brendl et al. remind us that although prejudice (conscious or not) may well produce an effect on the IAT (or, indeed, on any measure involving response latencies), an effect on the IAT or similar measure may not indicate prejudice, for the simple reason that such an effect may have multiple causes, such as target familiarity or task difficulty, that have nothing to do with prejudice.

The question of whether the IAT actually assesses people's attitudes and beliefs raises the critical and thorny question of whether the attitudes and beliefs revealed by the IAT really are unconscious—that is, whether subjects' responses on the IAT can be predicted by measures of their corresponding explicit attitudes and beliefs. In this regard, the evidence remains mixed. In their original paper, Greenwald, McGhee, et al. (1998) reported that the average correlation between explicit and implicit measures of the same construct ($r = .25$) was lower than the average correlations among explicit measures ($r = .60$), but the implicit-explicit correlations were still numerically positive. Similar findings were obtained by Greenwald and Farnham (2000) in a comparison of explicit and implicit self-esteem. In the Cunningham et al. (2001) study, a first-order confirmatory factor analysis revealed significant relations between all three implicit measures of racism and an explicit measure, and in fact the two paths involving the IAT were stronger than the path involving the priming-based measure. In a second-order analysis, in which the three tests were considered to converge on a single latent variable, the association between implicit and explicit prejudice remained strong. Another study of racial attitudes found that the IAT was correlated significantly with an explicit questionnaire measure of racial prejudice (McConnell & Leibold, 2001). A recent

analysis of four data sets collected over the Internet yielded implicit-explicit correlations ranging from .174 to .775, and averaging approximately .43 (Greenwald, Nosek, & Banaji, 2002, Tables 2-6 and p. 20).

Like Greenwald, Cunningham et al. (2001) noted that the overall implicit-explicit relationship was weaker than the individual relations among the implicit-implicit relationships, but the fact remains that the implicit-explicit relationship was far from trivial in magnitude. In all these studies, explicit and implicit attitudes were dissociated in the weak sense of not being highly correlated (no correlation is perfect), but not in the strong sense of being entirely unrelated. In a sense, the question is whether the glass is half empty or half full, and it risks reviving one of the less savory aspects of the trait-situation debate that bedeviled the psychology of personality in the 1970s and early 1980s: Whose correlations are bigger? It should be understood, first, that the explicit measures used in these studies are various forms of questionnaires and self-ratings, and the IAT is first and foremost a behavioral measure of human performance. Correlations between these two classes of measures are notoriously (and, still, controversially) low. The explicit-implicit correlations obtained by Greenwald, McGhee, et al. (1998), for example, were well in line with the typical correlation between questionnaire measures of traits and attitudes, on one hand, and actual attitude-relevant behavior on the other (Sherman & Fazio, 1983). In a recent report on the psychometric characteristics of their instrument, Greenwald, Nosek, et al. (2002) clearly state that “superior IAT measures should yield higher values for these [implicit-explicit] correlations” (p. 5) and that “even the smallest positive implicit-explicit correlations appear to demand an interpretation in terms of construct overlap” (p. 20). Given that truly implicit measures of attitude and belief should be dissociated—that is, *uncorrelated*—with their explicit counterparts, it seems clear that Greenwald, Banaji,

and their colleagues tend to view the IAT as an unobtrusive measure of subjects' attitudes, beliefs, and values, not as a measure of truly unconscious mental states.

In the final analysis, the issue of the implicit-explicit relationship can be settled only by employing measures of explicit attitudes, beliefs, and values that are comparable to our measures of their implicit counterparts—whether the implicit measures are provided by the IAT, priming, a psychophysiological measure, or something else. Only when sources of method variance are minimized, if not eliminated, can we hope to determine the true relation between explicit and implicit measures of social attitudes, beliefs, and values. It is not at all clear that the solution to this problem will be as straightforward for implicit attitudes, beliefs, and values as it was for implicit memories, but the ambiguity of the current situation calls out for some determined effort to resolve it.

THE UNOBTRUSIVE, THE AUTOMATIC, THE IMPLICIT—AND THE PSYCHOLOGIST'S FALLACY

Based on the model of implicit memory, an increasing number of investigators are coming to take seriously the proposition that unconscious attitudes, beliefs, and values can influence people's social interactions. Of course, such an idea was central to psychoanalytic theory, but the connection to modern cognitive psychology frees the idea of unconscious influence from its Freudian death grip. Now, when social psychologists talk of the unconscious, they use the same concepts and methods as their cognitive colleagues—at least in principle. This line of inquiry is still in its infancy, or perhaps the toddler stage (though we can hope it will avoid the Terrible Twos and the White Food Stage), and it is extremely promising—not least because it links the interest in unconscious processes clearly present in cognitive psychology with the interest in

linking cognition to actual social behavior that is the core of social psychology.

Nevertheless, if genuine progress is to be made, investigators need to distinguish among three quite different topics: unobtrusive, non-reactive methods of measuring attitudes, beliefs, and values; the automatic generation of these mental states, whether conscious or unconscious; and truly implicit, unconscious, attitudes, beliefs, and values. The relations among these are somewhat complicated. Presumably, unobtrusive measures are used to reveal attitudes, beliefs, and values of which the person is consciously aware, but unwilling to disclose to others. Automatic processes may unconsciously activate attitudes, beliefs, and values, but these mental states themselves are not necessarily unconscious. Implicit attitudes, beliefs, and values may well affect a person's conscious experience, thought, or action, but these mental states are, by definition, not accessible to conscious awareness. If we are interested in the truly unconscious determinants of social behavior, we cannot be satisfied merely with the development of unobtrusive measures, or even with the demonstration that certain attitudes, beliefs, and values are generated automatically. We must also demonstrate that these mental states are unconscious, in the sense that they can be dissociated from, and are not predicted by, their explicit counterparts.

Herein lies the problem: What do we take as evidence for an unconscious mental state? Long ago, William James noted that the unconscious "is the sovereign means for believing what one likes in psychology, and of turning what might become a science into a tumbling-ground for whimsies (James, 1890/1980, p. 163). James also cautioned psychologists against the *psychologist's fallacy*, which he defined as "the confusion of his own standpoint with that of the mental fact about which he is making his report" (James, 1890/1980, p. 196). The psychologist's fallacy, in which we assume not only that every event has a psychological explanation, but

also that *our* psychological explanation is the correct one, is hard enough to resist with respect to people's *conscious* mental states, as when we infer people's attitudes, beliefs, and values from their behavior. But it is particularly vicious with respect to people's *unconscious* mental states, when they are in no position to authoritatively correct our inferences. Psychoanalysts and some other insight-oriented psychotherapists have been doing this sort of thing to their patients for a hundred years (Freud, 1905/1953). In the current revival of interest in the psychological unconscious, it is important that we not perpetuate their errors (Kihlstrom, 1997).

The study of implicit memory and its cognate phenomena addresses this problem in a number of ways. First, the implicit expression of episodic memory, whether in the form of priming or some other effect, has to be related plausibly to some independently verifiable event in the subject's past personal experience. Second, the dissociation between implicit and explicit memory is documented by comparing subjects' performance on two closely matched tests, one that refers to, and requires, conscious recollection of a prior event and another one that does not. Something similar needs to happen in the study of implicit social cognition if implicit attitudes, beliefs, and values are to be considered truly unconscious. First, we need assurance that the effect under consideration, whether a priming effect or an implicit association or something else, really is an expression of the person's attitudes and beliefs, rather than an artifact of some stimulus property such as familiarity or some task property such as difficulty. Ordinarily, such evidence would be provided by a positive correlation between the effect and the person's responses to a questionnaire or some other measure. (e.g., Fazio, Sanbonmatsu, Powell, & Kardes, 1986), but that sort of evidence is not available when it comes to truly implicit attitudes, beliefs, and values, because by definition

they should not correlate with their explicit counterparts. In fact, we want the correlations between explicit and implicit measures to be as close to zero as possible, and to be reassured that the low correlations are not procedural or statistical artifacts.

In such a situation, the validity of tests of implicit attitudes, beliefs, and values will rest on a package of both convergent and discriminant evidence (Cronbach & Meehl, 1955; Loewinger, 1957). On the discriminant side, it must be demonstrated that implicit attitudes, beliefs, and values are essentially uncorrelated with their explicit counterparts (see Cook & Groom, Chapter 2, this volume). Moreover, it is important that the explicit measures employed be comparable with the implicit measures under consideration. It is not enough to compare priming or implicit associations with questionnaire responses or thermometer settings. The explicit and implicit tests must be as closely comparable as possible, differing chiefly in whether they require subjects to reflect consciously on their attitudes, beliefs and values. On the convergent side, it must be demonstrated that implicit attitudes, beliefs, and values are associated with construct-relevant behaviors or experimental manipulations, just as their explicit counterparts are. Depending on theoretical considerations, it may well be that explicit and implicit attitudes, beliefs, and values are affected by different manipulations, correlate with different variables, and predict different behaviors. Or, it might be that implicit attitudes, beliefs, and values are more strongly related to some external variables than are their explicit counterparts. Whatever proves to be the case, it is important that these external relations should be construct-relevant, as defined by the investigator's theory of the construct under investigation. In this way, we can avoid the psychologist's fallacy and have a genuine science of the unconscious, not a tumbling ground for whimsies.

NOTES

1. The second lesson is that no amount of statistical finesse (Jackson, 1971) can substitute for a few intelligent people writing items based on clear definitions of the construct to be measured (Ashton & Goldberg, 1973; Hase & Goldberg, 1967; Jackson, 1975).
2. Extensive information on the IAT, including demonstrations, generic software for constructing experiments, and bibliographies of published and unpublished work, is available on the World Wide Web at the following URLs: <https://implicit.harvard.edu/implicit/> and http://faculty.washington.edu/agg/iat_materials.htm. These Web sites also make reference to an "IAT Corp." which presumably was established to promote the IAT as a psychometric instrument for assessment of social beliefs and attitudes.

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