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**DEVELOPMENT AND VALIDATION OF IMPLICIT MEASURES OF  
ORGANIZATIONAL CLIMATE**

A Master's Thesis

Presented to

The Graduate College of  
Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree  
Master of Science, Psychology

By

Kailey Ann Meyer

May 2020

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# **DEVELOPMENT AND VALIDATION OF IMPLICIT MEASURES OF ORGANIZATIONAL CLIMATE**

Psychology

Missouri State University, May 2020

Master of Science

Kailey Ann Meyer

## **ABSTRACT**

Organizational climate is the shared perceptions that employees hold about their experiences in the workplace. The current research on organizational climate relies upon explicit (self-report) measures, which can be contaminated by impression management and inaccurate self-knowledge artifacts. This research used Implicit Association Test (IAT) procedures to develop implicit measures of selected aspects of organizational climate. The study examined the relationships of the implicit organizational climate measures with theoretically related explicit measures according to a multitrait-multimethod design. A series of confirmatory factor analyses of latent trait models were used to assess convergent and discriminant validity evidence. While results provided some construct validity evidence for the implicit measures, future research might focus upon developing implicit measures with better psychometric properties and exploring the potential incremental predictive validity of these measures.

**KEYWORDS:** organizational climate, role, supervisor, implicit measures, Implicit Association Test, confirmatory factor analysis

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A Master's Thesis  
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May 2020

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In the interest of academic freedom and the principle of free speech, approval of this thesis indicates the format is acceptable and meets the academic criteria for the discipline as determined by the faculty that constitute the thesis committee. The content and views expressed in this thesis are those of the student-scholar and are not endorsed by Missouri State University, its Graduate College, or its employees.

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## INTRODUCTION

One may wonder how individuals conceptualize and organize experiences that occur within the workplace. The idea of organizational climate addresses these issues. Although the idea of organizational climate is not new, some research has indicated that it is not well understood (Hellriegel & Solcum, 1974). Because of this, organizational climate has been an increasingly popular topic to research within the last half-century, especially during the first decade of this century (Schneider, Gonzalez-Roma, Ostroff & West, 2017).

James and Jones (1974) suggest that when individuals in an organization have shared perceptions of meaningful experiences, it makes sense to talk about the psychological climate of the organization. James and James (1989) developed a model that can be used to examine the meaningful experiences that individuals have within the workplace. This model is a multidimensional hierarchical conceptual framework for explicit psychological climate measures (self-report climate scales). Schneider et al. (2017), provide a comprehensive definition of organizational climate, which is,

“a summary perception derived from a body of inter-connected experiences with organizational policies, practices and procedures (e.g., from leadership and HR practices, and so forth) and observations of what is rewarded, supported and expected in the organizations with these summary perceptions becoming meaningful and shared based on the natural interactions of people with each other” (p. 468).

In essence, organizational climate can be viewed as the Gestalt of one’s perceptions and experiences formed from one's work environment (Schneider et al., 2017). Organizational climate is a construct that is seen as a relatively enduring aspect within an organizational setting (Pritchard & Karasick, 1973).

James and James' (1989) multidimensional hierarchical model consists of four domains, which were derived through exploratory factor analysis. The four domains of this model are leader support and facilitation, role stress and lack of harmony, job challenge and autonomy, and workgroup cooperation, warmth and friendliness (James & James, 1989). This model was developed using a diverse set of work settings, which makes this four-factor model particularly useful in the sense that it provides evidence of invariance across diverse work settings (James & James, 1989).

All four domains in this model can be further partitioned into more narrowly focused constituent dimensions. Job challenge and autonomy consists of three components: job autonomy, job importance, job challenge and variety (James & James, 1989). Jones and James (1977) broadly define job challenge as “the extent to which a job gives the individual a chance to use his skills and abilities” (p. 31).

Work group cooperation, warmth and friendliness is composed of workgroup cooperation, responsibility for effectiveness, and workgroup warmth and friendliness (James & James, 1989). Jones and James (1977) defined workgroup cooperation as “an atmosphere in which there is cooperative effort among individuals to carry out difficult tasks” (p. 33).

Research has established that leadership is an important aspect of an organization's climate (Kozlowski & Doherty, 1989; Likert, 1967; Litwin & Stringer, 1968). In James and James' (1989) model, the leader support dimension consists of five facets: hierarchal influence, psychological influence, leader trait and support, leader interaction facilitation, and leader goal emphasis and facilitation. The current research will focus on leader support, without breaking down the subsections provided within the model. Jones and James (1977) define leader support as “the extent to which the leader is aware of and responsive to the needs of his subordinates. [It

involves] behavior which enhances someone else's feelings of personal worth and importance" (p. 31). This includes the perception an employee has of the leader helping accomplish necessary work goals through activities such as planning, scheduling, and providing personal support (Jones & James, 1977).

Leadership can be seen in multiple forms and can include aspects of good or poor leaderships styles. Two poor leadership styles may consist of behaviors that foster perceptions of someone as being a disengaged leader or a hostile leader. Kelloway, Sivanathan, Francis and Barling (2005) state that leadership is abusive when "individuals in a formal leadership role engage in aggressive or punitive behavior towards their employees" (p. 91). This type of leadership style may emerge in different capacities and can range in severity from acts of name calling to even job loss (Kelloway et al., 2005). Likewise, passive leadership is destructive (Kelloway et al., 2005; Skogstad, Einarsen, Torsheim, Schanke & Hetland, 2007). Skogstad et al. (2007) explored this idea and found that laissez-faire leadership is related to role conflict and role ambiguity, which is another component of James and James' (1989) multidimensional climate model.

According to James and James (1989), the role stress and lack of harmony dimension of the model consists of five separate components including role ambiguity, role conflict, role overload, submit conflict, organization identification, and management concern and awareness. While all these components are important, the current research will focus on role conflict and role ambiguity. Schuler, Aldag and Brief (1977) provided a conceptualization for both role conflict and role ambiguity. To do so, Schuler et al. (1977) examined the factor structure of role conflict and role ambiguity based on the role conflict scale developed by Rizzo, House and Lirtzman (1970). Consistent with results from Rizzo et al. (1970), Schuler et al. (1977) supported

a two-factor model, with the factors being named role conflict and role ambiguity. Jones and James (1977) defined role conflict as “the presence of pressure for conflicting or mutually exclusive behaviors” (p. 31). Jones and James (1977) define role ambiguity as “the extent to which a task is unclear in its demands, criteria, or relationships with other tasks” (p. 31). These definitions provided by Jones and James (1977) are similar to the ones provided by Rizzo et al. (1970) and Schuler et al. (1977).

### **Importance of Organizational Climate**

Research findings on organizational climate are impactful for both the organization and the individual (Ostroff et al., 2012). Babin and Boles (1996) found that employee perceptions have an influence on stress and job satisfaction. Additional research has examined the relationship between organizational climate, role stress, and job satisfaction. Thakre and Shroff (2016) and discovered that when employees report experiencing a favorable organizational climate, they have lower role stress when compared to employees that report they experience a less favorable organizational climate. Even further, organizational research has demonstrated that organizational climate influences an employee’s intention to stay with the organization (Shanker, 2014) and their engagement in organizational citizenship behavior (Organ, 1988). Therefore, aggregated individual perceptions are important to understand for organizational outcomes (Schneider et al., 2017).

Schneider (1974) suggests that organizational climate can influence the strength of the relationship between individual differences and job performance/satisfaction. In particular, he found that job-related knowledge, skills, abilities and other attributes (KSAOs) were better predictors of job performance and satisfaction in in some organizations than others. The

KSAO—performance/satisfaction relationships were stronger in organizations where there was supportive leadership, coworker unity/cooperation, autonomy and an emphasis on development. Consequently, interventions that attempt to change the KSAO profile of a workforce by improving basic HR functions involving selection or training will have greater impact on the organization's overall effectiveness if the climate reflects Schneider's four attributes. Therefore, it is useful to know whether the climate is conducive to amplifying and sustaining the impact of HR interventions before investing in the effort. If an organization is low on these dimensions, it represents a climate that is likely to dampen the impact an HR intervention may have and it may be more beneficial for the organization to invest in interventions that target changing the climate rather than its HR practices.

Additional research has shown how climate can moderate KSAO—performance/satisfaction relationships. Andrews (1967) and Litwin and Stringer (1968) found that climate moderates both the strength of motivation – performance and motivation – satisfaction relationships. Dunnette (1973) found that equity perceptions and performance-contingent reward perceptions moderate the strength of ability – performance relationships.

### **Measurements of Organizational Climate**

The best way to measure organizational climate has been the subject of considerable debate within the literature. In the 1970s, research became more focused on different ways to measure climate, and what might be related to the construct (Schneider et al., 2017). Glick (1985) argued that organizational climate should be defined in broad terms, rather than individual psychological units of analysis, as a way of defining the organizational environment for individuals' actions. Another argument posed by Jones and James (1974) contends that

organizational climate should be measured as an aggregation of perceptions held by employees in the workplace. James and Jones (1974) conducted a review on the predominant theories, definitions, and research of organizational climate. They found that there are three ways in which organizational climate can be measured. They described these as the “multiple measurement-organizational attribute approach,” the “perceptual measurement-organizational attribute approach” and the “perceptual measurement-individual attribute approach” (p. 1096 – 1097).

The multiple measurements – organizational attribute approach involves measuring organizational climate as a set of attributes with a variety of methods. The primary methods James and Jones (1974) highlighted included field studies and experimental designs. Additionally, much of the research on this approach adopted a broad definition, making it difficult to untangle the difference between an organizational attribute and organizational climate (e.g., Forehand & Gilmer, 1964; James & Jones, 1974).

Perceptual measurements – organizational attribute approached measured climate based upon perceptions (James & Jones, 1974). An area of concern with this approach is that definitions for organizational structure variables (e.g., span of control) and organizational climate variables (e.g., autonomy) are not clearly distinct. Furthermore, this approach focused on perceptions of organizational processes and characteristics, although it can be argued that these are individual attributes (James & Jones, 1974).

Perceptual measurement – individual attribute approach can be described as a summary of the perceptions of the individual within the organization (James & Jones, 1974). There are two important components to this approach: the perceived event and the climate perceptions constructed from those events. The summary of interactions between the two components is considered organizational climate. The primary difference between this approach and perceptual

measurement – organizational attribute approach is that the perceptual measurement – individual approach examines climate as an individual attribute, whereas perceptual measurement – organizational attribute approach views climate as an organizational attribute (James & Jones, 1974). Much of the work with this approach has stemmed from Schneider and his colleagues (James & Jones, 1974).

Hellriegel & Slocum (1974) noted that most organizational climate research consists of “structured perception questionnaires” (p. 257). Specifically, these measures rely on individuals endorsing, denying or evaluating explicit statements about meaningful experiences in the workplace. However, there may be times where individuals do not fully report their true perceptions about the organizational climate. In some instances, individuals may engage in impression management tactics in order to gain favor or avoid undesirable consequences. Impression management, as defined by Learly and Kowalski (1990) is “the process by which individuals attempt to control the impressions others form of them” (p. 34). When asked how supportive their supervisor is or if they are experiencing role conflict, employees may want to paint a more favorable situation than what they are experiencing. Implicit measures have a long history of being used to address the contaminating effects that impression management can have on explicit measures.

### **Implicit Cognition**

Implicit cognition refers to cognitions that one is unaware of and therefore cannot self-reflect upon or self-report (Greenwald & Banaji, 1995). Greenwald and Banaji (1995) describe that although implicit cognitions are not remembered or able to be self-reported, they may still impact performance. An attitude is defined by Greenwald and Banaji (1995) as a favorable or

unfavorable feeling towards an object (e.g. person, place, idea). In other words, an attitude involves the association between beliefs and emotions toward targets (e.g., social objects), which in turn lead to behavioral predispositions. An implicit attitude is defined as “introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feelings, thought or action toward social objects” (Greenwald & Banaji, 1995, p. 5).

Greenwald, Banaji, Rudman, Farnham, Nosek and Mellot (2002) developed the Unified Theory of Implicit Social Cognition as a way of explaining how implicit and explicit cognitive processes jointly influence the way we think, feel and act. In some respects, James and James’ (1989) climate model reflects these cognitive theories or models of attitudes. The James and James (1989) model involves the *self* (the person) and the *organizational climate dimension* (attribute). The Unified Theory of Greenwald et al. (2002) would argue that a person’s attitudes regarding meaningful work experiences is a function of both explicit and implicit cognitive processes. Furthermore, as is the case with a person’s attitudes about social groups, there is a potential for dissociation between implicit and explicit measures of these attitudes.

### **Implicit Association Test**

The Implicit Association Test (IAT) was developed by Greenwald, McGhee and Schwartz (1998) to measure social attitudes (e.g., racial preference and stereotyping). Since the development of the IAT by Greenwald and colleagues over 20 years ago, it has been used to measure many psychological attributes other than attitudes related to social groups (Lane, Banaji, Nosek & Greenwald, 2007). Additional IAT research has expanded to explore the implicit attitudes towards homosexuality (Banse, Seise, & Zerbes, 2001), gender stereotypes (Dasgupta & Asgari, 2004), self-esteem and gender self-concept (Greenwald & Farnham, 2000), integrity

and character (Fischer & Bates, 2008), psychopathy (Fischer, Stassen, Thomas & Willis, 2015), Big 5 personality traits (Steffens & Konig, 2006), shyness (Asendorpf, Banse & Mucke, 2002), emotional intelligence (Oberdiear, Fischer, Fiscus, Willis, Stassen & Miles, 2016) and more (Lane et al., 2007). Perhaps, one of the most interesting aspects of the IAT is its ability to reveal associations that are different from those explicitly reported, either verbally or written (Lane et al., 2007). Consequently, many studies have explored the association or disassociation between implicit and explicit measures (Lane et al., 2007).

Ziegert and Hanges (2005) explored and attempted to replicate findings from Brief and colleagues (2000) about the role of implicit attitudes in a climate for racial bias. Ziegert and Hanges (2005) used the implicit race IAT developed by Greenwald et al., (1998) to examine implicit attitudes and explicit race scales. Results indicated a difference in the implicit and explicit measures of race. Furthermore, Ziegert and Hanges (2005) found that implicit racism interacted with climate for racial bias, which in turn predicted discrimination. Ziegert and Hanges (2005) specifically noted "...when individuals were given a business justification for racial discrimination their implicit racists attitudes were related to their discriminatory behavior" (p. 561). In some respects, this research highlights the importance of not relying exclusively on explicit measures to reveal attitudes about climate characteristics within an organization (Schneider et al., 2017).

The IAT is a procedure used to measure one's automatic associations between set categories and attributes (two categories and two attributes; Greenwald et al., 1998; Lane et al., 2007). These automatic associations are measured by examining reaction times on classification tasks where the participant sorts stimuli into category--attribute pairs by pressing a letter on the keyboard. The labels for the two category--attribute pairs are displayed in the upper left and

upper right corners of the screen. The sorting task occurs when stimuli are presented one at a time in the middle of the screen. Participants press the “e” or “i” key depending on whether the stimulus item belongs in the category or attribute on the left (“e”) or in the category or attribute on the right (“i”). The time it takes to classify the items into paired categories is used to measure the strength of the association between the paired attribute and category. The faster and more accurately the stimuli are sorted, the stronger the association between the category and attribute. Whereas the slower and less accurate the sorting of stimuli, the weaker the association between the concepts (Lane et al., 2007).

Perhaps the most well-known example of an IAT is the one described in the article where the method is introduced (Greenwald et al., 1998). The flower-insect IAT assesses attitudes toward flowers and insects. In this IAT the two categories were flowers and insects, and the two attributes were pleasant and unpleasant. Participants sorted examples of flowers (e.g. rose) and insects (e.g. bee), along with examples of pleasant words (e.g. wonderful) and unpleasant words (e.g. crash). This IAT used a seven-block procedure. The first block was used to familiarize the participant with the two categories and their corresponding stimuli (see Table 1.). The participant pressed the “e” or “i” key, according to whether the stimulus item was a flower or an insect. Block two was used to familiarize the participants with the attributes and their stimuli, where the “e” or “i” key was pressed depending upon whether the stimulus item was a pleasant or unpleasant word. Block three and four are more complex in that each category was paired with an attribute. In the compatible pairing, flowers are combined with pleasant (left side pair) and insects are combined with unpleasant (right side pair). Although both blocks three and four involve the same pairings, block three is called a practice block and block four is called a test block. The side of the screen to which the attributes are assigned is switched in block five.

Pleasant is moved to the right side of the screen and unpleasant is moved to the left side of the screen and participants practice the new assignments by pressing the “e” or “i” key accordingly as stimulus items (pleasant and unpleasant words) are presented. Blocks six and seven are called the incompatible because flowers are paired with unpleasant words and insects are paired with pleasant words. The IAT score (also referred to as the IAT effect) is a function of the difference between the mean response times for the compatible and incompatible pairings. The greater the difference in the mean response times, the stronger the automatic association between the compatible paired concepts (flowers + favorable and insects + unfavorable; Greenwald et al., 2003, Lane et al., 2007).

Table 1. Schematic Overview of the Implicit Association Test

Block	Left Key (“e”)	Right Key (“i”)
1*	Flower	Insect
2*	Pleasant	Unpleasant
3*	Flower + Pleasant	Insect + Unpleasant
4**	Flower + Pleasant	Insect + Unpleasant
5*	Unpleasant	Favorable
6*	Flower + Unpleasant	Insect + Pleasant
7**	Flower + Unpleasant	Insect + Pleasant

\*Practice Blocks; \*\*Test Blocks

Another type of IAT is called the single target IAT, which does not include two categories like the standard IAT (Karpinski & Steinman, 2006). The single-target IAT is similar to the standard IAT in that it measures the response latencies on classification tasks. However, it

consists of a single-target category which is paired with two attributes. The single-target IAT is useful for assessing associations where a referent group isn't available for creating compatible and incompatible category—attribute pairs (Bluemke & Friese, 2008). The standard IAT consists of seven trial blocks, whereas the single-target IAT consists of five trial blocks. Like the standard IAT, the first block is to familiarize the participant with the two attributes (e.g., good or bad) and their corresponding stimuli. The participant presses the “e” and “i” key depending on whether the stimulus item was good (e.g. marvelous) or bad (e.g. tragic). Block two is used as a practice block to familiarize the participants with the animal targets and their stimuli (e.g. sheep) and the attribute-target pairing. The target animal names are paired on the right side of the screen with the attribute “good”. The same attribute-target pairing is used in block three, however, this is a test block. The side of the screen to which the target is assigned is switched in block four. Animal names are now paired with “bad” which is located on the left side of the screen. Block four is considered the practice block and block five is the test block. See table 2 for the schematic overview of the single target IAT by Karpinski and Steinman (2006). For the current research, four single-target IATs were developed, two IATs assessing leader support and two IATs assessing role conflict.

The IAT has often been used in conjunction with explicit measures of psychological attributes (Greenwald et al., 1998, Greenwald et al., 2007). Results from these studies have highlighted the potential for association and dissociation between the implicit and explicit measures. Greenwald suggests that dissociation may occur because of either impression management or inaccurate self- knowledge artifacts (Greenwald et al., 2002). Specifically, Greenwald et al., (1998) discussed that a unique property of IATs may be that it “may reveal attitudes and other automatic associations even for participants who prefer not to express those

attitudes” (p. 1464). For example, an employee may not express the way she really feels about how supportive her supervisor is because she does not want to be identified as a disgruntled employee. Alternatively, an individual’s self-awareness may not be a true representation of how that person will behave in relevant situations. For example, a person may sincerely (explicitly) define themselves as one who is not prejudicially biased (e.g., against African-Americans), but exhibit prejudicial behavior when interacting with others (e.g., when evaluating African-American candidates for jobs; Zierget & Hanges, 2005). The current study seeks to examine the association between explicit and implicit measures of organizational climate attributes. The study will investigate the construct validity of the implicit measures of organizational climate using a multitrait-multimethod (MTMM) design (Campbell & Fiske, 1959).

Table 2. Schematic Overview of the Single Target Implicit Association Test

Block	Left Key (“e”)	Right Key (“i”)
1*	Good	Bad
2*	Good + Animal	Bad
3**	Good + Animal	Bad
4*	Good	Bad + Animal
5**	Good	Bad + Animal

\*Practice Blocks; \*\* Test Blocks

## Hypothesis

It is hypothesized that IAT measures for selected organizational climate attributes (leader support and role conflict) will be related to corresponding explicit measures of these attributes

(evidence of convergent validity). It is also hypothesized that the measures of different climate attributes will be unrelated (evidence of discriminant validity). Finally, it is hypothesized that method factors will account for additional variance, so that the best fitting model for the MTMM data will include four factors – two climate factors (leader support and role conflict) and two method factors (explicit and implicit). These hypotheses will be tested using the hierarchical confirmatory factor analysis procedure (CFA) described by Widaman (1985).

## METHOD

### Sample

Approval from the Institutional Review Board (IRB) at Missouri State University was received on December 7, 2018 (Study #: IRB-FY2019-343; See appendix A for IRB approval letter). Participants were recruited from the psychology department's online human subject pool system (i.e., SONA Systems). Students ( $N = 153$ ) self-elected to participate in this study and received participation credit through the SONA system. An a priori power analysis indicated that the sample size exceeds the size necessary for adequate power (.80), given a hypothesis of close fit ( $H_0$ : RMSEA = .05) and the alternative hypothesis of poor fit ( $H_A$ : RMSEA = .10) (MacCallum, Browne & Sugawara, 1996).

### Explicit Measures

**Index of Supervisor Support.** Developed by Ko, Frey, Osteen and Ahn (2015) to examine perceptions of supervisor support, items were rated on a 4-point Likert scale ranging from (1) strongly disagree to (4) strongly agree. Example items of this scale include "My supervisor recognizes when I do a good job" and "My supervisor is responsive to my needs when I have family or personal business to take care of." The Cronbach's alpha was .90. See Appendix B for the full scale.

**Role Conflict and Ambiguity Scale.** This scale was developed by Schuler, Aldag and Brief (1977) to measure the role conflict and role ambiguity that one may experience within the workplace. This scale consisted of two subscales: role conflict and role ambiguity. All items

were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Schuler et al., (1977) tested the internal consistency of the scale six times with different samples and all alphas met the criteria established by Nunnally (1978). An example item of role conflict is “I do things that are apt to be accepted by one person and not accepted by others.” An example item of role ambiguity is “I know exactly what is expected of me.” The Cronbach’s alpha for role conflict was .79 and the alpha for role ambiguity was .77. See Appendix C for the full scale.

**Work Environment Scale.** This measure was developed by Insel and Moos (1972) to assess the climate within a work environment. This measure is composed of 10 subscales; however, for the purpose of this research, only two of the subscales were included; supervisory support and role clarity. Items were rated either “true” or “false”. Example items of the supervisory support subscale were “Supervisors tend to talk down to employees (reverse scored)” and “Supervisors really stand up for their people.” Sample items of role clarity included “Things are sometimes pretty disorganized (reverse scored)” and “The details of assigned jobs are generally explained to employees.” The Cronbach’s alpha for supervisor support was .57, and role clarity was .66. See Appendix D for the full scale.

**Demographic measures.** Demographic questions assessed a participants’ gender, age, race/ethnicity, and years of work experience.

### **Implicit Measures**

This study developed four IATs based on the four-factor climate model developed by James and James (1989). These measures were developed in accordance with the guidelines provided by Lane et al. (2007) using software provided by Millisecond, Inc. The implicit

measures developed for the purpose of this research included four single target IATs following the five block guidelines outlined in Greenwald, Nosek and Banaji (2003). A series of IATs were pilot tested using the scoring procedure provided by Greenwald et al. (2003) and Lane et al. (2007) in order to obtain measures that exhibited desirable psychometric properties (lower error rates for stimuli classification, acceptable internal consistency and inter-individual variance). All IATs were developed using mono-color as opposed to the standard color IATs. Mono-color IATs were used because the sorting tasks becomes easier when colors are involved. A participant may end up sorting words based on color rather than the words' semantic value. See tables 3 - 6 for a list of the attributes and targets for each of the four single-target IATs developed.

A series of pilot tests were used to examine combinations of categories and attributes used to construct each of the four IATs. Three pilot tests examined the psychometric properties of the four IAT measures under development ( $N = 35$ ,  $N = 33$ ,  $N = 26$ ). From each pilot test, changes were made to the attribute labels and target labels based upon statistics comparing the mean classification error rates, IAT score variances, and internal consistency coefficients. These were then used to create the final set of the four IATs used to examine organizational climate.

Table 3. Category Labels and Word Stimuli for Single – Target Role Conflict IAT

Conflict	Harmony	Employment
Stress	Balance	Work
Dispute	Unity	Task
Friction	Agree	Job
Hostility	Peace	Office

Table 4. Category Labels and Word Stimuli for Single – Target Role Ambiguity IAT

Ambiguous	Clear	Employment
Vague	Known	Work
Confuse	Certain	Task
Uncertain	Explicit	Job
Questionable	Definite	Office

Table 5. Category Labels and Word Stimuli for Single – Target Supervisor Disengaged IAT

Supportive	Disengaged	Supervisor
Support	Ignore	Supervisor
Helpful	Indifferent	Boss
Respect	Uncaring	Manager
Assistance	Disregard	Administrator

Table 6. Category Labels and Word Stimuli for Single – Target Supervisor Hostility IAT

Supportive	Mean	Supervisor
Support	Attack	Supervisor
Helpful	Rude	Boss
Respect	Hostile	Manager
Assistance	Mean	Administrator

## **Procedure**

Upon entering the testing room, participants were visually and orally presented with the informed consent statement. In order to prime participants to begin thinking about their employment setting, the informed consent stated, “When responding to all items, we want you to be thinking about the last few months of your current or most recent employment.” See Appendix E for the full text of the informed consent statement.

Once participants agreed to participate, they began the study by clicking on the link which opened the Millisecond software. The study began with four demographic questions, followed by two mono-color single-target IAT measures (i.e. role conflict and hostile supervisor). A set of explicit measures followed in this order: Supervisory Support (Ko et al., 2015), Work Environment Scale Role Clarity (Insel & Moos., 1972), Role Ambiguity (Schuler et al., (1977), Role Conflict (Schuler et al., 1977), and Work Environment Scale Supervisor Support (Insel & Moos, 1972). The final two mono-color single-target IAT measures then followed the explicit measures (i.e. role ambiguity and disengaged supervisor). Once participants completed the questionnaire they were thanked for their time and told they could exit the testing room. The researchers decided to break up the four IAT sets into two sets in hopes of reducing mental fatigue and boredom due to the monotonous task of pressing alternate “e” and “i” keys. The data was analyzed using SPSS and the AMOS package.

## **Data Analysis**

Confirmatory factor analysis (CFA) model comparisons were used for data analysis. Widaman (1985) developed a procedure to assess convergent and discriminant validity of traits

in a MTMM study. To do so, changes in fit statistics between successive pairs of models are analyzed. The comparisons begin with the least restrictive model (Model 1) where the factors intercorrelate freely. The following models, which are more restrictive in alternative ways, are compared to Model 1.

The least restrictive model in this study is portrayed in Figure 1. For this model, there are two freely correlated method factors (e.g., implicit and explicit), and two freely correlated trait factors (e.g., supervisor support and role clarity). Model 2 represents two freely correlated method factors and no trait factors (see Figure 2). This model is more restrictive than the initial model because it does not include the trait factors. Model 3 consists of two freely correlated method factors and perfectly correlated trait factors (see Figure 3). Model 4 represents two uncorrelated method factors and freely correlated trait factors (see Figure 4). Model 5 contains perfectly correlated methods factors and freely correlated trait factors (see Figure 5).

It is a common experience to obtain inadmissible solutions in initial CFA analyses of data from MTMM designs (Byrne, 2010; Marsh, 1989). This can often be managed by imposing constraints on estimates that are problematic (i.e., variance estimates that are negative). When efforts to achieve an admissible solution for the hypothesized model (Model 1) using this method proved unsuccessful, the explicit measures were parceled (Matsunaga, 2008). Two indicator variables were created for each explicit measure by deriving a score based on the measure's even-numbered items and one for its odd-numbered items. This procedure produced an admissible solution without imposing other constraints for the hypothesized model (and all subsequent models). The parceled measures are indicated by an "A" or "B" suffix to the original scale in the appropriate tables below.

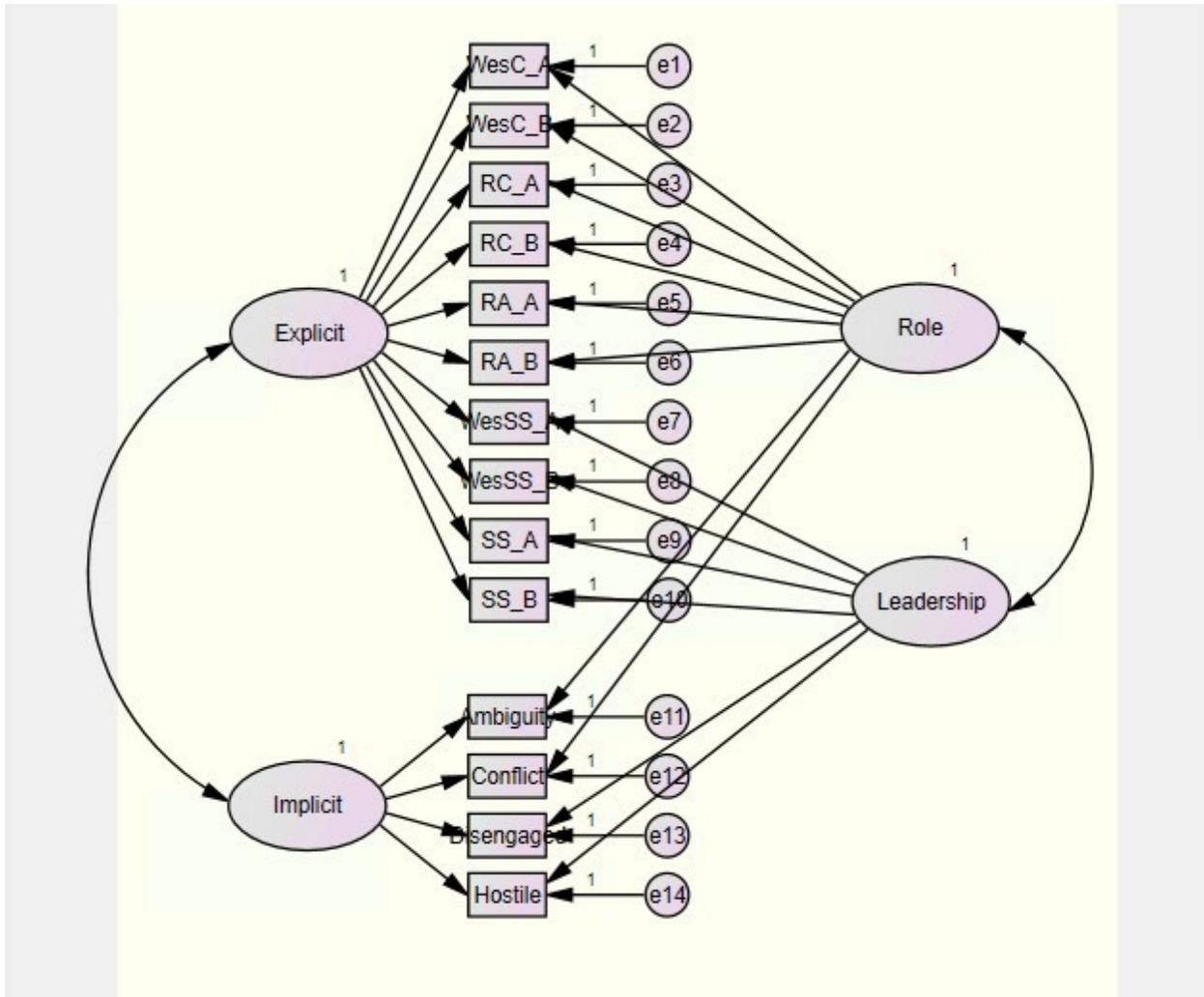


Figure 1. CFA Model 1: Two Freely Correlated Method Factors and Two Freely Correlated Trait Factors

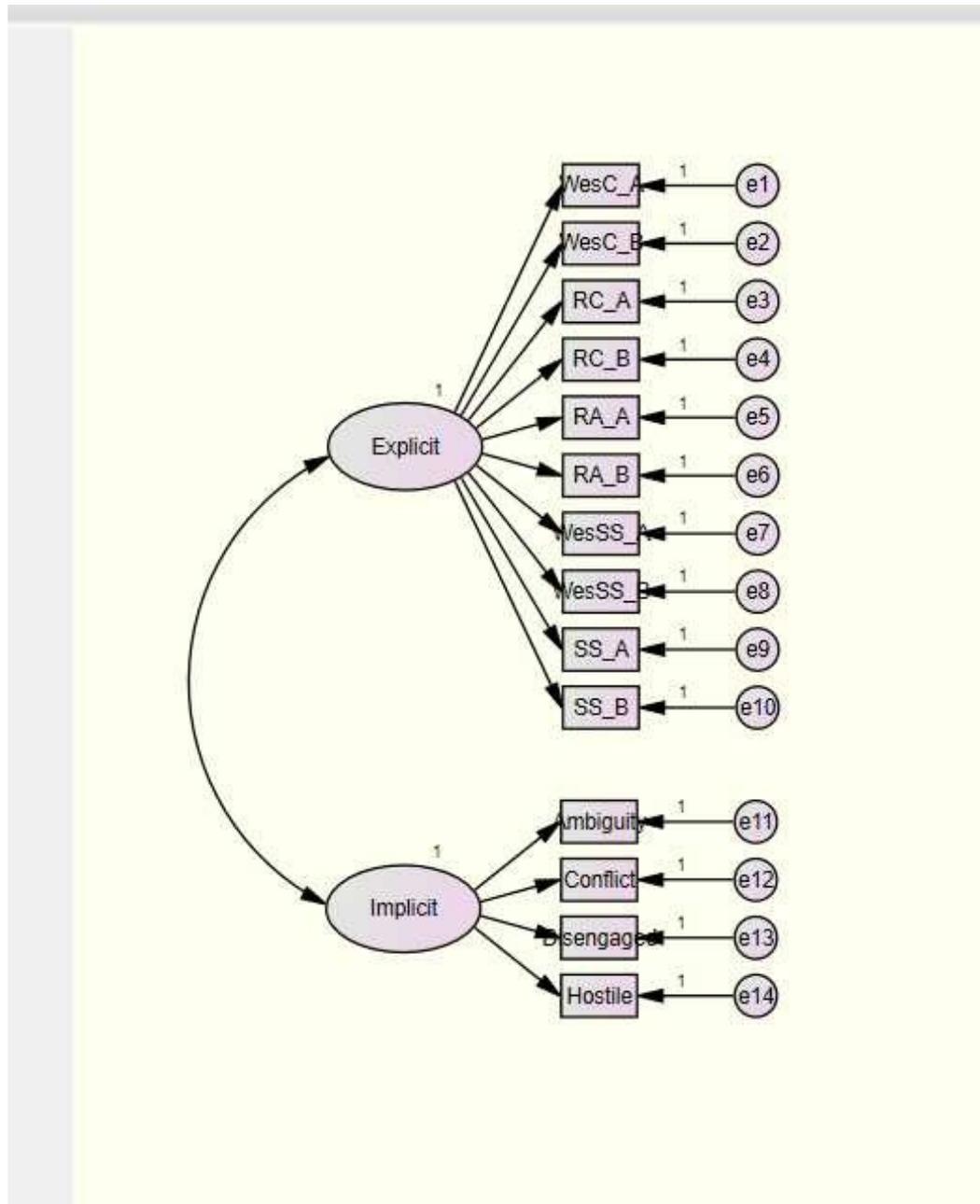


Figure 2. CFA Model 2: Two Freely Correlated Method Factors and No Trait Factors

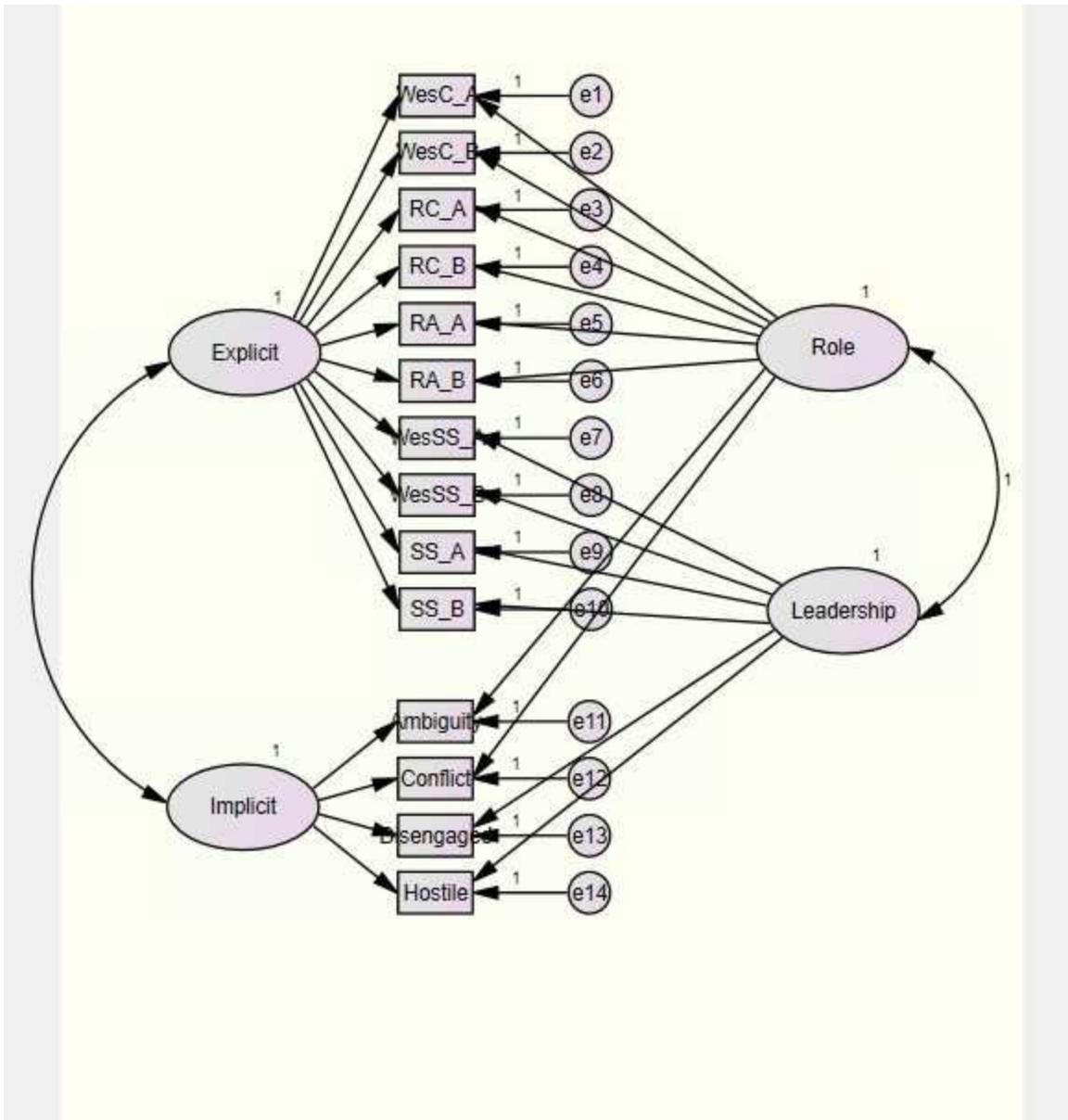


Figure 3. CFA Model 3: Two Freely Correlated Method Factors and Two Perfectly Correlated Trait Factors

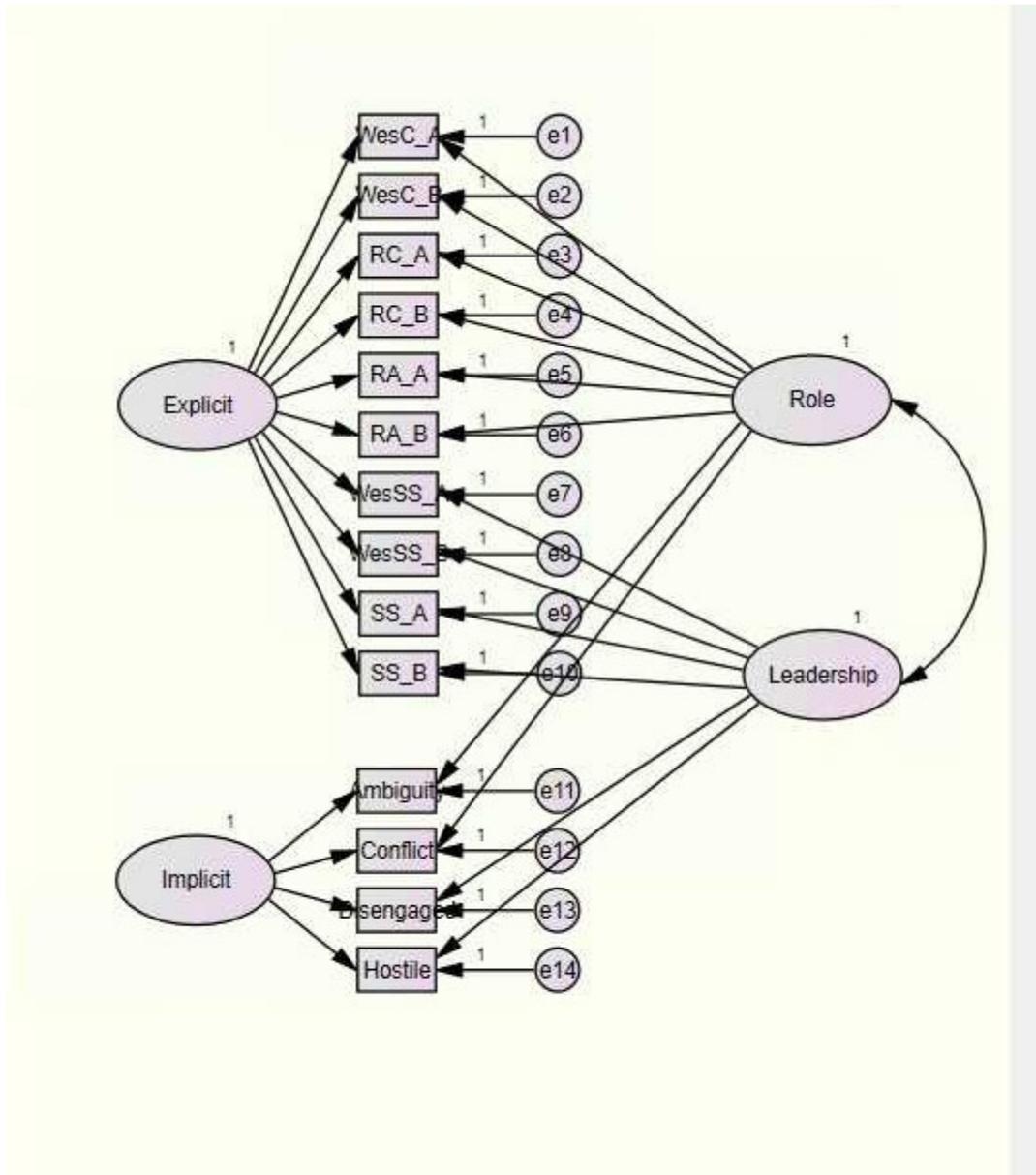


Figure 4. CFA Model 4. Two Uncorrelated Method Factors and Two Freely Correlated Trait Factors

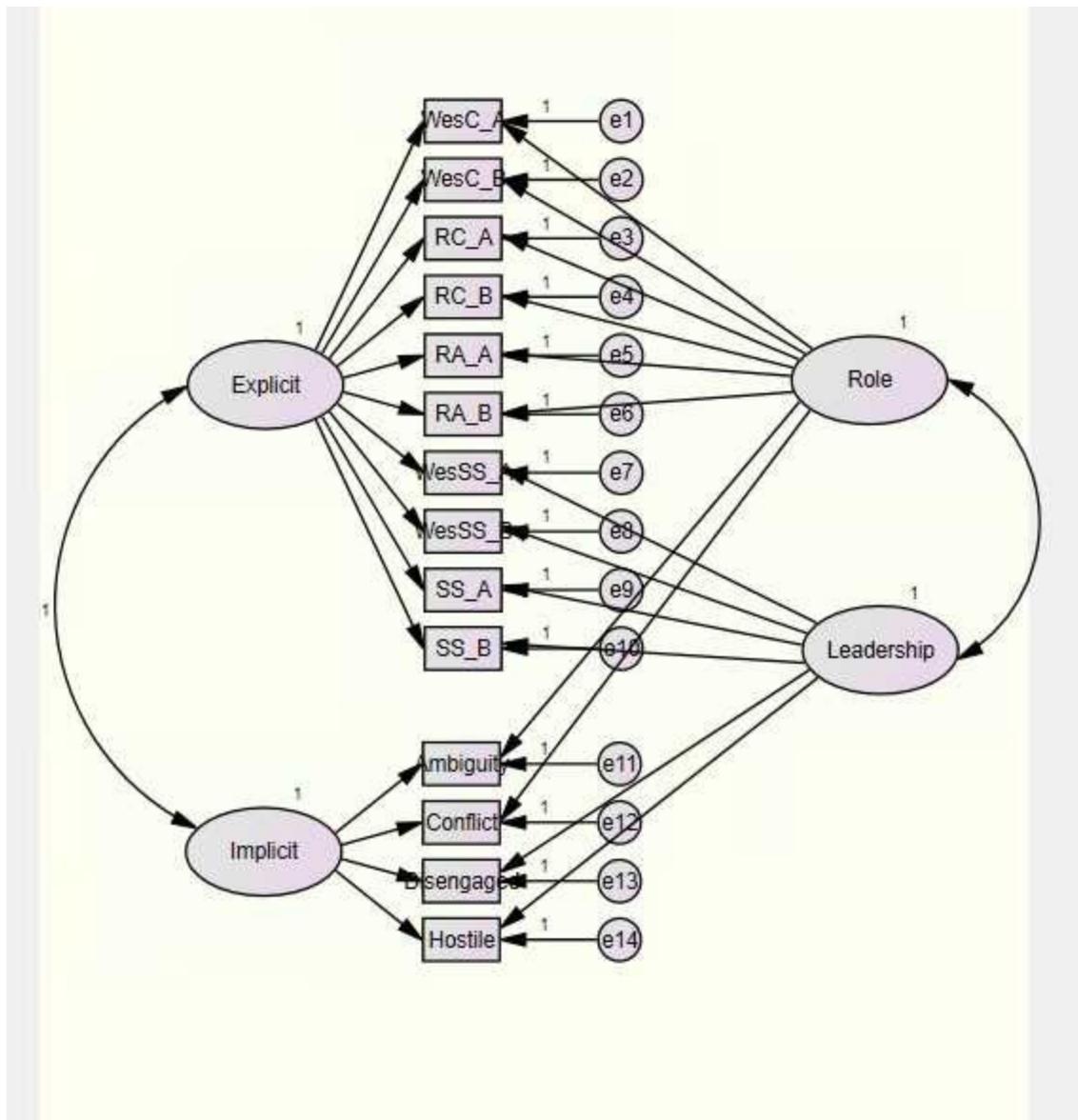


Figure 5. CFA Model 5. Perfectly Correlated Method Factors and Two Freely Correlated Trait Factors

## RESULTS

### Demographics

The final sample was composed of 153 participants. Data was cleaned by eliminating participants with excessive error rates on one or more of IAT responses. Of the 153 participants in the final sample, 89 indicated they were female (58.2%) and 64 (41.8%) male. The sample's racial/ethnic demographics were as follows: 1% American Indian or Alaska Native, 1% Asian, 3% Black or African American, 3% Hispanic or Latino, 5% two or more, and 87% White. The age of respondents ranged from 17 to 69, with the mean being 19.38 years old. Participants reported a range of 1 to 48 years of work experience, with the mean being 3.49 years of work experience. See Table 7 for a summary of these results. See Table 8 for zero-order correlations for study variables.

When examining the zero-order correlation table, we expected to find a stronger relationship between the implicit and explicit measures of common constructs than what we did, e.g., Ambiguity IAT and WES Clarity (A and B) and Role Ambiguity (A and B). Notably, most of the correlations between the implicit and explicit measures are small and non-significant according to the standards set forth by Cohen (1992). Related to these results are the relatively poor reliabilities of the implicit measures, especially the Ambiguity IAT (.22) and Disengagement IAT (.47), which fail to meet Nunnally's (1978) standards. These results will be further addressed in the discussion section.

Table 7. Descriptive Statistics for Study Variables

Variables	N	Min	Max	Mean	SD	Alpha
Demographics						
Age	153	17	69	19.38	4.34	NA
Years of Work	153	1	48	3.49	3.95	NA
Implicit Measure						
Ambiguity	153	-.86	.58	-.21	.27	.22
Conflict	153	-.91	.75	-.02	.32	.56
Disengaged	153	-.69	1.00	.29	.29	.47
Hostile	153	-.71	.94	.23	.30	.52
Explicit Measures						
Role Ambiguity	153	12	30	23.13	3.57	.77
Role Conflict	153	8	39	32.69	5.76	.79
Supervisor Support	153	9	36	26.95	5.38	.90
WES Clarity	153	0	9	5.49	2.12	.66
WES Supervisor Support	153	0	9	4.56	2.02	.57

## Test of Hypothesis

Nested CFA model comparisons are used to assess the convergent and discriminant validity of the measures (Widaman, 1985). Model 1 is the initial model against which subsequent models are compared. This model is the least restrictive in that both method factors (e.g., implicit and explicit) and trait factors (e.g., clarity and support) are freely correlated. The model comparisons begin by examining differences between Model 1 and Model 2, which is used to assess convergent validity. A comparison of Model 1 to Model 3 is used to assess discriminant validity. The comparison between Model 1 and Model 4 tests the hypothesis that the methods are uncorrelated. A final comparison between Model 1 and Model 5 tests the hypothesis that the methods are perfectly correlated (i.e., the hypothesis that there is only one method factor).

Table 8. Zero-Order Correlations Based on Study Variables

Variables <sup>1</sup>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Implicit														
Ambiguity	-													
Conflict	.13	-												
Disengaged	.00	-.15	-											
Hostile	-.11	-.14	.12	-										
Explicit														
WesC_A	.01	.06	.07	.15	-									
WesC_B	-.01	-.07	.12	.13	.52**	-								
RA_A	.00	.00	.01	.02	.51**	.47**	-							
RA_B	.05	-.03	-.03	.08	.34*	.35**	.66**	-						
RC_A	.10	.02	-.04	-.19*	-.45**	-.43**	-.33**	-.24**	-					
RC_B	.09	-.00	-.06	-.19*	-.38**	-.41**	-.27**	-.18*	.82**	-				
WesSS_A	-.08	-.08	.12	-.03	.29**	.40**	.26**	.12	-.28**	-.24**	-			
WesSS_B	-.10	.06	.08	.14	.27**	.33**	.23**	.18*	-.29**	-.25**	.45**	-		
SS_A	-.07	.03	.11	.13	.46**	.52**	.44**	.30**	-.47**	-.37*	.53**	.47**	-	
SS_B	-.02	-.04	.14	.09	.39**	.42**	.39**	.32**	-.44**	-.34**	.41**	.38**	.80**	-

\* $p < .05$ ; \*\* $p < .01$

<sup>1</sup> Variable names have been shortened due to space restrictions. All variables Names are as follows Implicit measures, Ambiguity, Conflict, Disengaged, Hostile, Explicit Measures Work Environment Scale A, Work Environment Scale B, Role Ambiguity A, Role Ambiguity B, Role Conflict A, Role Conflict B, Work Environment Scale Supervisor Support A, Work Environment Scale Supervisor Support B, Supervisor Support A, Supervisor Support B.

The fit statistics for Model 1 indicate that it describes the relationships among variables in this study very well ( $\chi^2_{(61)} = 76.30$ ; CFI = .98; RMSEA = .041, 90% C.I. = .006, .067). Specifically, the CFI for Model 1 is above the threshold of .90 and the RMSEA is less than .08 (Bentler, 1990; Byrne, 2010). Furthermore, Model 1 falls within the thresholds provided by MacCallum et al., (1996) in that the 90% confidence interval is small and the upper bound of the confidence interval is less than .10. A comparison of Model 1 and Model 2 assesses convergent validity. The comparison of Model 1 fit statistics to Model 2 fit statistics reveals a substantial degradation in the 2<sup>nd</sup> model's ability to describe the data. Because there are no specified trait factors in Model 2, these results constitute convergent validity evidence – i.e., the relationships among study variables cannot be described by method factors alone. Discriminant validity is assessed by comparing Model 1 and Model 3. Model 3 represents two freely correlated method factors and perfectly correlated trait factors. In essence, organizational climate factors of role clarity and supervisory support are reduced to one factor, such as an overall organizational climate dimension. The larger the difference, the greater the evidence of discriminate validity. As can be seen in Table 9, the fit statistics for Model 3 are poor and fail to achieve the threshold standards established by Bentler and others. Next, a comparison between Model 1 and Model 4 reveals virtually no difference in the fit statistics, which suggests that there is no common method variance between the implicit and explicit measures. The last comparison was between Model 1 and Model 5. Model 5 represents two perfectly correlated method factors and two freely correlated trait factors. A comparison of the fit statistics suggests very little difference between these two models' ability to describe relationships among study variables. The apparent paradox regarding the last two comparisons will be addressed below. Table 9 contains a summary of all Goodness-of-Fit Statistics for the CFA models used in this study.

Table 9. Summary of Goodness-of-Fit Statistics for CFA Models

Model	$\chi^2$	df	CFI	RMSEA	90% C.I
1. Two Freely Correlated Methods Factors; Two Freely Correlated Trait Factors	76.30	61	.98	.041	.006, .067
2. Two Freely Correlated Method Factors; No Trait Factors	305.89	76	.68	.141	.125, .158
3. Two Freely Correlated Method Factors; Perfectly Correlated Trait Factors	153.93	62	.87	.099	.079, .118
4. Two Uncorrelated Method Factors; Freely Correlated Traits	77.78	62	.98	.041	.000, .067
5. Two Perfectly Correlated Method Factors; Freely Correlated Trait Factors	83.12	62	.97	.047	.012, .072

Table 10 Displays the differential Goodness-of-Fit Statistics for nested model comparison. The results of the comparison of Model 1 to Model 2 provide support for convergent validity in that the fit statistics deteriorate substantially. More specifically, the CFI (.98) and RMSEA (.041) for Model 1 represent a better fitting model than the fit statistics for Model 2, CFI (.68) and RMSEA (.141). The fit standards provided for Model 1 are within the recommendations made by Bentler (1990) while the fit statistics for Model 2 fall well below these norms.

In a similar manner, discriminant validity can be assessed by comparing the fit statistics of Model 1 vs Model 3 and Model 1 vs Model 4. When comparing Model 1 to Model 3, the results indicated that when organizational climate is restricted to a single factor, the model does a poorer job of describing the relationships among variables. The CFI (.98) and RMSEA (.041) for Model 1 represent a “good fit” while the CFI (.87) and RMSEA (.099) for Model 3 are both outside the recommendations for a good fit. Model 1 and Model 4 comparison indicated that the

fit statistics are very similar – only the Chi Square statistics differ. Lastly, a comparison between Model 1 and Model 5 also revealed similar fit statistics, with Model 5 CFI (.97) and RMSEA (.047). The fit statistics for both models are within the thresholds provided by Bentler (1990) and Byrne (2010). This finding is interesting because it begs the following question: do these analyses best support a four-factor model (e.g., Model 4) or a three-factor model (e.g., Model 5)? This question becomes more perplexing when one compares the correlation between the two method factors in Model 1 (.31) with that in Model 5 (1.0). These results will be further considered in the Discussion section below.

Table 10. Differential Goodness-of-Fit Statistics for Nested Model Comparisons

Model Comparisons	$\Delta X^2$	df	$\Delta CFI$
Test of Convergent Validity			
Model 1 vs. Model 2	229.59**	15	.30
Tests of Discriminant Validity			
Model 1 vs. Model 3	77.63**	1	.11
Model 1 vs. Model 4	1.48	1	.01
Model 1 vs. Model 5	6.82**	1	.01

\*\*p<.01

Finally, Table 11 displays the factor loadings for each of the study variables in Model 1: two method factors (e.g., implicit and explicit) and two organizational climate trait factors (e.g., role clarity and supervisor support). These results suggest that only some of the indicator variables for each factor had significant loadings (16 out of 28), which provides only modest support for construct validity of the measures. More specifically, the implicit measures did not load on the trait factors in the hypothesized manner.

Table 11. Trait and Method Loadings for CFA Model 1

	<b>Implicit</b>	<b>Explicit</b>	<b>Role</b>	<b>Supervisor</b>
<b>Implicit Measures</b>				
Ambiguity	-.23		.07	
Conflict	-.29*		-.00	
Disengaged	.24			.10
Hostile	.52*			.02
<b>Explicit Measures</b>				
WesC_A		.52*	.38	
WesC_B		.52*	.36	
RA_A		.43*	.77*	
RA_B		.31	.64*	
RC_A		-.94*	.10	
RC_B		-.86*	.14	
WesSS_A		.32*		.44*
WesSS_B		.33*		.37*
SS_A		.53		.81*
SS_B		.48*		.67*

\*p<.05

## DISCUSSION

The purpose of the current study was to develop and validate implicit association tests of two factors of organizational climate. This study sought to develop and validate measures of organizational climate that could be used when employees may not respond in ways that accurately represent their organizational experiences and attitudes. Model 1 for this study fit the data well according to the statistical analyses. As more restrictive models were added, we observed a degradation in the fit statistics that supports the convergent and discriminant validity of the measures.

Evidence of convergent validity was stronger for the explicit measures than it was for the implicit measures. It would have been ideal to see stronger loadings for the implicit measures on the latent trait factors. A potentially positive aspect to this finding is that the lack of substantial correlation between the implicit and explicit measures may mean that the implicit measures have the potential to predict behavior in ways that explicit measures do not. The potential incremental validity of implicit measures to predict engagement and citizenship behavior warrants future study.

Future research should also focus upon improving the psychometric properties of the implicit measures of organizational climate. The reliabilities reported in Table 7 do not meet Nunnally's (1978) minimum standard for being acceptable (.7). These values were Spearman-Brown coefficients based on split-half correlations – IAT scores based on practice block trials (blocks 2 and 4 in Table 2) were correlated with IAT scores based on test block trials (blocks 3 and 5 in Table 2). However, the fact remains that measurement error may be playing a major role in attenuating correlations between the implicit measures and the theoretically related

explicit measures – none of the 40 correlations between the implicit and explicit measures exceeded .20 and only two of these were statistically significant (see Table 8). In order to draw the conclusions regarding convergent and discriminant validity, it is essential that the psychometric properties of the implicit measures be adequate.

This problem of low reliabilities may also contribute to the weak evidence supporting the need for two method factors and two trait factors – weak relationships among study variables means there is not much covariance to explain. The psychometric properties of explicit measures of organizational climate met the standards provided by Nunnally (1978). However, as noted previously, the low reliabilities of the implicit measures of organizational climate make it likely that these measures are too contaminated by measurement error to be of functional value.

A final consideration involves the concept of over-fitting with latent trait models. Byrne, Bentler, MacCallum and others counsel caution when fit statistics exceed the thresholds for “good fit” ( $CFI > .95$ ;  $RMSEA < .04$ ). The fit statistics for Models 1 and 4 are approaching this range, which may suggest that the data are overfitted by the factors specified in these models. Consequently, we examined a fifth model which consisted of two perfectly correlated method factors (i.e., a single method factor) and two freely correlated trait factors (see Figure 5). When examining the fit statistics for this model, we observed no degradation in the fit statistics (see Table 9 and Table 10). Arguably, Model 4 or Model 5 explain the relationships among study variables equally well. Essentially, the parsimony that is gained in dropping one of the latent method factors (from Model 4 to Model 5) does not cost very much in terms of the ability to capture the variance-covariance structure of these measures. However, there are important theoretical reasons supported by substantial empirical evidence to reject Model 5. The implicit and explicit methods tap distinct cognitive processes. To use Kahneman’s (2011) terms, explicit

measures involve “system 2” (conscious, effortful, deliberative processes), while implicit measures involve “system 1” (unconscious, fast, automatic processes). When explicit and implicit measures are dissociated, as is the case with these data, we would expect that two factors are needed to explain the method variance in the measures. In an effort to further explore the hypothesis that a model involving three rather than four factors better fits the data, a sixth model was examined – one that involved two uncorrelated method factors and two perfectly correlated trait factors (i.e., two method factors but only one trait factor; see Figure 6). Although there are theoretical reasons supported by considerable empirical evidence to reject this model as well, we thought it might shed some light on whether the over-fit fell more on the method side or on the trait side of the hypothesized model. The fit statistics for this model were considerably poorer than those for Model 1 and 4 (CFI = .85 and RMSEA = .10). While this provides additional support for the discriminant validity of the climate traits, it does little to resolve the conundrum regarding the method traits.

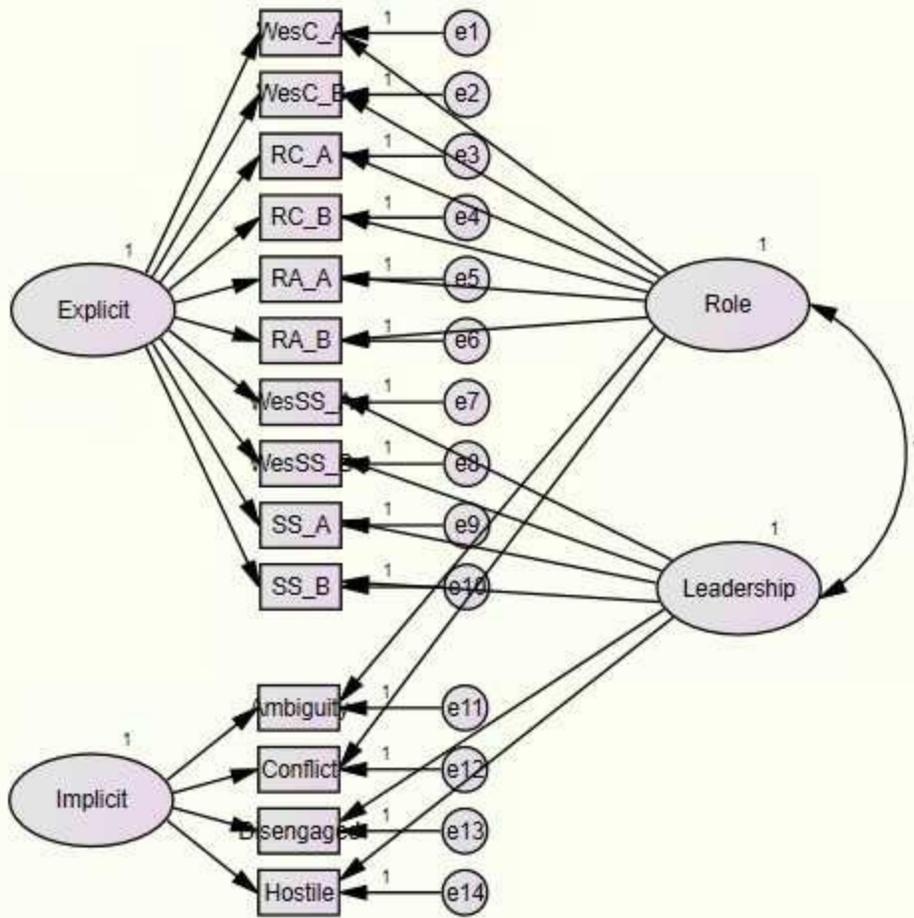


Figure 6. CFA Model 6: Two Uncorrelated Method Factors and Two Perfectly Correlated Trait Factors

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# APPENDICES

## Appendix A: Human Subjects IRB Approval



**To:**  
Donald Fischer  
Psychology  
Kailey Meyer

**RE:** Notice of IRB Approval  
**Submission Type:** Initial  
**Study #:** IRB-FY2019-343  
**Study Title:** The Development and Validation of Implicit Measures for Organizational Climate  
**Decision:** Approved

**Approval Date:** December 7, 2018  
**Expiration Date:** December 7, 2019

This submission has been approved by the Missouri State University Institutional Review Board (IRB) for the period indicated.

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Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented. Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

Researchers Associated with this Project:

**PI:** Donald Fischer  
**Co-PI:** Kailey Meyer  
**Primary Contact:** Donald Fischer  
**Other Investigators:** Lauren Krieg, Alana Wilcox, Thomas Ryan

## **Appendix B: Supervisor Support Scale**

1. My supervisor keeps me informed me of the things I need to know to do my job well.
2. My supervisor has expectations of my performance on the job that are realistic.
3. My supervisor recognizes when I do a good job.
4. My supervisor is supportive when I have a work problem.
5. My supervisor is fair and does not show favoritism.
6. My supervisor is responsive to my needs when I have family or personal business to take care of.
7. My supervisor is understanding when I talk about personal or family issues that affect my work.
8. I feel comfortable bringing up personal or family issues with my supervisor.
9. My supervisor really cares about the effects that work demands have on my personal and family life.

## **Appendix C: Role Conflict and Ambiguity Scale**

### **Role Conflict**

1. I have to do things that should be done differently under different conditions.
2. I receive an assignment without the manpower to complete it.
3. I have to buck a rule or policy in order to carry out an assignment.
4. I work with two or more groups who operate quite differently.
5. I receive incompatible requests from two or more people.
6. I do things that are apt to be accepted by one person and not by others.
7. I receive an assignment without adequate resources and materials to execute it.
8. I work on unnecessary things.

### **Role Ambiguity**

1. I have clear, planned goals and objectives for my job.
2. I know that I have divided my time properly.
3. I know what my responsibilities are.
4. I know exactly what is expected of me.
5. I feel certain about how much authority I have on the job.
6. Explanation is clear of what has to be done.

## Appendix D: Work Environment Scale

### Supervisory Support

1. Supervisors tend to talk down to employees (R)
2. Supervisors usually complement employees who do well
3. Supervisors tend to discourage criticisms from employees (R)
4. Supervisors give full credit to ideas contributed by employees
5. Supervisors often criticize employees over minor things (R)
6. Employees generally feel free to ask for a raise
7. Supervisors expect for too much from employees (R)
8. Employees discuss their personal problems with supervisors
9. Supervisors really stand up for their people

### Clarity

1. Things are sometimes pretty disorganized (R)
2. Activities are well planned
3. Rules and regulations are somewhat vague and ambiguous (R)
4. The responsibilities of supervisors are clearly defined
5. The details of assigned jobs are generally explained to employees
6. Employees are often confused about exactly what they are suppose to do (R)
7. Fringe benefits are fully explained to employees
8. Rules and policies are constantly changing (R)
9. Supervisors encourage employees to be neat and orderly

## **Appendix E: Informed Consent Statement**

The purpose of this study is to develop implicit measures of how we perceive and evaluate the experiences one has at work. In particular, we are interested in assessing how supportive supervisors are perceived and how stressful a work environment is experienced. This study involves taking several Implicit Association Tests or IATs. The IAT is a procedure which records your reaction times on classification tasks. You will be asked to press alternate computer keys as words are presented one at a time on the screen. When responding to all items we want you to be thinking about the last few months of your current or most recent employment. It should take you about 20 minutes to complete the entire study.

Participation in this study is voluntary and you can withdraw at any time, without penalty. You will receive two units of credit for participating. Your identity as a subject in this study is confidential – no names or other personally identifying information will be retained or reported. The faculty member responsible for this study is Donald Fischer in the Psychology Department and he will answer any questions you may have regarding this study. You can also ask me (a research assistant) any questions you have about this study and I will answer them to the best of my ability. Do you have any questions you wish to ask at this time?

You may now read the statement in your email message and click on the link.