What Are Implicit Measures and Why Are We Using Them?

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Abstract: I argue that implicit measures are measurement outcomes that have certain functional properties. The expression “indirect measure,” however, refers to an objective property of the measurement procedure, being that the researcher does not assess the attitude on the basis of a self-assessment by the participant but on the basis of another behavior. With regard to the question of why one should use implicit measures, research suggests that they do not allow one to register stable structures in memory. It is also doubtful that they provide an index of implicit attitudes. But to the extent that implicit measures reflect the automatic impact of attitudes and cognitions, they could provide a unique insight into the effects of automatic processing on real-life behavior.

INTRODUCTION

For many years, psychologists have tried to measure attitudes and other cognitions in an attempt to understand, control, or predict human behavior. Most often, they have done so using questionnaires. More recently, there has been a growing interest in a new type of measures, often denoted “implicit” or “indirect” measures. Examples of such measures are the affective priming task (e.g., Fazio et al., 1995), the Implicit Association Test (IAT; e.g., Greenwald et al., 1998), the Extrinsic Affective Simon Task (EAST; e.g., De Houwer, 2003; De Houwer & Eelen, 1998), and the word association task (e.g., Stacy, 1997; see Fazio & Olson, 2003, for a review). Implicit measures such as these are now widely used in social psychology (e.g., Greenwald et al., 1998), clinical psychology (e.g., Teachman et al., 2001), personality psychology (e.g., Asendorpf et al., 2002), marketing (e.g., Brunel et al., in press), and health psychology (e.g., Stacy, 1997; Wiers et al.,

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Despite their immense popularity, it is often not clear what terms such as "implicit measure," "implicit attitude," or "implicit cognition" refer to. In this chapter, I examine what it might mean to say that a measure is implicit or indirect and look at the possible benefits of using these measures. Although my analysis applies to all available implicit and indirect measures, I will focus primarily on reaction time measures such as the IAT and affective priming task simply because these are currently the most popular ones.

**WHAT ARE "IMPlicit" AND "INDIRECT" MEASURES?**

**What Are "Implicit Measures"?**

Many researchers use the expression "implicit measures" and "indirect measures" to refer to a class of measures that are supposed to be in some way different from more traditional questionnaire measures. But what is unique about these measures? What does it mean to say that a measure is implicit or indirect? To answer this question, it is important to realize that the term "measure" can be used in different ways. It can either be used to refer to the outcome of a measurement procedure (e.g., a particular score on a questionnaire or a particular pattern of performance such as an IAT or priming effect) or to the objective measurement procedure itself (e.g., the questionnaire itself as consisting of certain instructions and certain questions or the exact instructions and stimuli that are presented during a reaction time task). A measurement procedure can be called a measure in the sense that it can in principle be used to obtain an outcome that provides an index of a construct or entity. For example, putting someone on a scale is a measure of weight in the sense that it is a procedure one can follow to obtain an estimate of someone’s weight. The number provided by the scale is the outcome of the measurement procedure. This outcome can be called a measure of weight in that it is an estimate of the actual weight of the person. For an outcome to reflect a construct or entity (such as an attitude or weight), it must somehow be (partially) produced or determined by the construct or entity. In other words, there are some underlying processes through which the construct or entity produces or determines the outcome of the measurement procedure (e.g., the processes by which the weight of the person is translated into a value on the scale).

Let us now turn to the definitions of implicit measures that can be found in recent psychological literature. Researchers have argued that, contrary to traditional (explicit) measures, implicit measures provide an index of a certain attitude or cognition even though participants (1) are not aware of the fact that the attitude or cognition is being measured (e.g., Brunel et al., in press), (2) do not have conscious access to the attitude or cognition (e.g., Asendorpf et al., 2002), or (3) have no control over the measurement outcome (e.g., Fazio & Olson, 2003). What is clear from these definitions is that they do not refer to objective properties of the measurement procedure itself. A procedure is merely a set of guidelines about what one should do as a researcher. Rather, the definitions of “implicit measure” that can be found in the literature refer to the conditions under which the outcome of the procedure functions as an index of the to-be-measured attitude or cognition. In line with the available definitions, one can therefore say that the term “implicit measure” refers to certain functional properties of measurement outcomes: The outcome functions as an index of an attitude or cognition despite the fact that participants are unaware of the impact of the attitude or cognition on the outcome, are not aware of the attitude or outcome, or have no control over the outcome. Because a measurement
outcome can only function as a measure by the grace of certain underlying processes (see above), the functional properties of a measurement outcome therefore actually refer to the conditions under which the underlying processes operate.

This analysis leads to four important conclusions. First, the term “implicit measure” refers to the functional properties of measurement outcomes (e.g., an IAT effect defined as the difference between the compatible and incompatible test block) rather than to the measurement procedure (e.g., a particular IAT task as involving certain stimuli, responses, and instructions). From now on, when I use the term “implicit measure,” I thus refer to a measurement outcome rather than a measurement procedure. Second, because the term “implicit measure” can refer to several functional properties, it is necessary to specify which properties one has in mind. For instance, rather than claiming that a measure is implicit, one could say that a measure is implicit in the sense that participants are not aware of what the measurement outcome reflects. Third, to conclude that a measure is actually implicit in a certain sense, one has to verify empirically whether it possesses the specified functional properties. That is, it is necessary not only to examine whether the measure does provide a reliable index of the to-be-measured attitude or cognition (that it is reliable and valid) but also whether specified conditions are met. For instance, before a measure can be called implicit in the sense of unaware, it needs to be verified empirically as to whether participants are indeed unaware of the fact that the outcome reflects a certain attitude or whether they are unaware of the attitude itself. Whether a measure is reliable and valid always needs to be checked (if it is not, the measurement outcome is not a measure in the true sense of the word). But if one makes the additional claim that a measure is implicit, one also needs to specify and examine its functional properties. Fourth, the various functional properties that have been assigned to implicit measures do not necessarily co-occur. For instance, if one can demonstrate that participants have little control over the outcome of a measurement procedure, this does not imply that the participants are unaware of the attitude or cognition that is being measured. Therefore, each functional property has to be examined for each measure separately. This is also why one always needs to specify in which sense a measure is implicit. If, for instance, a measure cannot be controlled by the participant but the participant is typically aware of the attitude or cognition that is being measured, one should describe this measure as a measure that is implicit in the sense of uncontrollable (but not in the sense of unaware).

I am thus arguing that a conditional approach of the term “implicit measure” is warranted. This approach is in many ways similar to a conditional approach of the concept “automaticity.” Researchers such as Logan (1985) and Bargh (1992) correctly pointed out that the term “automaticity” can refer to several functional properties that often do not co-occur. Therefore, to say that a process is automatic, one needs to specify the properties that the process possesses (e.g., unconscious, involuntary, effortless, goal-independent, and/or controllable) and conduct extensive research to check for each automaticity property separately whether it applies to that process. A similar approach is needed if one wants to continue to use the term “implicit measure” in a meaningful manner. A conditional approach to the concept “implicit measure” would also avoid unproductive debates about whether a measurement outcome is “truly” implicit. Just like there are probably few processes that have all the properties of an automatic process, there are probably few measures that are implicit in all possible senses of the word. Therefore, findings that show that
a measurement outcome does not have a particular property of implicit measures do not allow one to conclude that it is not "truly" implicit. A more productive approach is to examine in what sense the measure is implicit.

Because both "implicit" and "automatic" refer to functional properties, one could also use a conditional approach to examine whether and in what sense implicit measures are automatic measures. In fact, several of the functional properties that are attributed to implicit measures are actually properties that are also attributed to automatic processes. For instance, both implicit and automatic processes can be characterized as uncontrollable (participants cannot control the outcome of the process) or unconscious (either in the sense that participants are unaware of the fact that an effect was due to a particular process or that participants do not have conscious access to the process that produced the effect). It might even be useful to replace the term "implicit measure" with "automatic measure" because much more is known about the functional properties that the term "automatic" can refer to (e.g., Bargh, 1992; Logan, 1985; Moors & De Houwer, in press). Also, whereas "implicit" is most often used to refer to the property "unconscious," the term "automatic" is traditionally used to refer to a much wider range of functional properties. Replacing the term "implicit measure" with the term "automatic measure" might thus broaden the scope of research on the functional properties of these measures.

In sum, one can define an implicit measure as a measurement outcome that reflects a certain attitude or cognition in an automatic manner, where "automatic" needs to be specified in terms of the presence of one or more functional features. Although one can have a debate about which properties are central to the concept of automaticity (see Moors & De Houwer, 2004), the fact remains that one cannot use the term "implicit measure" in a meaningful manner without (1) making explicit the functional properties of the measurement outcome that one is referring to, and (2) providing empirical evidence that supports these functional properties. Although such a conditional approach to the concept "implicit measure" or "automatic measure" is thus necessary and would avoid a lot of confusion, it is rarely adopted. In the next section, I briefly summarize some of the research that has examined the functional properties of so-called implicit measures that are used in current research.

Evidence for the Implicit or Automatic Nature of Implicit Measurement Outcomes

Are existing implicit measures implicit in the sense that participants are unaware of the fact that the measurement outcome measures something?

Surprisingly, whether participants are indeed unaware of the fact that implicit measures measure something is almost never examined. One study that did probe this suggests that, at least in some cases, participants do know what is measured. Monteith et al. (2001) interviewed participants about their experiences with a race IAT. During the race IAT, positive words (e.g., happy), negative words (e.g., disgusting), first names typical of white Americans (e.g., John), and first names typical of black Americans (e.g., Jamal) were presented one by one on the screen. Participants responded to each stimulus by pressing one of two keys on the basis of the category to which the stimulus belonged (i.e., positive, negative, white, black). As is typically found in race IAT studies, participants were slower when they pressed one key for positive words and black names and the other key for negative words and white names (incompatible task) than when they pressed one key for positive words and white
names and the other key for negative words and black names (compatible task). Such a result is taken as evidence for the hypothesis that (white) American people have a more negative attitude toward black people than toward white people. What is interesting for the present purpose is that 64 percent of the participants noticed that they were faster in the compatible task than in the incompatible task. Of the participants who noticed that they were faster in the compatible task, 37 percent attributed this slower performance to the fact that they apparently had a more negative attitude toward black people than toward white people. This result strongly suggests that a substantial number of the participants are aware of what a race IAT measures.

Studies by Duscherer et al. (2002) suggest that participants are often also aware of affective Simon effects and the origins of such effects. They used a standard affective Simon task during which positive and negative nouns (e.g., FLOWER, CANCER) and adjectives (e.g., HAPPY, DISGUSTING) were presented one by one on a computer screen. Half of the participants were instructed to say “GOOD” whenever an adjective was presented and “BAD” whenever a noun appeared, irrespective of the (good or bad) meaning of the noun or adjective. The response assignments were reversed for the other participants (i.e., say “GOOD” to nouns and “BAD” to adjectives). Reaction times were slower when the meaning of the correct response was incompatible with the meaning of the presented word (e.g., say “GOOD” to DISGUSTING because it is an adjective; incongruent trial) than when the meaning of the correct response and the presented word matched (e.g., say “BAD” to CANCER because it is a noun; congruent trial). But when asked to guess what the purpose of the experiments was, almost 80 percent of the participants mentioned that the purpose was to see whether the match between the valence of the word and the response influenced the speed of responding. Importantly, participants who realized this also showed a bigger Simon effect (i.e., more delay and errors on incongruent trials). This suggests that the outcome of certain measurement procedures might in part depend on whether participants have an insight into the measure.

In sum, one cannot simply assume that existing implicit measures such as IAT and Simon effects are implicit in the sense that they reflect attitudes and cognitions even though participants are not aware that the outcome reflects these attitudes or cognitions. Instead, this property needs to be verified empirically before any claim can be made about it. Although initial studies suggest that participants are often aware of the purpose of popular implicit measures such as the IAT, it is likely that some measures are implicit in this sense. For instance, research has shown that affective priming effects can be found even when the primes are presented subliminally (e.g., Klauer et al., 2003). That is, when a target (e.g., HAPPY) is preceded by a subliminally presented prime stimulus that has the same valence as the target (e.g., FLOWER), participants need less time to respond to the target than when the target is preceded by a subliminally presented prime with a different valence (e.g., CANCER). One could use this procedure to measure attitudes. For example, in order to examine whether someone has a positive or negative attitude toward smoking, one could present a smoking-related prime word in a subliminal manner and examine whether responses are faster when this word is followed by positive targets (in which case one can infer a positive attitude toward smoking) or when the word is followed by negative targets (in which case one can infer a negative attitude toward smoking). If such a measure works, it is likely that participants are unaware of what the task measures simply because they are unaware of the priming stimuli (i.e., the smoking-related words). It
remains to be seen, however, whether such an implicit measure produces reliable and valid results (see Banse, 2001, for data with regard to the limited reliability of subliminal affective priming measures).

Are implicit measures implicit in the sense that participants are unaware of the attitude or cognition that is measured?

Rather than being unaware of the fact that the measure is measuring something, participants might be unaware of the attitude or cognition that is being measured. Do existing implicit measures (i.e., measurement outcomes) provide an index of such unconscious attitudes or cognitions? As Fazio and Olson (2003) pointed out, this is almost never checked. Moreover, often participants do realize that they possess the attitude or cognition that is being measured. For instance, flower-insect IAT studies revealed that participants are faster when they need to press one key for flower names (e.g., TULIP) and positive words (e.g., HAPPY) and the other key for insect names (e.g., COCKROACH) and negative words (e.g., DISGUSTING) than in a task where the response assignments are reversed (i.e., press one key for flower names and negative words and the other key for insect names and positive words). This result is in line with the idea that most people have a more positive attitude toward flowers than toward insects. But in all likelihood, the participants were aware of the fact that they liked flowers more than insects. It thus seems safe to conclude that implicit measures such as the IAT can register attitudes and cognitions that are available to consciousness. Therefore, one cannot simply interpret an implicit measure such as the IAT effect as reflecting the strength of an unconscious attitude or cognition (also see Fazio & Olson, 2003).

This does not imply that implicit measures can never register attitudes or cognitions that participants are unaware of. For instance, Olson and Fazio (2001) used an evaluative conditioning procedure to induce a positive or negative attitude toward certain Pokemon characters. That is, they unobtrusively paired one Pokemon with negative stimuli (e.g., the picture of a dead cow) and another Pokemon with positive stimuli (e.g., the picture of a puppy). Afterward, participants indicated that they liked the first Pokemon less than the second one even though they were unaware of the fact that one Pokemon was previously paired with positive stimuli and the other with negative stimuli. These implicitly learned attitudes were also detected using an IAT and a subliminal affective priming procedure. One can thus conclude that measures such as the IAT and subliminal affective priming can detect attitudes that participants have learned unconsciously. But it remains the case that these measures can also be influenced by attitudes that participants have learned in a conscious, controlled manner. Moreover, one might argue that participants in the Olson and Fazio study were aware of their attitudes in the sense that they could consciously report which Pokemon they liked best. Their attitude was "implicit" only in the sense that they were not aware of the reasons for their attitudes and could thus not provide an accurate justification for their attitudes. I will discuss the issue of whether and in what sense attitudes can be unconscious or implicit in the second part of this chapter. For now, it is sufficient to realize that, although implicit measures might sometimes register unaware attitudes and cognitions, one can certainly not assume that the outcome of implicit measures provides a direct and exclusive index of such unaware cognitions.

Are implicit measures implicit in the sense that participants cannot strategically control the outcome of the measure?

One of the most popular reasons for using so-called implicit measures is that they are supposed to be less susceptible to deception and social desirability. This argument is based
mainly on the assumption that participants cannot strategically control (the impact of the attitude or cognition on) the outcome of the measurement procedure. But what does the evidence tell us?

There are some studies in which participants were asked to fake a certain attitude on the IAT. Kim (2003) instructed participants to perform a race IAT in such a way that it would not provide evidence for a racial bias against black people. These instructions had no impact on IAT scores. Lowery et al. (2001), however, did find less evidence for racial prejudice as measured by the IAT when participants were asked to be as unprejudiced as possible. They also found that Caucasian (but not Asian) participants showed less prejudice on the IAT when the experimenter was black than when he or she was white. Banse et al. (2001) found that heterosexual participants were unable to fake a positive attitude toward homosexuality on the IAT. Asendorpf et al. (2002) and Egloff and Schmukle (2002) failed to find a significant effect of faking instructions on the outcome of IAT measures of shyness or anxiety. Steffens (2004), however, noted that in the studies of Banse et al., Asendorpf et al., and Egloff and Schmukle, there was a nonsignificant trend toward an effect of faking instructions (Cohen’s d effect size of between .13 and .39, M = .23). Steffens argued that participants might be better able to fake a certain attitude on the IAT when they already had some experience with the IAT. To test this prediction, all participants completed the same IAT twice and were given faking instructions before completing the second IAT. Steffens observed a small effect of faking instructions on an IAT designed to measure conscientiousness and a large effect on an IAT designed to measure introversion and extroversion. In the latter case, participants who were instructed to fake extroversion on average had an IAT score that suggested that they were extroverted (i.e., faster when self and extroversion items were assigned to the same key) whereas participants who were instructed to fake introversion had an IAT score that classified them as introverted (i.e., faster when self and introversion items were assigned to the same key). Although these findings suggest that participants can control the outcome of at least some IATs, it should be noted that the impact of faking instructions on the IAT was smaller than the impact of such instructions on the outcome of questionnaires. One can thus still argue that IAT effects are less susceptible to faking than (some) traditional questionnaire measures. Moreover, in the study of Steffens (2004), there still was a significant correlation between the scores of individuals on the first administration of the IAT (at a time when they were not asked to fake) and their scores on the second IAT (when they were asked to fake). This suggests that participants are unable to completely hide their “true” attitudes and associations when asked to fake.

A closer inspection of the data of Steffens (2004) suggests that participants can fake a certain attitude or association on the IAT by intentionally slowing down their reaction times (or increasing the number of errors) during certain phases of the IAT. There is, however, also a more subtle manner in which participants can strategically influence the outcome of an IAT and other implicit measures. Research has shown that implicit measurement outcomes are very context-dependent (see Blair, 2002, for a review). For instance, Mitchell et al. (2003, Experiment 1) presented names of liked black athletes, disliked white politicians, positive words, and negative words. When participants were asked to respond to the names on the basis of occupation (athlete or politician) and to words on the basis of valence, the IAT revealed a more positive attitude toward black athletes than toward white politicians. When the race of the names was relevant (black or white), however,
a more positive attitude toward white politicians was found. Likewise, Dasgupta and Greenwald (2001) found smaller race IAT effects (i.e., less prejudice against black people as measured by the IAT) when participants saw names of admired black Americans and disliked white Americans before completing the race IAT. This suggests that participants can influence the outcome of an IAT by intentionally retrieving certain information or paying attention to certain features. For instance, when participants complete an extroversion-introversion IAT and are asked to fake being extroverted, they might retrieve memories of events in which they behaved in an extroverted manner (Steffens, 2004). They might even imagine events that have never occurred.

As far as we know, little or no research has been done about the ability of participants to strategically control other implicit measurement outcomes such as affective priming and affective Simon effects. But given that participants can in principle temporarily change their attitudes and cognitions by intentionally retrieving or constructing certain information, one would expect that most implicit measurement outcomes will be sensitive to faking. One possible exception is the subliminal affective priming task. Because participants are unaware of the subliminally presented primes, they do not know what attitudes are measured. It is therefore unlikely that they know which attitude they need to fake (unless they can infer from the test context what the crucial attitude is).

Are implicit measures implicit in the sense of unintentional, goal-independent, and efficient?

Above I noted that the concept “implicit” refers to functional properties that are also associated with the concept “automatic.” The latter concept, however, also includes other functional properties that are typically not linked to the concept “implicit.” The most important of these properties are unintentional, goal-independent, and efficient (e.g., Bargh, 1992; Moors & De Houwer, 2004). An implicit measurement outcome can be described as unintentional if it reflects the to-be-measured attitude or cognition even though participants do not have the intention to reveal their attitude or cognition (in that measure) or if the participants do not have the intention to retrieve information about the attitude or cognition. It can be described as goal-independent if the implicit measurement outcome reflects the attitude or cognition regardless of the processing goal that the participant has. Finally, it would be efficient when the attitude or cognition is reflected in the implicit measure even when the participant is engaged in other demanding tasks (see Moors & De Houwer, 2004).

For most of the implicit measures that have been proposed in recent years, it has not been examined whether they possess these automaticity properties. Probably this is due to the fact that “implicit” is most often interpreted as “unconscious.” There is, however, some evidence concerning whether affective priming effects provide an automatic measure of attitudes (see Klauer & Musch, 2003, for a review). First, the unintentional nature of affective priming is supported by the observation that affective priming effects are found even when participants are told that the primes are not important and should be ignored (e.g., Hermans et al., 1994). This renders it unlikely (but not impossible) that priming effects are due to the fact that participants intentionally process the valence of the primes or use information about prime valence as a basis for responding to the targets. Another argument is that priming effects are typically found when the asynchrony between the onset of the prime and the onset of the target (i.e., SOA) is so short that participants do not have the time to intentionally process and strategically use the valence of the prime (e.g., Hermans et al., 2001). A final argument is that such effects also arise when the primes are presented
unaware of what the IAT effect measures and in the sense that participants have relatively little control over these effects. There is also research that supports the idea that most implicit measures rely on a mixture of automatic and nonautomatic processes. For example, IAT effects are known to depend on the exact labels that are used during the task or on how the presented stimuli are interpreted by the participants (e.g., De Houwer, 2001; Mitchell et al., 2003). Likewise, affective priming effects depend on how the participants classify the primes (e.g., Olson & Fazio, 2003). But regardless of whether functional properties are absolute or relative, the fact remains that they need to be clearly specified and examined empirically.

With regard to the latter point, it needs to be pointed out that in some cases, claims about the functional properties of a measurement outcome can be based on logical arguments with regard to the measurement procedure rather than on empirical evidence. For instance, it seems unlikely that participants can consciously control the outcome of an affective priming measure if the primes are presented subliminally. Nevertheless, in most cases, functional properties of measurement outcomes are not determined fully by the procedure but do need to be verified empirically. This review shows that many issues still need to be investigated. Such research is desperately needed, not only to arrive at a certain level of conceptual clarity, but also to get a better understanding of the measures that researchers are using.

**What Are Indirect Measures?**

Until now, I have used the term “measure” to refer to the outcome of a measurement procedure. But as I pointed out earlier, “measure” can also refer to the measurement procedure itself. It makes little sense to say that a measurement procedure is implicit. There is nothing unconscious, uncontrollable, or
automatic about a procedure. A procedure is merely a set of objective guidelines that can only be characterized on the basis of the nature of these guidelines.

When regarded as procedures, what most so-called implicit measures have in common is that participants are not asked to self-assess the extent to which they hold a certain attitude or cognition. Instead, the attitude or cognition is assessed indirectly by examining its effect on other behavior. As such, most implicit measurement procedures can be characterized as indirect measures. In contrast, many traditional procedures for measuring attitudes or cognitions are direct. That is, participants are asked to respond to a question about the attitude or cognition of interest. For instance, to directly measure how much someone likes Belgian Trappist beer, one could ask the person to rate on a seven-point scale how much he or she likes Trappist beer. Whether a measure is direct or indirect is an objective property of the measure: If the measure involves asking participants to express the attitudes or thoughts that are measured, it is a direct measure. If the attitude or cognition is inferred from behavior other than a self-assessment of the participant, it is an indirect measure. There is no need to do research about this. The direct or indirect nature of the measure is determined simply by looking at its objective properties.

Note that the outcome of an indirect measurement procedure does not necessarily have the functional properties of implicit measures (e.g., unconscious, uncontrollable, automatic). Whether it does, needs to be determined on the basis of research. Also note that indirect measures can be based on self-report. In virtually all studies on the name-letter effect (e.g., Koole et al., 2001), for instance, participants are asked to express their liking of each letter of the alphabet on a Likert-type rating scale. Results typically show that people tend to like letters that are part of their name better than other letters. The size of this effect can be regarded as an index of self-esteem. Although participants are asked to give self-reports, these self-reports are not about the attitude that one wants to measure. That is, participants are asked to express how much they like the letters and not how much they like themselves. The name-letter procedure is thus a direct measure of attitudes toward letters but an indirect measure of self-esteem. In fact, many of the measurement procedures that are currently used to obtain implicit measures of attitudes are based on verbal reports of one kind or the other (e.g., free association, word-stem completion, stereotypic explanatory bias; see Fazio & Olson, 2003, for a review). As noted by Vargas (2004), such indirect measures have a long history in psychology.

From this perspective, many traditional questionnaires can be also regarded as indirect measures. The well-known Minnesota Multiphasic Personality Inventory (MMPI), for instance, is a questionnaire that was designed to measure various personality traits (e.g., Butcher et al., 2003). It does not do so by asking participants to answer questions about the extent to which they believe that they possess a certain personality trait, but by asking them whether statements about feelings and behaviors apply to them. For instance, people who endorse the item “I have a good appetite” will receive a lower score on the depression scale. As such, the MMPI can be regarded as an indirect measure of personality. Some might argue that the results of questionnaires such as the MMPI are unlikely to be implicit because participants have control over their answers or might realize that certain traits are being measured. But as I have argued above, the implicit nature of the results of an indirect measure (be it a questionnaire or a reaction time task) needs to be determined on the basis of research. It is not because an indirect
measure depends on the verbal answer of participants to certain questions that it by definition does not provide an implicit measure. Therefore, if one wants to claim that a certain questionnaire (or any other measure for that matter) does or does not provide an implicit measure, one has to clearly state the functional properties and the evidence on which this statement is based.

Just like indirect measures do not by definition provide implicit measures, direct measures do not by definition provide explicit measures. For instance, one can ask participants to express their liking of a certain object as quickly as possible and/or while performing a demanding secondary task. In such cases, participants might have little control over the expressed attitude (e.g., Wilson et al., 2000). But again, one should always verify what the functional properties of the measurement outcome are before claiming that it is an implicit measure.

From the above, it should be clear that indirect measures are not a separate class of measures next to the class of implicit measures. The qualification “direct/indirect” refers to the measurement procedure whereas the qualification “implicit/explicit” refers to the functional properties of the outcome of the measurement procedure. Each indirect measure produces an outcome for which it needs to be determined whether it can be characterized as implicit.

WHAT ARE THE POTENTIAL BENEFITS OF USING IMPLICIT MEASURES?

In this second part of the chapter, I will discuss why researchers would want to use implicit measures. Why do they want to have a measure that participants do not recognize as such, that registers attitudes and cognitions even when participants are not aware that they have them, or that participants cannot control? I will evaluate the shortcomings and merits of three possible answers to this question: Implicit measures might provide a way to measure (1) stable attitudes and cognitions, (2) implicit attitudes and cognitions, or (3) automatically activated attitudes and cognitions. This section is thus about the constructs that implicit measures might reveal rather than the conditions under which the implicit measures reveal a certain construct (i.e., its functional properties). Note that the three constructs that I will address do not entirely overlap. For instance, stable attitudes and automatically activated attitudes are not necessarily implicit in the sense of unconscious. Likewise, stable attitudes are not necessarily activated automatically.

Can Implicit Measures Measure “True,” Stable Attitudes or Cognitions?

Psychologists have for a long time assumed that attitudes and other associations in memory are stable structures that underlie behavior in a variety of situations (e.g., Allport, 1935; Beck, 1976). A perfect measure of attitudes and cognitions would directly tap into these underlying—stable structures without being influenced by other factors. It is well-known, however, that traditional questionnaire measures can provide biased estimates. For instance, a participant can intentionally try to deceive the researchers, the measurement outcome can be affected by social desirability, and the outcome can depend heavily on properties of the context (e.g., how questions are formulated or who asks the questions; see Blair, 2002, p. 256). Implicit measures promised to provide a less biased estimate of attitudes and cognitions. The hope was that they would be less affected by deception and social desirability and would reflect stable structures. In part, this promise is fulfilled. Above, I have discussed data that suggest that
compared to traditional measures, implicit measures such as the IAT are indeed less affected by intentional efforts to deceive. Moreover, there is some evidence that the correlation between implicit measures and traditional self-report measures increases if the impact of self-presentation on explicit measures is reduced (see Fazio & Olson, 2003). On the other hand, IAT effects (and most likely also other implicit measures) can at least sometimes and to a certain extent be faked. Even more important, implicit measures seem to be highly malleable. That is, they depend heavily on a variety of extraneous factors such as self-image enhancement, the social context in which the measure is taken, mental imagery, recently presented information, and focus of attention (see Blair, 2002, for a review). One can thus conclude that implicit measures are not miracle measures that provide an unbiased view of the “true,” stable attitudes and cognitions that are assumed to underlie behavior.

Based on these and other findings, more and more researchers are questioning whether this quest for the “true” attitude or cognition makes sense (e.g., Blair, 2002; Mitchell et al., 2003). It is, for instance, likely that attitudes are in principle context-dependent because the context determines how an attitude object is represented or construed. For instance, smokers might have both a negative and a positive attitude toward smoking. Which attitude is activated will depend on which aspect of the concept “smoking” is activated. When the sociable character of smoking is highlighted by the context (e.g., a party), someone might hold a favorable attitude toward smoking. When the health implications of smoking are activated by the context (e.g., when confronted with an advertisement against smoking), the same person might evaluate smoking as negative. Another view is that attitudes and other associations in memory are not stable structures but temporary constructions that are formed in response to a particular situation. This would imply that the manner in which attitudes change across different contexts could itself provide an important source for predicting behavior.

Can Implicit Measures Measure Implicit Attitudes or Cognitions?

It is sometimes suggested that implicit measures are capable of measuring so-called implicit attitudes or implicit cognitions. But as is the case with the expression “implicit measures,” it is often unclear what researchers mean when they use the term “implicit attitude” or “implicit cognition.” Two papers are often cited in this context: Wilson et al. (2000) and Greenwald and Banaji (1995). It is important to note that in neither of these, implicit attitudes or cognitions are defined as unconscious attitudes or cognitions. Wilson et al. (2000, p. 119), for instance, “suspect that cases... in which people have no awareness of their implicit attitudes, are relatively rare.” As I pointed out above, it is also rarely checked whether participants are aware of the attitudes that the implicit measure is supposed to register. Moreover, one cannot simply interpret an implicit measure as a measure of an attitude or cognition that participants are not aware of because participants are often aware of the attitude or cognition that is reflected in the implicit measure. One can thus conclude that implicit measures most often do not measure “implicit attitudes” or “implicit cognitions” in the sense of unconscious attitudes or cognitions.

The most frequently cited definition of “implicit attitude” is the one formulated by Greenwald and Banaji (1995, p. 8). They define an implicit attitude as “introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects.” Note that implicit attitudes are thus not viewed as a separate structure or entity, but as an unconscious effect of the
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attitude or past experiences on current feeling, thought, or action. In other words, Greenwald and Banaji use the term “implicit attitude” as shorthand for the unconscious operation or effect of an attitude.

The views of Greenwald and Banaji (1995) are closely related to the MODE model of Fazio (1990; see below), except that Greenwald and Banaji put the emphasis on the unconscious operation of attitudes whereas Fazio emphasizes the automatic operation of attitudes. The term “automatic” can entail not only the functional property unconscious, but also other properties such as unintentional, fast, efficient, and/or goal-independent. There are possible downsides to focusing exclusively on the property unconscious. First, as is clear from the literature on implicit memory and implicit learning, there are serious difficulties with assessing whether participants are aware of something (e.g., Shanks & St. John, 1994). Second, the definition of Greenwald and Banaji raises questions about whether so-called implicit measures are privileged indicators of implicit attitudes. As we have seen above, there is evidence that participants can be aware that a certain attitude is measured by an implicit measure and can be aware of the attitude that is measured. In other words, neither the attitude, nor the effect of the attitude on implicit measures such as the IAT is necessarily “introspectively undefined.” One could thus argue that these measures do not register implicit attitudes. Maybe the measures do register implicit attitudes in the sense that participants are not aware of the past experiences that led to the attitude that they are aware of and that they know is being measured. But if this is a sufficient criterion to state that a measure reflects an implicit attitude, then the outcome of direct measurement procedures can also be said to reflect implicit attitudes. People can indeed express their feelings toward an attitude object by using a rating scale even when the traces of past experience that mediate this favorable or unfavorable feeling are introspectively undefined. For instance, I am able to say in a controlled manner that I like brussels sprouts even though I have no insight into the experiences that led to this positive evaluation. In fact, most preferences cannot be justified in this manner (e.g., Zajonc, 1980). Does this mean that direct measurement procedures are as suitable for measuring implicit attitudes as indirect measurement procedures? One might argue that implicit measures such as IAT effects are more suitable for measuring implicit attitudes because participants are not aware of the processes by which the attitude or past experiences produces a certain IAT effect. Although this might be true, one could say that participants also do not have full insight in how they translate a particular attitude or feeling into a particular score on a rating scale. In sum, although Greenwald and Banaji should be applauded for providing a definition of the concept “implicit attitude,” their definition is problematic in some respects.

Wilson et al. (2000, p. 104) define implicit attitudes as “evaluations that (a) have an unknown origin (i.e., people are unaware of the basis of their evaluation); (b) are activated automatically; and (c) influence implicit responses, namely uncontrollable responses and ones that people do not view as an expression of their attitude and thus do not attempt to control.” They assume that implicit attitudes can coexist with and differ from explicit attitudes. One person could thus simultaneously hold a positive implicit attitude toward a certain object, but a negative explicit attitude toward the same object. The implicit attitudes are viewed as attitudes that were once explicit but were replaced by a new explicit attitude. The past attitudes are, however, not overwritten but remain latent and operate automatically like habits.

Although the dual-attitude model of Wilson et al. (2000) has the merit of attempting to clarify the relation between different
kinds of attitudes and the relation between attitudes and behavior, there are some potential problems with it. First, as I have argued above, the definition of implicit attitudes as attitudes that have an unknown origin (i.e., participants are unaware of the past experiences that led to the attitude) is problematic. Second, the characterization of implicit attitudes as habits that are overlearned seems incompatible with the observation that newly learned attitudes can be activated automatically and can be detected with implicit measures. For instance, De Houwer et al. (1998) showed that so-called Turkish words (in fact, they were nonwords) produce affective priming effects even when the meaning of these words was learned immediately before the start of the priming phase. Likewise, Gregg et al. (in press) found that nonsense labels will function as positive or negative concepts in an IAT after merely asking participants to suppose that one label is the name of a group of aggressive people whereas the other label is the name of a group of victims. It is difficult to imagine that such new attitudes were overlearned or habit-like. One could argue, however, that implicit measures will reflect newly learned attitudes only if they are not in conflict with older attitudes that have previously been (over)learned. There is indeed some evidence that IAT effects reflect older attitudes. For instance, Rudman (2004) found that smokers’ (negative) implicit attitudes toward smoking were correlated with early (negative) experiences rather than recent experiences. Research on evaluative conditioning, however, suggests that previously learned attitudes can be changed by providing new experiences, even when participants are not aware of what caused their initial attitudes or the subsequent change in attitudes (e.g., Baeyens et al., 1989). Characterizing implicit attitudes as habit-like also suggests that they are rigid and context-independent. Studies show, however, that the attitudes that are measured by implicit measures are instead highly malleable and context-dependent (e.g., Blair, 2002). The dual-process model therefore does not seem to give an adequate characterization of the types of attitudes that are measured by current implicit measures.

**Can Implicit Measures Measure Automatically Activated Attitudes and Cognitions?**

Fazio and Olson (2003, p. 301) argued that the MODE model of Fazio (1990) provides a useful framework for understanding the possible benefits of implicit measures. The MODE model “proposes that attitudes can exert influence through relatively spontaneous or more deliberative processes. The former involve judgments of, or behavior toward, an object being influenced by one’s construal of the object in the immediate situation—perceptions that themselves can be affected by individuals’ attitudes having been automatically activated upon encountering the attitude object. In contrast, deliberative processing involves a more effortful, cost-benefit analysis of the utility of a particular behavior.” Importantly, deliberative processing will take place only when participants have the opportunity and are motivated to engage in such processing.

Most often, people do not analyze their attitudes toward stimuli in a conscious and deliberate manner. Rather, their behavior is guided by a spontaneous, automatic affective appraisal of the environment (e.g., Zajonc, 1980). Whereas traditional questionnaires typically measure consciously constructed and expressed attitudes, implicit measures could index the spontaneous, automatic evaluation of stimuli. Hence, implicit measures could be particularly suited to predict spontaneous, uncontrolled behavior. Fazio and Olson (2003) review evidence that indeed suggests that implicit measures are particularly helpful in predicting behavior that is intrinsically
difficult to control or behavior in situations where people are not motivated or do not have the opportunity to control the impact of automatically activated attitudes on behavior.

The proposal of Fazio and Olson (2003) has many merits. First, rather than relying on the concept “implicit,” it focuses on the distinction between automatic and deliberative processing. As I argued earlier, the concept “automatic” is more clearly defined than the concept “implicit”; it can be linked to a variety of testable functional properties, and it does not have the limitation of referring only to a state of awareness. Second, the proposal fits well with the characterization of implicit measures as measurement outcomes that can have certain functional properties that are typical of automatic processes. Implicit measures are measures that at least in some respects reflect the automatic influence of attitudes and cognitions on behavior. From the perspective of the MODE model, implicit measures are thus laboratory equivalents of the automatic influence of attitudes and cognitions on real-life behavior. Hence, implicit measures can provide a unique perspective on real-life behavior. This argument is closely related to the idea of transfer-appropriate processing (e.g., Roediger, 1990). That is, the closer the overlap between the processes that determine the measurement outcome and those that determine the actual behavior that one wants to predict, the more that the measurement outcome will be able to predict the behavior (also see Vargas, 2004). In fact, one could say that both the measurement outcome and the real-life behavior have certain functional properties (i.e., the processes through which an attitude or cognition influences the outcome or behavior operate under certain conditions). One could thus argue that the predictive value of the measurement outcome depends on the extent to which its functional properties overlap with the functional properties of the real-life behavior that one wants to explain. For instance, real-life, attitude-driven behavior that occurs when people do not have the conscious goal to evaluate stimuli in the environment might be related most to measurement outcomes that occur in the absence of a conscious evaluation goal.

CONCLUSION

Ultimately, the merits of implicit measures will be judged on the basis of whether and to what extent they provide unique insights into human behavior. On the one hand, the predictive power of implicit measures will depend on psychometric properties such as test-retest reliability and validity (i.e., whether they in fact register the attitudes and cognitions that one wants to measure). The fact that reliability and validity are essential for all possible measures is well-known and beyond dispute. The aim of this chapter was, however, to communicate that it is also important to consider the functional properties of the measure, especially in the case of so-called implicit measures. That is, if one claims that a measure reflects an attitude or cognition under a certain set of conditions, one does not only need to verify whether it indeed provides a reliable index of the to-be-measured attitude or cognition (i.e., that it is reliable and valid) but also to make clear which conditions one refers to and to verify whether these conditions are actually met. Not only is this necessary to reduce conceptual problems (e.g., what does it mean to say that a measure is implicit or explicit), based on the MODE model one could argue that it can also help optimize the predictive power of (implicit) measures. I therefore hope that my attempt to clarify what implicit measures are and why we should use them will facilitate future research with and about these measures.
REFERENCES


