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Digging deeper or piling it higher? Implicit measurement in organizational behavior and human resource management

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ABSTRACT

Organizational researchers can dig deeper into peoples' thoughts, attitudes, and self-concepts to understand how automatic processes may impact judgment and social behavior in organizations. Measures of these automatic processes, including the Implicit Association Test (e.g., IAT; Greenwald, McGhee, & Schwartz, 1998), Semantic Priming (e.g., SP; Wittenbrink, Judd, & Park, 1997), Affect Misattribution Procedure (e.g., AMP; Payne, Cheng, Govorun, & Stewart, 2005), Word Completion Tasks (e.g., WCT; Johnson & Saboe, 2011), among many others, deserve greater attention as alternatives or supplements to traditional self-report measures of variables important in organizations (e.g., job satisfaction, personality and trait measurement, diversity attitudes). In this paper, we first provide a primer on implicit social cognition and its relationship to automatic and controlled cognitive processes, discussing major types of implicit measures, how these might operate, criticisms of this approach, and how these implicit constructs may give rise to behavior in organizations. Second, we discuss models of automatic processes and explore their validity and how these may predict behavior. Third, we offer advice for selecting, constructing, and improving implicit measurements when used in organizational research to enhance human resources and organizational functioning.
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1. Introduction

Because organizations are social systems, processes in thinking, perceiving others, and understanding behavior are important in understanding organizational processes and effectiveness (Katz & Kahn, 1978). Many people take comfort that their conscious thoughts, declarative knowledge, and deliberate intentions guide their decision-making processes and social behavior. Advances in implicit measurement, however, indicate that some thought processes may be less accessible than one may assume (Greenwald & Banaji, 1995; Nisbett & Wilson, 1977), and may operate automatically (e.g., Bargh, 1994). The space between conscious reflection and accurate assessment has motivated researchers to develop measures of these automatic processes for digging deeper into people's thoughts, goals, and self-knowledge (e.g., Fazio, Jackson, Dunton, & Williams, 1995; Greenwald, McGhee, & Schwartz, 1998; Payne, Cheng, Govorun, & Stewart, 2005). However, with these advances, the question remains how do we impact and improve organizations as we dig deeper into measuring these automatic processes that govern cognition, attitudes, and behaviors? Or does this line of research simply pile higher our knowledge of biases, limitations, and criticisms preventing us from further improving organizational behavior and effectiveness?

Implicit measurement poses both opportunities and challenges for organizational researchers. In terms of opportunities, digging deeper using implicit measures, such as the Implicit Association Test (IAT; Greenwald et al., 1998), Semantic Priming tasks (SP; e.g., Wittenbrink, Judd, & Park, 1997), the Affect Misattribution Procedure (AMP; Payne et al., 2005), Name Letter Effects procedure (NLE; Nuttin, 1985), and Word Completion Tasks (WCT; e.g., Johnson & Saboe, 2011; Johnson, Tolentino, Rodopman, & Cho, 2010), among

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others, may provide additional approaches for assessing thoughts and feelings when social desirability, lack of introspective access, and faking may distort declared or stated beliefs (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff & Organ, 1986). Using these measures offers an alternative to understanding and improving organizations because we can now measure a person's attitudes, stereotypes, and prejudices from two perspectives, one explicit, and one implicit, and link these separately, jointly, and incrementally to each other and organizational phenomena to enhance theory and improve organizations.

In terms of challenges, the routine inclusion of implicit measures in research has not been without criticism, debate, and caution (e.g., Arkes & Tetlock, 2004; Blanton & Jaccard, 2006; Blanton et al., 2009; DeHouwer, Teige-Mocigemba, Spruyt, & Moors, 2009; Fazio, 2007; Fazio & Olson, 2003; Gawronski, LeBel, & Peters, 2007; Karpinski & Hilton, 2001; Landy, 2008; McConnell & Leibold, 2009; Ziegert & Hanges, 2009). Many of these arguments (e.g., use of real world criteria) regarding implicit measurement often also apply to the use of explicit or traditional forms of measurement. Further, there remains considerable debate regarding the meaning and usefulness of measures of automatic cognitive processes and the extent to which they provide distinct information about inner thoughts and states that truly relate to important, measureable behaviors in organizations or society at large. Instead of piling higher cautions and admonitions about the use of these measures in organizations, we look at these problems as challenges and as opportunities for future research to fully evaluate the efficacy of such measures to assist us in improving workplaces and organizations.

The purpose of this paper is to review the social cognitive perspective on the measurement of automatic cognitive processes and how these relate to organizational outcomes. We review the theoretical basis and the validity evidence for these measures, and suggest several research strategies for those interested in using, critiquing, and improving implicit measurement in organizational research. We discuss many judgment processes in organizations and how these may be impacted by implicit cognition as we take a deeper, process-oriented, and more critical view of implicit cognition in organizations (Haines & Sumner, 2006; Johnson & Steinman, 2009; Sumner & Haines, 2004). Finally we briefly provide practical advice to organizational researchers interested in exploring implicit measurement and automatic processes to both understand and improve organizational behavior.

2. The case for implicit measurement

Implicit social cognition refers to thoughts based on implicit associations that lack introspective awareness, impact on our current thinking and behavior, and arise from our previous experiences (Fazio & Olson, 2003; Greenwald & Banaji, 1995). Researchers often use different terms to describe implicit social cognition such as thought that is indirect, unconscious, subconscious, automatic, or unaware (Gawronski & Payne, 2010). For the purposes of this review, we use the term implicit measure to refer to the measuring of an automatic cognitive process, one that is typically defined as being unaware, uncontrollable, unconscious, and efficient (Bargh, 1994). Automaticity in cognition is contrasted with controlled cognition, characterized as thoughtful, aware, deliberate, logical, and planned. Explicit measures or assessments may include many questionnaires, interviews, surveys, standardized tests, or physical counts and measurements, whereas implicit measures of automatic cognitions include latency pairing tasks, subliminal priming tasks, and word completion tasks (e.g., Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Gaertner & McLaughlin, 1983; Gilbert & Hixon, 1991; Greenwald et al., 1998; Payne et al., 2005; Wittenbrink et al., 1997). As in other issues of measurement, we do not intend to conflate a measurement with the construct it is intended to represent. Just as the results of an IQ test are not the same thing as one's intelligence, any implicit measure is just one way of assessing an implicit process.

Although more than twenty types of specific implicit measurement procedures have been used in social cognition research (Nosek, Hawkins, & Frazier, 2011; Uhlmann et al., 2012), two categories of latency measures dominate the measurement of implicit attitudes, stereotypes, and self concepts: 1) Implicit Association Test-inspired tasks (e.g., IAT, Single Category IAT, Go-No-Go Task), and 2) Priming-inspired Tasks (e.g., Affect Misattribution Procedure, Affective priming). Both types of these tasks rely on a Stroop like interference paradigm (i.e., classifying a stimulus on separate dimensions to gauge associations between related and unrelated concepts). Both of these also rely on computerized stimuli and recording of reaction processes. There are also paper and pencil measures of implicit associations that may be useful for researchers, including word completion tasks and the like (e.g., Johnson & Saboe, 2011; Johnson et al., 2010). These can be used without a technological platform, perhaps making them easier to use in some organizational applications and settings where the technology is neither reliable nor accessible.

2.1. Implicit Association Test

In IAT inspired tasks, participants complete several speeded categorization tasks on a computer and comparisons are made between congruent and incongruent categorization tasks. For example, in an implicit race attitude task to measure the strength of association between White and pleasant (and Black and Unpleasant), participants sort White faces, Black faces, pleasant words (e.g., diamond) and unpleasant words (e.g., filth) using just two response keys on a computer keyboard (usually the “E” and “I” keys as they are on the left and right hand sides of the keyboard). Thus, a right-handed correct response (“I”) represents a White face or a pleasant word and a left-handed correct response (“E”) represents a Black face or an unpleasant word. The implicit attitude is measured by the speed at which participants can sort words and pictures when White and pleasant share a response key as compared to when Black and pleasant share a response key. The strength of the implicit association is usually represented as a difference in average latencies when white and pleasant are paired vs. when black and pleasant are paired together on the same response key. Other variants of the IAT include: 1) the Go-No-Go Association Task (GNAT; Nosek & Banaji, 2001), which can use one or two categories, 2) a single category IAT (SC-IAT; Karpinski & Steinman, 2006), or Single Target IAT

(ST-IAT; Bluemke & Friese, 2008), and 3) a paper and pencil IAT (Lemm, Lane, Sattler, Khan, & Nosek, 2008). Trial IATs assessing a variety of common attitudes and stereotypes can be found at https://implicit.harvard.edu/implicit/.

The IAT is flexible in its application and can be used to assess a variety of attitudes and beliefs, an important consideration for organizational researchers concerned with a broad range of issues. For example IATs may measure an implicit attitude (White-pleasant/Black-unpleasant association) about a group. And while such attitudes may be important in some applications in an organization, the IAT can be adapted to assess other attitudes important in organizations that may represent implicit satisfaction or preference with an object like work, coworkers, supervisors, or the organization itself. For example, a measure of implicit work satisfaction can be developed by assessing latencies pairing words associated with work (e.g., job title, major duties and activities performed on the job) and pleasant words (e.g., sunshine), compared to words not associated with your work (e.g., other job titles and duties not a part of your job) and unpleasant words (e.g., filth, stink). Further, even implicit self-concept, usually focused on the personality trait self-esteem can similarly be adapted to assess the extent to which a person feels identified with a job, profession, or an organization. Here work words (e.g., job title, organization name, professional titles, etc.) can be paired with self words including a person's name, and pronouns used to identify the self (e.g., I, me, my, mine, etc.), and latencies can be compared to assess the extent a person implicitly aligns him or herself with or identifies with an organization.

Many types of attitudes, stereotypes, and prejudices important to human resources and organizational researchers can easily be assessed using implicit measures. For example, several implicit race attitude and prejudice measures have been linked to outcomes in hiring tasks (e.g., Derous, Nguyen, & Ryan, 2009; Yogeeswaran & Dasgupta, 2010; Ziegert & Hanges, 2005). In Derous et al. (2009) job suitability ratings were impacted by implicit anti-Arab bias; interestingly, the same relationship was not found using the explicit measure of prejudice. Similarly, results from Yogeeswaran and Dasgupta (2010) suggested those who held an implicit association of America and White tended to evaluate simulated resumes of Asian job candidates more negatively than white ones for a hypothetical security analyst position at the national security administration. Moving away from hiring and selection tasks, implicit gender and race attitudes and their relations to customer satisfaction were investigated by Hekman et al. (2010). In this paper, Hekman et al. (2010) found those with negative implicit race and gender attitudes evaluated women and nonwhite males significantly more negatively in customer satisfaction scores than white males. Further, implicit attitudes have been assessed about clientele populations being served and then linked to satisfaction and turnover intentions (von Hippel, Brener, & von Hippel, 2008). Specifically, von Hippel et al. (2008) found in a sample of nurses that negative prejudices about IV drug users mediated the relationship between stress and intentions to quit, beyond explicit measures of satisfaction and prejudice. Lastly, aspects of work satisfaction (e.g., coworker satisfaction, supervisor satisfaction) and their relationship to performance and citizenship behavior (Leavitt, Fong, & Greenwald, 2011) were also investigated using an implicit framework. Leavitt et al. (2011) demonstrated the combination of implicit and explicit work attitudes best predicted performance and citizenship behavior better than either the implicit or explicit measures alone. In sum, it is clear researchers are using a variety of implicit measures to investigate the broad array of phenomena of interest to organizational and human resources researchers.

The IAT, however, has most often been used as a measurement of implicit preferences such as implicit bias and implicit stereotypes, topics that may also be of great concern to organizational researchers and leaders. In an examination of 2.5 million IAT tasks, Nosek, Greenwald, and Banaji (2007) and Nosek, Smyth et al. (2007) demonstrated pervasive implicit biases. For example, they show that 68% of all people show an implicit bias in favor of Caucasians over African Americans, implicit preference for youth (80%) over age, implicit anti Muslim bias (50%) compared to several other groups, and an implicit bias against the disabled (76%). Nosek, Greenwald et al. (2007) and Nosek, Smyth et al. (2007) also demonstrated pervasive gender stereotypes connecting women with family and the arts, and men with careers in science and math (76%). Given all of these biases may relate in some way to anti-discrimination laws in the U.S., human resource professionals should be concerned about where these implicit stereotypes might impact judgment or behavior in organizations, potentially triggering litigation (Faigman, Dasgupta, & Ridgeway, 2007; Greenwald & Krieger, 2006; Jolls & Sunstein, 2006).

The IAT has been touted as less fakable than traditional attitude and self-concept measures (e.g., Banse, Seise, & Zerbes, 2001; Egloff & Schmukle, 2002; Fiedler & Bluemke, 2005; Kim, 2003; Steffens, 2004), an important consideration for researchers in organizations concerned with gathering accurate information about potentially sensitive topics like attitudes and stereotypes. Further, research suggests that participants rarely discover a faking strategy on their own (Cvencek, Greenwald, Brown, Snowden, & Gray, 2010), and even when participants try to fake response on an IAT, that faking can be identified and corrected. For example, Cvencek et al. have shown that subjects can fake responses to a gender identity task (me + woman) by making a slower response to a compatible block pairing (for women: me + woman). Cvenecek and colleagues were able to identity this slowing by comparing faking and non-faking subjects and then statistically correct this slowing by removing variability from the implicit measure. Furthermore, this faking could also be identified and corrected without the use of specific faking instruction and could be identified between people who are more and less motivated to provide a faking response (e.g., convicted sex offenders vs. non-offenders).

2.2. Priming inspired tasks

Many of the priming techniques in implicit measurement such as Sequential Priming and Semantic Priming appear superficially similar to Lexical Decision Tasks (LDT). In the classical Lexical Decision Task (Meyer & Schvaneveldt, 1971) people are instructed to classify stimuli as words or non-words; categorization speed is enhanced by word frequency and familiarity. In Sequential Priming Tasks (e.g., Fazio et al., 1986; Wittenbrink et al., 1997) participants are presented a subliminal prime (e.g., the word “Black” is flashed subliminally on a computer screen) followed immediately by a target word to be categorized (e.g., “athletic”). Participants are instructed to categorize the target as a word or non-word as in the LDT. Other variations have participants categorize words as

pleasant or unpleasant. A measure of association strength can be assessed for implicit attitudes (e.g., "Black" → "pleasant") as well as implicit stereotypes (e.g., "Black" → Athletic"). For example, Wittenbrink et al. (1997) showed that Black primes (i.e., the word "Black") facilitated the identification of stereotype-congruent words (i.e., athletic, aggressive, poor) more than did White primes.

Self-attitudes (e.g., esteem, self identity) can also be measured in this way. For example, Spalding and Hardin (1999) subliminally primed subjects with self-words (e.g., me, myself) and then instructed them to respond to words (e.g., proud, good, ashamed, bad) as positive or negative. Implicit self-esteem was not related to explicit self-esteem (as Greenwald & Farnham, 2000 also show), but each type of self-esteem predicted different behaviors. Low implicit self-esteem predicted nonverbal anxiety in an interview situation and explicit self-esteem predicted self-handicapping behavior. A person's sense of self-esteem is often thought related to leadership capability (Schoel, Bluemke, Mueller, & Stahlberg, 2011) as well as the capability to learn and change in response to organizational change and restructuring (e.g., Pierce & Gardner, 2004).

In a variant of Semantic Priming, the Affect Misattribution Procedure (AMP; Payne et al., 2005) is another approach to measure implicit attitudes. In this procedure an object expected to evoke an affective response (e.g., alcohol, cigarettes) is presented subliminally before a novel, abstract stimulus (e.g., Chinese character). The subject's task is to evaluate if the novel stimuli has either a positive or negative meaning; thus, subjects project an evaluation from the subliminal object onto the novel stimuli. The implicit attitude is then measured by the difference between the evaluation of a target stimulus and the evaluation of a neutral stimulus. For example, Payne et al. (2005) demonstrated that people with conservative attitudes were more likely to rate novel stimuli as pleasant when the novel stimuli were preceded by a George Bush stimulus (rather than a John Kerry stimulus).

2.3. Paper and pencil implicit measures

Computers are not necessary for implicit measurement, so impromptu measures can be developed and used to assess group processes and attitudes without much technology and planning. For example, in word completion task paradigms, participants complete word stems (i.e., words with missing letters) as an indirect measure of thoughts and feelings. For example, in an experiment investigating the activation and application of stereotypes, Gilbert and Hixon (1991) used word completion tasks to see if stereotyping had been activated (e.g., R I _ _ for RICE in response to an Asian research assistant). These types of measures are flexible to measure implicit self-attitudes as well. Implicit self-esteem has been measured by assessing the degree to which people prefer the initials in their name (also known as the Name Letter Effect; Nuttin, 1985). The Name Letter Effect predicts brand choices with people preferring brands that start with the initials of their names (Hodson & Olson, 2005). More surprisingly, people are more likely to work for companies that share initials with their own (Anseel & Duyck, 2009) and are more likely to go into professions that resemble their first names (Phil the photographer, Dennis the dentist; Pelham, Mirenberg, & Jones, 2002). It is possible that matches between an employee's implicit self-concept and one's workplace may either enhance commitment to an organization or perhaps facilitate another's perceptions of worker fit within an organization.

A paper and pencil IAT can measure implicit associations in similar ways to the computerized version (Lemm et al., 2008). Instead of timing the response to each stimulus, participants are given a time limit to categorize items presented in the middle of a page. As in the IAT, items vary between target and concept (e.g., picture, pleasant word, unpleasant word, White face, Black Face, unpleasant word). Participants mark the left or right side of the page to indicate a left or right hand response. Participants sort items under time limits (e.g., 20 seconds) in several different sorting blocks (as when White and pleasant share a right sided response compared to when Black and pleasant a response) and the number of correct items completed in time allowed is used as the response. As in the computerized IAT, the measure of implicit association is calculated as the difference between blocks of sorting tasks. Lemm et al. (2008) show that the paper IAT was superior to the computerized IAT on effect size and test-retest reliability. The paper and pencil type tests might actually be easier in some regard to administer to assess various diversity attitudes in organizations or associations about new products and services in development by an organization.

Recently, paper and pencil measures have been used to assess implicit self-concept and its relationship to workplace behaviors. For example Johnson and Saboe (2011) had individuals complete word fragments to either represent an independent or interdependent orientation (U N I _ _ _; UNIQUE = independent, UNITED = interdependent). Those individuals with a more independent implicit self-concept were more likely to engage in counterproductive work behaviors. Further analysis indicated that implicit self-concept was a superior predictor of supervisor rated criteria such as task performance, citizenship, and counterproductive behavior. It is possible that implicit self-concept appears to be one determinant of behavior that explicit self-concept does not measure. However, at a basic level, it is important to understand theoretical underpinnings of implicit measurement to develop workable hypotheses about implicit cognition-behavior linkages.

3. How automatic and controlled cognition may contribute to behavior

A number of models of cognition separate aspects of cognitive processes and pose alternative pathways by which implicit cognition may impact behavior. Among these are the: 1) dual process models that differentiate automatic and controlled processes, 2) associative cognition models that discuss different memory systems and their potential impact on behavior, and 3) motivation and opportunity as determinants (MODE) models that suggest moderating meta-cognitive variables that link aspects of cognition to behavior.

3.1. Dual process

From the dual process perspective, two modes of thought affect cognition, behavior, and emotion (e.g., Chaiken & Trope, 1999). One cognitive process is a direct, deliberative, controlled, and conscious mode of thought, and the second is an automatic mode of thought based on associations. The distinction in implicit cognition between controlled and automatic processes align with measurement approaches where traditional measurement approaches (e.g., questionnaires, interviews) might be characterized as tapping more explicit, processed judgment and responses, and implicit approaches discussed above tap more automatic, unconscious processes. Although these two cognitive processes operate simultaneously, they operate differently and may give rise to different behavior.

The early work linking dual process cognitions to behavior took a strong form of the dual process claim where implicit measures gave rise and should be related to automatic behaviors (i.e., those below awareness), and explicit measures gave rise to and should relate to more deliberative behavior such as judgments requiring reflection (e.g., Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997). For example, McConnell and Leibold (2001) demonstrated that automatic African-American prejudice (assessed using a latency-based implicit cognition task) was related to Whites' nonverbal discomfort (i.e., behavioral leakage) when interacting with a Black confederate than with a White confederate. Furthermore, Dovidio, Kawakami, and Gaertner (2002) showed that a priming measure of implicit prejudice predicted nonverbal friendliness, and a self-report measure of anti-Black prejudice was related to guilt judgments of American defendants. This research was put forth as evidence that implicit and explicit attitudes are part of the same overall, sometimes ambivalent attitude, but that the different processes give rise to different types of behavior. According to a strong form of the dual process approach (e.g., Wilson, Lindsey, & Schooler, 2000) the implicit component of an attitude is more likely expressed than the explicit component of the attitude when cognitive capacity is low. In an organizational context, many situations may be there to strengthen the expression of an automatic attitude over an explicit one as when people are rushed or under stress and their over-learned, possibly biased habits, prevail.

Dual process ideas linking implicit and explicit measures to outcomes pose interesting theoretical and practical questions for organizations. If a manager, for example, has to fill a position in an organization, a number of decisions and cognitive activities are involved in determining job specifications, assessing the existing talent pool, reviewing resumes, interviewing candidates, and making a final judgment to offer the position to an applicant. Throughout this process, implicit and explicit cognitions are operating in tandem and may influence different aspects of the judgment process. Deciding what to look for in a resume may be a deliberate cognitive process focused on competencies and experience levels. Contrarily, looking over resumes and evaluating candidates may be influenced by other information contained in the resume such as a candidate's gender or the assumed ethnicity indicated by surname, that is processed automatically. Recent research has supported the idea that implicit measures of prejudice do impact simulated job suitability ratings, (e.g., Derous et al., 2009; Yogeeswaran & Dasgupta, 2010); however more research is needed like Rooth (2009), which linked implicit measures to biases in actual selection tasks to determine the extent of real world effects.

3.2. Association vs. Rule

Several other models have built on the dual process approach to take into account two separate memory systems and how individuals use information to evaluate their beliefs. According to several models such as the Associative Propositional Evaluation Model (APE Model; Gawronski & Bodenhausen, 2006), the Reflective Impulsive Model (RIM; Strack & Deutsch, 2004), and the work of Smith and DeCoster (2000), automaticity and control are best understood in terms of associative and propositional mental processes originating from two types of memory (i.e., one slow to form, one fast to form, respectively). In general, associative processes are largely affective in nature and while they are acquired slowly through repeated pairings, attitudes formed through associative pairings often have spontaneous effects on behaviors and judgment without regard to whether or not they are valid. By contrast, propositional processes require reasoning, are acquired more quickly, and have their effects when one desires to evaluate the truth or falsity of a belief or attitude. For example, one may have made associations between “male” and “leader” from cultural stereotypes and experiences that connect men with power more often than women. These repeated pairings may lead one to have a more favorable reaction to a male boss over a female boss. However, if conscious attention is directed at this preference (perhaps through training and other experiences with supervisors) a correction process can occur and override the habit of preferring men for leadership and supervisory positions compared to women. This conscious attention could be the drive behind diversity training programs.

Associative-propositional models are also of interest to human resources researchers because they make specific statements about how beliefs and attitudes are not only formed, but also changed. For example, because implicit associations take longer to form and are more like habits, they may be more difficult to change. Explicit, declarative statements are more controllable and may be susceptible to change from direct education. However, if rules and propositions are repeated, they can affect implicit attitudes and may form as the repeated rules create new automatic associations over time. For organizations, this model suggests that the direct educational route for creating change in attitudes, stereotypes, and prejudices in organizations may be more effective in altering employees' explicit attitudes, as measured by knowledge tests or direct assessments, than their implicit attitudes, which are more resistant and may take longer to change.

3.3. Motivation and opportunity

According to Fazio's (1990) Motivation and Opportunity as Determinants (MODE) model, the expression of an implicit process or explicit process depends on two moderating factors: (a) Are people motivated to consciously reflect on their attitudes? and (b) do

they have the opportunity to engage in reflection? That is, when people are motivated and have the time to carefully evaluate their attitudes, there will be a strong connection between declared attitudes and behavior. Fazio proposes that implicit attitudes will affect deliberative processing when people have low motivation and there is not sufficient opportunity. As a result, automatically activated attitudes can determine both subtle (e.g., nonverbal) as well as controlled responses (e.g., self-reported attitudes, and preferences). Fazio argues that when individuals are in the presence of an attitude object, automatic processes affect early perception and attention and may have many "downstream consequences" on behavior—especially when cognitive resources are depleted. That is, automatically activated attitudes are activated early in the judgment process (upstream) and are able to direct selective attention and information search. As a consequence, these implicit attitudes affect declarative, explicit judgments (downstream). According to the MODE model, automatically activated attitudes would be most critical in understanding organizational function when the moderators of motivation and opportunity are not present. In the context of organizations, recognizing implicit work attitudes – such as satisfaction – could be one of the upstream causes of work behavior. Recent results from Leavitt et al. (2011) suggest implicit satisfaction is in fact a predictor of performance and citizenship behavior, thus lending support to this idea.

Although several models of cognitive-behavior linkage are seen in the literature, it remains clear the relationships between thought and behavior are complex. Although each model suggests somewhat different pathways linking cognition and behavior, research supporting the efficacy of one approach over another is less conclusive. The complexity of looking at these linkages in organizations, although interesting from a theoretical perspective, may not be as useful to researchers more interested in the extent these measures predict relevant, real-world behavior. Further, the extent implicit and explicit measures can be used, both separately and in conjunction with each other, to predict important organizational outcomes remains the central issue for many applied researchers. Thus, regardless of which model or combination of models proves superior, questions of the predictive and incremental validity of implicit measures remain an important concern for applied researchers interested in improving the experience of people in organizations.

4. Predicting behavioral outcomes using implicit and explicit measures

The ability to predict behavioral outcomes is important and remains challenging in organizational behavior and human resource management regardless of whether you use implicit, explicit, or multiple measures. To this end, several strategies have been used to assess the relative usefulness of these measures of automatic cognitive processes to predict specific behavioral outcomes: additive, incremental, double dissociation, moderator, and multiplicative strategies.

First, one can simply investigate the predictive validity of an implicit measure as compared to an explicit measure on an outcome, and see which measure has greater predictive value. In a meta analysis reviewing 122 IAT studies on diverse topics such as political choice, race attitudes, and sexuality, Greenwald, Poehlman, Uhlmann, and Banaji (2009) showed that the average correlation was higher for explicit measures ($r = .36$) than the implicit measures ($r = .27$) and that the implicit–explicit correlation was .21. (c.f. $r = .38$, Nosek, 2007; $r = .24$, Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). Thus, across most content, explicit measures may be stronger predictors of criteria than an implicit measure across attitude types using the IAT. There are many examples, however, of how implicit measures add value in prediction, particularly in regards to socially sensitive topics such as race and other intergroup biases. For example, automatic race attitudes had a .24 correlation with behavior as compared with a .12 correlation for explicit measures. Using partial correlations, Greenwald and his colleagues confirm that the "IAT and self report measures each predict criterion variance that was not predicted by the other." (p. 30, Greenwald et al., 2009).

Other research indicates the incremental validity of implicit measures. For example in a measure of trait affectivity, Johnson et al. (2010), showed that implicit associations between self to negative affect were powerful predictors of supervisor rated counterproductive work behaviors in ways that explicit measures of self-concept were not. Another investigation revealed the incremental validity of an implicit measure, or how implicit measures add to the predictive validity of a behavior above and beyond an explicit measure. This approach can tell you how much an implicit measure affords a researcher explanatory power. In the Greenwald et al. (2009), meta-analysis, he and his colleagues showed that a Black-White IAT bias predicted discomfort during racial interaction. A race IAT predicted black white interactions at $r = .24$ while explicit questionnaire self-report measures only predicted it at $r = .19$. The authors suggest that social sensitivity (race and group relations) hampers an explicit measure's utility and improves an implicit measure's criterion validity.

There are situations when implicit measures predict automatic behaviors and explicit measures predict deliberate behaviors; this is also known as the double dissociation pattern and is favored by many with a strong dual process approach. For example, Purugini (2005) showed that an implicit preference for fruit over snacks determined spontaneous choice behavior, whereas the explicit preference determined deliberately stated preferences. Furthermore, in an implicit measure of self-shyness, Asendorpf, Banse, and Muecke (2002) showed that implicit self-shy associations predicted spontaneous behaviors (e.g., body posture and tension), whereas explicit measures of self-shyness contributed to more controlled shyness behaviors (e.g., speech patterns).

A moderation strategy identifies the conditions under which an implicit measure will predict a behavior. This approach has been most popular in the last ten years of implicit measurement. Extensive research has shown that various situational and individual factors affect the expression of implicit process on behavior. For example, implicit measures are capable of predicting behavior when individuals are in a promotion focus state (i.e., focusing on gains rather than loses; Florack, Friese, & Scarabis, 2010), have impaired processing time (Friese, Wänke, & Plessner, 2006), have consumed alcohol (Hofmann & Friese, 2008), or are under a high cognitive load (Friese, Hofmann, & Wänke, 2009). In the context of organizations Ziegert and Hanges (2005) showed that implicit racial attitudes best predict employment discrimination when there is a climate of discrimination and when people are low in motivation to control prejudice. Derous et al. (2009) similarly identified cognitive workload and client contact as

moderators of implicit attitude and job rating suitability bias in a hiring task. Thus, it may be important for organizations to know about people's motivations as well as the environment in which work is conducted as critical moderators of implicit bias on behavior in organizations.

There are also times when implicit and explicit processes work together in a multiplicative way to give rise to behaviors—perhaps when people feel ambivalent. For example, Jordan, Spencer, Zanna, Hoshino-Browne, and Correll (2003) showed that people who have high explicit self-esteem (using a questionnaire measure) but low implicit self-esteem (measured with an IAT) showed the highest levels of narcissism, in-group bias, and defensive behavior. In a similar multiplicative approach, those individuals who have high implicit aggression (as measured by a Conditional Reasoning Task) but low explicit self reports of aggression are most likely to be passive aggressive in their interactions with others (Frost, Ko, & James, 2007). Thus, the multiplicative approach where one investigates the combined and unique effects of implicit and explicit processes together to understand is most similar to Winter, John, Stewart, Klohnen, and Duncan's (1998) channeling hypothesis. This hypothesis links the combination of implicit motives and explicit personality traits to outcomes and may be particularly useful in organizations where traits (e.g., conscientiousness) and organizational processes and norms (e.g., disruptive innovation) may be in conflict with one another.

5. Conditions in organizations that promote automatic processes

Day to day work experiences and the way organizations typically operate may be prime grounds for the expression of automatic cognitive processes and the biases that may result from implicit attitudes, stereotypes, or other prejudices. Research has found that implicit processes are involved in our reactions to others, our behavior towards others, our perceptions and impressions of others, as well as judgments that we make. For example, research has linked implicit attitudes to intergroup bias indicated by nonverbal friendliness and social distancing (e.g., Dovidio et al., 2002; McConnell & Leibold, 2001) that one might observe in public settings (e.g., Lambert et al., 2003) such as work. People may see others as unfriendly and be less likely to contribute to groups and teams because they feel unwelcome as a result of subtle social distancing behavior.

Another reason, as noted previously, when people are rushed or stressed, automatic processes may prevail over controlled processes. Any profession where decisions need to be made quickly (e.g., finance, law enforcement) may want to explore how implicit associations guide such split second decisions such as buy/sell, shoot/don't shoot and how they impact lives and financial or personal loss. Weapons or Shooter Bias (Correll, Park, Judd, & Wittenbrink, 2002) shows that when subjects are instructed to *shoot* at armed Black or White targets and *don't shoot* at White or Black unarmed targets, there is a racial bias in speed and accuracy. That is, people are generally faster and more accurate when responding to *shoot* at an armed Black man (as compared to an armed White man); the reverse is also true: people are faster and more accurate with *don't shoot* decisions when an unarmed target is a White man (as compared to an unarmed Black man). Shooter Bias is strongest when people have an automatic Black-weapons associations (Glaser & Knowles, 2008) and the Shooter Bias occurs with both college students as well as trained police officers; however, with training this bias can be overcome (Correll et al., 2007). To the extent that almost all work situations compel quick decision-making, stress, or overloaded attentional resources, at one time or another, it is likely that automatic processes may be present and operating.

Implicit attitudes also affect how we form impressions of others, an important factor in the hiring, promotion, and evaluation processes. For example, McConnell, Rydell, Strain, and Mackie (2008) showed that a perceiver's implicit group attitude (e.g., race, weight, attractiveness) can outweigh explicit behavioral information presented about a target. More specifically, when an implicit attitude was negative and the behavior was positive, negative impressions prevailed (the reverse was also true). Rooth (2009) also showed that implicit measure of bias (IAT) in favor of Swedish relative to Arab was associated with whether or not an HR professional called back a Swedish job applicant as compared to an Arab job applicant.

In sum, it is clear that research does demonstrate that implicit measures do assess something, and do predict many things, although the extent to which their prediction is unique or incremental to explicit measures is less well understood. From this, the challenge becomes the answer to the question: As we dig deeper into attitudes, thoughts, and cognitions, can we also dig deeper into organizational theory and behavior to improve effectiveness? Although implicit measurement may be a promising approach to assessing phenomena of interest to organizational researchers, this approach is not without criticism. A substantial body of research has developed in recent years critiquing the approach and findings from this research. Understanding this literature is important to researchers starting to use these measures in organizational settings to ensure constructs are assessed appropriately and research questions answered in ways that lead to more research, instead of piling higher the criticism of these studies and measures. In this light, we see critiques of implicit measures as ways to improve this technique and apply it to real world settings.

6. Piling it higher: criticism of implicit measures

Despite the evidence that automatic processes may guide behaviors and judgment processes in certain situations, the measures used to assess automatic processes are debated on several grounds. These include: potential limitations of implicit measures' predictive validity, the use of an arbitrary metric, confounding of methodology with the process, assessments of cultural associations rather than intra-individual associations, and questions regarding the number of constructs behind implicit measurement. We would like to note that caution regarding the use and meaningfulness of implicit measures parallels the advice and caution when constructing explicit measurements such as how one develops questions, chooses response options, or determines scaling on a survey or explicit measure. Alternatively, the pile up of these criticisms may be used in order to further and fuel the debate about the utility of

implicit measurement in organizations. We also look to the challenge to empirically address these criticisms and address purported weaknesses in implicit assessment.

6.1. An arbitrary metric

Blanton and Jaccard (2006) have argued that implicit measures, especially the IAT, use an arbitrary metric. The arbitrary metric argument rests on the interrelatedness between constructs, measurement, and reality: (a) constructs are not directly observable (i.e., are latent) (b) we infer behaviors based on how individuals score on a measurement, and (c) this numerical score allows researchers to describe where an individual stands on the construct. Blanton and Jaccard argue that these numbers are arbitrary because not enough is known how the score truly maps on to a particular place on the construct. More specifically, they argue that because implicit measures are relative to the other scores in the sample, researchers do not have a firm understanding of what the absolute meanings of those scores mean for the construct in any particular study. However, they also argue that metrics can have additional meaning if these numbers are consistently associated with real world events or use a known groups design to represent high and low responders. In the context of organizational behavior high or low scorers on an implicit measure of work satisfaction must be understood in terms of how the measure actually relates to actual observable effort or specific behavioral outcomes. However, even if a person likes or dislikes his or her work, production quotas, work standards, and technology may not allow altering production standards leading to null findings.

6.2. Attitude–behavior linkages

A related concern is that predictive validity may also be lowered when the implicit measure is constructed in a way that it is too general to be connected to a specific behavior. Weak attitude behavior linkages have often been a problem in social psychology (e.g., Ajzen & Fishbein, 1977) and more general measures of implicit process may not map on well to specific work-related behaviors. Some of these criticisms parallel the attitude–behavior problem addressed over thirty years ago (Ajzen & Fishbein, 1977) when attitudes were shown to be weak predictors of behavior until moderators (e.g., attitude strength, strength of situation, specificity of attitude) were addressed. Greenwald et al. (2009) showed that correspondence between an implicit measure and a behavioral outcome is a significant moderator of the relationship between IAT and behavior across all content types. For example an implicit measure of general satisfaction with work (work + positive) may not be good to predict turnover intentions or maladaptive work-related behaviors as well as implicit attitudes about the specific features of one's job (e.g., teaching + positive for professor or teacher).

6.3. Extra personal associations

Implicit measures have been argued to assess both aspects of the person as well as the environment (Fazio, 2007). Termed the "extrapersonal associations," or the "culture vs. person" problem (Karpinski & Hilton, 2001; Olson & Fazio, 2004), implicit measures of automatic process may assess larger cultural knowledge rather than endorsement of that consensus. For example, Devine (1989) showed that both high and low prejudice people are equally knowledgeable and have equal activation of stereotypes—an indication of cultural knowledge rather than endorsed attitudes. However, Devine also showed that low prejudice individuals are able to inhibit stereotypical responding; this difference suggests that it may be less about the representation of the implicit attitude and more about how one manages the attitude expression. However, many implicit measures may tap into extra personal associations – not endorsed opinions – and it may be more useful to assess how and when people are able to control their implicit attitudes rather than the extent to which people hold implicit associations.

6.4. No process pure measures

There are no process pure measures. In other words, a measure assesses the construct as well as method-related variables. This issue is important as it relates to the construct validity of implicit measures—if two measures (one implicit, one explicit) supposedly measuring the same construct do not strongly correlate with one another, are they truly assessing the same construct? To address this issue Payne, Burkley, and Stokes (2008) varied the degree of structural fit (the degree of methodological similarity) of implicit and explicit measures. They showed that as structural fit increased, the correlation between explicit and implicit measures also increased. One reinterpretation of the dissociation between the outcomes of explicit and implicit measures (i.e., double dissociation) is that the structural differences in the measures themselves created the dissociated outcomes (e.g., Fazio, 1990; Gawronski et al., 2007). In addition to increasing structural fit some methods, such as structural equation modeling, have been used with success to separate method-related variance from assessments of the construct (e.g., Cunningham, Preacher, & Banaji, 2001).

6.5. Convergent or discriminant validity?

There is mixed evidence that different implicit measures converge with one another. For example, Cunningham et al. (2001) investigated the psychometric properties of the IAT, response window IAT, and an evaluative priming method (with response window) over time. Results showed that the three implicit measures were highly correlated with one another as a measure of implicit bias. Bosson, Swann, and Pennebaker (2000) showed greater inter-item consistency within implicit measures of self-esteem but lower inter-measure consistency. It is likely that low convergent validity among implicit measures is due to either procedural

differences in the implicit measurements and/or content differences of the implicit measures. For example, evaluative priming is strongly influenced by the stimuli used in the procedure while the IAT is more strongly affected by how the stimuli relate to the categories (Fazio & Olson, 2003). One would expect the implicit measures to correspond with one another to the extent that they measure the same content. For example, measures of an implicit attitude (IAT-attitude, AMP, Semantic priming) should share more variance when they assess implicit attitudes (vs. implicit stereotypes). To support this line of reasoning, Amodio and Devine (2006) showed no correlation between a race attitude IAT and a race stereotype IAT ($r = .06$); this lack of correlation supports the idea that implicit measures that assess conceptually different constructs (in this case implicit stereotyping vs. implicit evaluation) should not be strongly associated with one another.

6.6. How many constructs?

A possibly endless debate in the literature focuses on the constructs underlying implicit and explicit attitudes. Typically, any new measure must withstand tests of both discriminant and convergent validity with other known measures of the construct. In the early theorizing of implicit measures, some researchers supported a dual construct approach advocating that implicit and explicit attitudes represent different constructs that are separated by a lack of awareness (e.g., Greenwald & Banaji, 1995), or that are differentiated by the amount of cognitive effort required (Wilson et al., 2000). In support of this view, Nosek and Smyth (2007) used a multitrait–multimethod approach (Campbell & Fiske, 1959) and had participants complete explicit and implicit measures across seven topics. Using structural equation modeling, their analyses demonstrated that a two attitude model fit the data better than a single attitude model—even when the relationships between implicit and explicit measures were strongly correlated. Other researchers have favored a unitary construct approach where any differences between implicit and explicit measures are due to the processes used to obtain those measures (i.e., there are no process pure measures). The unitary construct approach has been favored by the MODE model (Fazio & Olson, 2003) that proposed a match between implicit and explicit measures when people are unmotivated and unable to control thoughtful processing. Greenwald and Nosek (2009) claimed that the question regarding the number underlying representations as "unresolvable" (p. 80) and that even those who adhere to a unitary approach (Fazio & Olson, 2003) must concede to two processes being involved.

In sum, implicit measures as well as explicit measures do predict outcomes of interest to organizational researchers. Although not without criticism, implicit measurement provides alternative ways to assess attitudes, stereotypes, and prejudices across a range of organizational phenomena. One issue holding many researchers back from using these measures is the different choices that have to be made as well as technical issues involved in getting such a research approach started. Below is a brief discussion of the literature to assist researchers interested in using these methods to determine which approach or approaches to use to study implicit processes in organizations.

7. Methods and advice for using implicit measures

From this review it is clear that we see promise in using implicit measures, despite limitations, and see research in labs and organizations as essential to further develop theory and raise opportunities to dig deeper and ultimately enhance organizational functioning. Despite the complexity of the cognitive processes involved in understanding the measurement of these constructs, the development and use of these approaches is now relatively straight forward.

7.1. Materials

The programs for running several types of implicit measurements such as for AMPs, GNATs, IATs, LDTs can be downloaded from Draine's Inquisit Software site at http://www.millisecond.com/download/samples/. In addition, Anthony Greenwald provides many useful resources at his website as well at http://faculty.washington.edu/agg/ such as generic IAT tasks and SPSS and SAS syntax to analyze results. Keith Payne also posts examples of his AMP task on his website at http://www.unc.edu/~bkpayne/materials.html. Although Inquisit is a fee based software, there is a free trial available. With computing expertise implicit tasks, such as the IAT, can be programmed in Visual Basic. Further, Uhlmann et al. (2012) provide a more extensive review of numerous implicit measures beyond the scope of this paper should a researcher be interested in selecting a specific measurement approach in a given situation, including paper and pencil and other techniques.

7.2. Choosing an implicit measure

If resources are available, implementing several implicit and explicit measures is preferable for further validation of these measures. In addition, some implicit measures may be more appropriate for tasks than others. For example, an AMP is more appropriate when a researcher is interested in attitudes that reflect liking or disliking such as job satisfaction, commitment, ingroup cohesion, and implicit bias toward an outgroup after a merger or reorganization. It would also be expected that an AMP would be correlated with an attitude IAT as both assess the implicit association between positive-negative and some construct (e.g., work, social group). The AMP would be less useful in understanding implicit personality traits because many traits vary on valence; an AMP measure of personality traits could mistakenly measure implicit self-esteem instead of implicit self-concept or personality.

An IAT would be best suited for understanding implicit stereotyping and implicit prejudice in an organization and how it is affected by training programs (e.g., before and after) because it is flexible and resistant to faking unlike many existing explicit

measures. The IAT is also connected to a decade of research in stereotyping and prejudice. If the concept does not have an obvious contrast (e.g., Black vs. white, work vs. home) a single category IAT (SC-IAT) may be used. Sequential and semantic priming are also very useful in measuring implicit associations and should be considered as well. In addition, developments in the Balanced Identity Design (Greenwald et al., 2002), where individuals complete three implicit association tasks (e.g., me-work, work-positive, me-positive), could extend theory in work satisfaction, commitment, and turnover intentions. However, some other organizational constructs that are not dualistic may be better served by non-IAT tasks. For example, items like the "*not me*" category in the IAT may distort attitudes because it is less familiar. Organizational self-esteem (my company-good) that may underlie the job satisfaction–job performance link (Bowling, 2007), may be measured more successfully by using priming tasks such as an Affect Misattribution Procedure (e.g., Payne et al., 2005) due to confounds inherent in not-me categories.

Paper and pencil measures would be desirable if access to technology is limited or unavailable. Johnson and his colleagues' work (Johnson & Lord, 2010; Johnson & Saboe, 2011; Johnson et al., 2010) may help guide organizational researchers in the area of implicit self-concept in independence and interdependence, implicit trait affectivity, and implicit self-concept changes in response to injustice. The paper–pencil IAT (Lemm et al., 2008) may also be effective for assessing work- related attitudes such as positive work associations. One note of caution, however, is that although paper–pencil implicit measures (e.g., Johnson & Saboe, 2011) may appear easier to use, considerable effort and time validating the word stems is needed to develop high quality measures.

Uhlmann et al. (2012) take these ideas further and develops a taxonomy that among other things reviews numerous implicit measures and their measurement qualities (i.e., reliability, validity, faking), task characteristics (e.g., flexibility, adaptability), and practical concerns in using them (e.g., cost, administration), as a way to assist researchers in selecting which implicit measures to use and where their use may provide greatest benefit. This "clearinghouse" taxonomy also attempts to provide links between implicit measures and criteria based on the extent and type of association and interpretation (Uhlmann et al., 2012). Organizational researchers can use these ideas as well as the ones presented in this paper to guide research on organizational and human resources issues.

7.3. Constructing implicit measurements

We offer several words of caution when constructing implicit measures. The choice of items can affect the construct validity of the measure. For example, a researcher intending to measure an implicit stereotype (Black-athletic; White-smart) could inadvertently select valence unmatched items such that one category is more positive than the other. When the two categories are not matched in valence in an IAT, that IAT may assess implicit attitudes in addition to implicit stereotypes (see Haines and Sumner (2006) for further discussion). In addition, Govan and Williams (2004) indicated that stimuli with multiple meanings can allow for a redefinition of how people think about the categories. For example, Mitchell, Nosek, and Banaji (2003) used Black athletes and White politicians as exemplars in an race attitude IAT and found that the typical race effect was reversed because people liked the athletes and disliked the politicians. However, DeHouwer (2001) showed that the category labels themselves may often be more important than the exemplars. In the context of organizational behavior one may inadvertently assess implicit self-esteem when assessing work-me associations if the work items are more positive in valence than the non-work items. Word choice can also affect how the paper and pencil tasks such as the word stems are constructed. For example, researchers would want to check word stems for frequency of use and familiarity to control for these effects (Dahl, 1979). Graf and Williams (1987) provide the typical responses to many word stems that may help researchers in choices of word stems.

If a researcher does use multiple measures, counterbalancing among measures is desirable. Order effects (order in which compatible and incompatible task are presented) sometimes occur with the IAT; when the compatible pairing is presented first, it strengthens the difference between compatible (e.g., Black-negative) and incompatible (Black-positive) tasks (Nosek, Greenwald et al., 2007). Increasing practice for the second set of trials is one method to reduce this effect (Nosek, Greenwald et al., 2007; Nosek, Smyth et al., 2007). In addition, administering several of the same implicit (such as the IAT) measures reduces the strength of the IAT effect for some of the implicit measures in the group (Greenwald, Nosek, & Banaji, 2003). Thus, singling out one of these as an individual difference measure may not be appropriate under these conditions. However, Bluemke and Friese (2008) were able to measure implicit attitudes (with several Single Target IATs) towards multiple political parties in Germany, and the order in which people completed their implicit preferences for five political parties did not compromise one of the implicit measures to predict voting intentions.

In sum, organizational and human resources researchers have many choices in planning and conducting research regarding important organizational phenomena. The research, resources, and thinking presented here, coupled with a good understanding of criticisms of this research paradigm, can help us select and use these alternative implicit tools to assess attitudes, stereotypes, and prejudices in organizations. Using these tools may not only help us understand implicit cognition better, but also help us understand judgment and social processes in organizations, and how these can be improved and changed to benefit both people and the organizations that employ them.

8. Conclusion

Implicit measures offer an additional method for assessing organizational constructs and potentially shedding light on slippery constructs such as work self-concept or attitude change in response to training. While there has been considerable discussion of the meaning and application of implicit measures (Landy, 2008), including the conditions where they will predict behavior, and their usefulness above and beyond explicit measures, the theoretical and conceptual advantages are still being debated. At the same time,

some of the concerns regarding the utility of implicit measurement should not focus solely on a simple association model where an implicit measure of an organization outcome such as turnover, job satisfaction, or worker evaluation.

Instead, we believe that the best way to address the "implicit measure issue" is to routinely ask finer-tuned questions. Among these are: Is it possible that automatic processes affect constructs that are of interest to my organization? When norms are strong to report a particular response (e.g., I learned a lot during training, I view social groups equally, I love my job), is it possible that an implicit measure may be a helpful complement to an explicit measure? Are the known moderators of the relationship between automatic process and behavior, such as motivation or cognitive load, routinely present in my organization? Should I be mindful of just the added effects that an implicit measure may "buy me," or can I also explore the possible multiplicative effects that occur when implicit and explicit thoughts are at odds with one another? These questions might motivate organizational researchers to look beyond the known validity and reliability of implicit measures, and to begin investigations of these second generation questions (Nosek et al., 2001). In sum, by digging deeper into thoughts, attitudes, and cognitive processes of individuals, we may pile higher our understanding of the behavior of people in organizations, and perhaps the behavior of organizations themselves.

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