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## The Effects Of Ethnic Diversity, Perceived Similarity, And Trust On Collaborative Behavior And Performance

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THE EFFECTS OF ETHNIC DIVERSITY, PERCEIVED SIMILARITY, AND TRUST ON  
COLLABORATIVE BEHAVIOR AND PERFORMANCE

by

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B.S., University of Central Florida, 2007

A thesis submitted in partial fulfillment of the requirements  
for the degree of Master of Science  
in the Department of Psychology  
in the College of Sciences  
at the University of Central Florida  
Orlando, Florida

Spring Term  
2010

Major Professor: Eduardo Salas

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## ABSTRACT

Recent issues such as global economic crises, terrorism, and conservation efforts are making international collaboration a critical topic. While cultural diversity often brings with it new perspectives and innovative solutions, diversity in collaborative settings can also lead to misunderstandings and interaction problems. Therefore, there is a pressing need to understand the processes and influences of intercultural collaboration and how to manage the collaborative process to result in the most effective outcomes possible. In order to address this need, the current study examines the effect of ethnic diversity, perceived deep-level similarity, trust, and distrust on collaborative behavior and performance in decision-making dyads. Participants were assigned to either same-ethnicity or different-ethnicity dyads and worked together on a political simulation game in which they had to make complex decisions to solve societal problems and increase their popularity. The results of this study indicate that ethnically similar dyads reported higher levels of perceived deep-level similarity than ethnically dissimilar dyads, and that this perceived deep-level similarity served as the mediating mechanism between objective differences in ethnic diversity and trust and distrust, respectively. The findings also suggest that trust and distrust attitudes, when considered together as a multiple mediation model, mediate the positive relationship between perceived deep-level similarity and collaborative behavior. Finally, results show that collaborative behavior significantly predicts objective performance on the political decision-making simulation. The implications of this study for theory and practice are discussed along with the study limitations and several suggestions for future research.

This work is dedicated to my mother, Sharon Gail Wildman, who taught me to cherish learning and never stop trying to improve as a person. I know she would be very proud to see me complete this work and continue to persevere in my ongoing path toward knowledge.

## ACKNOWLEDGMENTS

The process of completing this thesis has been one of the most challenging, yet rewarding, processes of my graduate career to date and I have many people to thank for that. First, I would like to thank my advisor, mentor, and committee chair, Dr. Eduardo Salas, for allowing me to single-handedly develop and manage an entire laboratory-based research project on my own despite the fact that it was the first time in my life I have managed anything research related. Overcoming the inevitable frustrations and challenges has taught me so many valuable lessons. Second, I would like to thank Dr. Barbara Fritzsche for encouraging me to write a thesis in the first place. At many points I felt like giving up, but looking back, it was the worthwhile experience she promised it would be. Third, I would like to thank Dr. Shawn Burke for listening to me as I changed my thesis topic over and over for a year before finally settling on the very first idea I had come up with.

I would also like to thank my amazing colleagues and friends for listening to me talk about my work constantly and for helping me to get this experiment up and running: Wendy Bedwell, Marissa Shuffler, Elizabeth Sanz, Carollaine Hall, Sallie Weaver, Davin Pavlas, Maritza Salazar, Julia Fullick, and the many others that have played a role in this endeavor. I'd especially like to thank Miliani Jimenez for enduring the thesis process with me for the past two years and for forcing me to stay on track.

Finally, I thank my father, Doug Wildman, my stepmother, Jamie Wildman, my grandmother, Wydetta Graham, and my sister, Jennifer Wildman, for always being so proud of my every accomplishment. I also thank my partner and best friend, Steven Pontones, for inspiring me to reach for more knowledge and to question every assumption, pushing me to be a better scientist each and every day.

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## CHAPTER ONE: INTRODUCTION

### Statement of the Problem

The nature of organizational work is changing at an incredible pace. In an era of rapid globalization and advancement of technology, many organizations, civilian and government alike, are turning toward collaborative work arrangements in order to gain an advantage and remain competitive. Rapidly developing technology has broken down geographic boundaries, making multinational corporations and overseas employment the wave of the future in both industry and government. More organizations are expanding to overseas markets and various collaborative structures such as strategic alliances, mergers, and acquisitions have become commonplace among industry. Military and political endeavors are becoming increasingly more collaborative as the world comes together to address global issues such as global economic crises, terrorism, and conservation. Simultaneously, the global workforce is becoming increasingly diverse in terms of ethnicity and gender as the world becomes a global melting pot. These issues, and more, are making intercultural collaboration an increasingly important performance phenomenon to understand.

Research has suggested that trust between involved parties is critical to the success of interdependent operations such as collaboration (Kramer, 1999; Mayer, Davis, & Schoorman, 1995; Salas, Sims, & Burke, 2005). The criticality of trust in international collaborative efforts has even been emphasized in the global news. For example, U.S. Defense Secretary Robert Gates, when discussing relations between the U.S. and Pakistani military, stated that a “trust deficit... had hampered cooperation against militancy” (“Gate Strives to Build Trust,” 2010). The impact of trust has been widely studied across a variety of team settings (e.g., virtual teams, Aubert & Kelsey, 2003; social care teams, Costa, 2003; student project teams, Kanawattanachi &

Yoo, 2002). However, very little research has focused on the development of trust in one particular setting: diverse, short-term, ad hoc teams.

Often in both industry and government, multicultural collaborative efforts come together and disband quickly, or occur in response to a very short-term problem. Emergency response teams and task forces are two examples of critically important collaborative groups that both come together quickly and enact their tasks quickly. Commonly in these situations, the interacting parties have no prior knowledge of each other and very little time for building trust before they must engage in their primary task. This is problematic given the majority of the trust literature posits that individuals make trust decisions based on the perceived benevolence, integrity, and ability of others (Mayer et al., 1995). In these quickly-paced short term collaborative settings, however, individuals do not have enough time or information to judge these deep-level characteristics before having to make a decision to trust. In this situation, individuals are likely to rely more heavily on category-based judgment, and use outwardly observable traits to form trust attitudes (Fiske & Neuberg, 1990). Recent theoretical developments have suggested that the formation of trust occurs differently in these short-term team contexts (e.g., Hung, Dennis, & Robert, 2004; Wildman et al., under review). However, to date, there is relative lack of empirical studies examining the formation of trust in short-term multicultural teams. Therefore, the primary purpose of this study is to provide a deeper understanding regarding how trust attitudes are formed by individuals in short-term, diverse, collaborative contexts, and how this trust influences subsequent collaboration and performance.

#### Purpose of the Current Study

Based on the previously described societal issues, there is an immediate need to start examining the influence of culture and diversity on trust and collaboration so that both

researchers and practitioners can effectively manage the growing number of intercultural collaborations happening across a variety of fields in today's world. In order to address this need, the current study begins the journey toward an understanding of intercultural collaboration; specifically focusing on collaboration in short-term temporary settings. The laboratory experiment examines the influence of ethnic diversity, which is considered one outwardly salient indicator of culture, on trust and distrust attitudes between collaborating partners, and how these attitudes subsequently influence collaborative process and outcomes.

This study will uniquely contribute to the trust and collaboration literature in several ways. First, it will be the first empirical study to examine collaboration based on a new multi-disciplinary, integrative definition developed by Bedwell, Wildman, DiazGranados, Salazar, Kramer, and Salas (under review). Second, it will be the first study laboratory-based experiment to examine the unique predictive impact of trust and distrust as separate attitudinal constructs in a collaborative context. Third, it will experimentally investigate the influence of ethnic diversity on trust and the effectiveness of collaboration, paving the way toward a better understanding of the mechanisms and influences of culture on collaborative interactions. The hope is that this empirical investigation will serve as a basis for further research examining the exact mechanisms through which culture influences trust and the effectiveness of collaboration.

## CHAPTER TWO: LITERATURE REVIEW

The current study draws upon several established areas of literature. The relationships regarding ethnicity are informed by the various theories of diversity including impression formation theory, relational demography, similarity-attraction paradigm, and social categorization theory. The relationships regarding trust are informed by well-known theories of interpersonal trust development. Finally, collaboration is defined based on the multidisciplinary definition put forth by Bedwell and colleagues (under review). In the following sections, each of the supporting theories and areas of literature included in the current study are described in further detail.

### Theories of Diversity

As mentioned previously, in quickly-paced short term settings, individuals are likely to use outwardly observable traits to form trust attitudes (Fiske & Neuberg, 1990). Therefore, rather than focus on deep-level differences in culture that could influence collaboration, focus in this study is kept on the theories of diversity that can inform these category-based judgments. Several different theories help to explain how surface-level diversity impacts the interactions between individuals, especially collaborative interactions. Impression formation theory explains how individuals form perceptions and attitudes when first meeting another individual. Relational demography theory focuses on the perception of demographic differences between individuals. Similarity-attraction paradigm is a broader theory which proposes that individuals are attracted to others similar to themselves. Finally, social identity theory and social categorization are theories that explain the cognitive mechanisms individuals use to place themselves and others into categories, and how these categorizations influence the ways individuals behave toward and react to others.

### *Impression Formation Theory*

Social psychology suggests that individuals use both data from the environment and pre-conceived expectancies to form impression of others (Fiske, 1993). Specifically, the continuum model of impression formation posits that individuals make category-based impressions when they have little individuating information available (Fiske & Neuberg, 1990). The dual process model of impression formation also suggests that individuals form impressions towards others by combining the available information about a person with prior knowledge that is in their long-term memory (Brewer, 1988). In the current study, the collaborating individuals will be strangers with no knowledge of one another, and are therefore likely to engage in this form of impression formation that relies heavily on category-based information and prior knowledge associated with those categories. Research has suggested that cognitive schema, or this prior knowledge, influences the impression formation process by causing a confirmation bias (Rosenhan, 1973; Snyder & Swann, 1978) to occur. In other words, in this study, because the trustor has a preconceived notion regarding the trustworthiness of different categories of people (e.g., race, gender, age), he or she will be more likely to search for and interpret information from the environment that confirms, or does not go against, his or her preconceived notions. Social psychology has been studying the process of impression formation for some time, and research has shown that attitudes such as trust can be formed towards others without people even being cognizant of the formation of these attitudes (McCulloch, Ferguson, Kawada, & Bargh, 2008).

### *Relational Demography*

Impression formation theory describes what information individuals use when forming impressions of others. The literature on relational demography theory focuses on similarity between an individual and another, suggesting that “an individual’s similarity or dissimilarity in

demographic characteristics to others in a social unit affects that individual's attitudes and behaviors" (Riordan & Wayne, 2008, p. 562). Simply stated, impression formation theory states that individuals perceive surface-level demographic characteristics of others around them such as in terms of ethnicity, gender, or age. In turn, relational demography states that these perceptions are compared to the self to determine whether the self and the other are similar or dissimilar, and this in turn influences attitudes and behaviors. Relational demography is especially salient to the current research content because when swiftly-forming collaborative groups come together, demographic cues are often the only information available on which the interacting parties can base their initial cognitions and attitudes. In particular, due to the highly visual nature of ethnicity, this is one of the most salient demographic characteristics that can influence an individual's behavior and attitudes. This, along with prior research that identifies ethnicity as one aspect of culture (e.g., Chao & Moon, 2005; Gelfand, Erez, & Aycan, 2007) and the tenets of impression formation theory, justifies the decision to focus on ethnicity as a relevant cultural variable. Previous research has shown that demographic similarity between two individuals is related to higher levels of interpersonal comfort (Allen, Day, & Lentz, 2005), liking (Ensher & Murphy, 1997; Lankau, Riordan, & Thomas, 2005), and group performance (Riordan & Weatherly, 1999), suggesting that it will indeed play a critical role in the collaborative process.

#### *Similarity-Attraction Paradigm*

Similarity-attraction paradigm (Byrne, 1971) proposes that individuals are attracted to others like themselves. In other words, birds of a feather flock together – similar people will be attracted to each other because they recognize similarities between themselves and the other, and therefore are more likely to get along with and work well with others like themselves. Theorists have suggested that similarity in demographic traits often leads to an assumption about similarity



in values, beliefs, and attitudes (Tsui, Porter, & Egan, 2002; Tsui, Xin, & Egan, 1995) and having this assumed knowledge about the other's values leads to a sense of predictability and comfort. Research has consistently found that perceived similarity increased liking between supervisors and their subordinates (e.g., Tsui & O'Reilly, 1989; Wayne & Liden, 1995). In sum, similarity-attraction paradigm further supports the idea that ethnically similar individuals will be more likely to have more positive interactions and more effective collaborations than ethnically dissimilar individuals. Further, similarity-attraction paradigm suggests that it is an individual's perception of their similarity to others that serves as the mechanism by which actual similarity influences attitudes and collaborative outcomes.

#### *Social Identity Theory and Social Categorization*

Despite the salience of ethnicity as a surface-level demographic variable, being similar in terms of ethnicity does not guarantee that the individuals will perceive themselves as similar, or vice versa. In order for an individual to reach this sense of predictability and comfort, they must first perceive the similarity or dissimilarity between themselves and the other person. Social identity theory helps to explain this phenomenon by proposing that individuals have an awareness of themselves as belonging to groups that share a common identity (Tsui et al., 2002). The basic tenants of social categorization theory are that people are motivated to maintain a high level of self-esteem and that in order to maintain high self-esteem people must distinguish themselves from others. This process of social comparison leads people to classify others as either in-group members (i.e. similar to the person) or out-group members (i.e. dissimilar). To maintain positive self-esteem, people ascribe positive characteristics to their in-group and ascribe negative characteristics to out-group members.

In other words, this theory explains how people categorize themselves and others into groups based on similarity and dissimilarity on factors such as demographics, and how those groups are associated with a set of predetermined assumptions and a sense of predictability. In order for the individuals to reach this sense of predictability and comfort, they must first perceive the demographic similarity between themselves and the other person. Because ethnicity is one of the few outwardly salient demographic variables, I believe it will be associated with perceived similarity. I especially believe this relationship will exist due to the short-term nature of our project. Because the individuals will have no prior work experience with each other, the only cues on which to base judgments of similarity will be the most outwardly salient cues, making ethnicity a highly influential input into an individual's sense of perceived similarity with another.

Research has found that in-group status is associated with evaluations of trustworthiness, honesty, and cooperativeness (Brewer, 1979). Since individuals are more likely to assume that their partner has similar values and beliefs to themselves if they perceive themselves to be similar, perceived similarity is proposed to result in an increased sense of interpersonal comfort and trust. Simply stated, individuals are likely to trust others perceived to be similar to themselves (Brewer, 1979; Brewer & Kramer, 1985; Kramer & Brewer, 1984). In the same logic, individuals will be less likely to distrust others perceived to be similar to themselves. Conversely, if individuals perceive others to be different, they are less likely to trust and more likely to distrust them (Kramer, 1994; Kramer & Messick, 1998).

### Trust

Trust has been one of the most widely studied constructs in organizational research, and consequently, multiple models have been developed and tested over the years. The most widely accepted models focus on delineating the antecedents that lead to the development of trust (e.g.,

Mayer et al., 1995), while other models focus on specific aspects of trust such as rebuilding trust (Mesquita, 2007) or the role of emotion management in the development of trust (Williams, 2007). The conceptualizations of trust can generally be grouped into three perspectives: trust as a stable trait, trust as a process, and trust as an emergent state (Burke, Sims, Lazzara, & Salas, 2007). Trust as a stable trait focuses on a concept known as propensity to trust. This can be described as the baseline level of trust that an individual is willing to extend to all others with whom they interact (Rotter, 1954; 1967). As a stable trait, trust is expected to remain at the same level for a given individual across a variety of settings and situations. This particular construct will be discussed in detail in a later section.

Trust has also been conceptualized as a process that unfolds over time. This perspective of trust suggests that trust is a process through which other behaviors, attitudes, and relationships are bolstered or weakened (Burke et al., 2007). In other words, trust is seen as a moderating variable. This is a unique view of trust because it implies that trust changes over time, but it also implies that trust is a process that individuals engage in, rather than an attitude or feeling, which tends to run counter to the average individual's conceptualization of trust.

Finally, trust has also been viewed as an emergent attitudinal state. Meaning, trust is an attitude held by an individual that develops and changes over time based on various contextual factors (Burke et al., 2007). Conceptualizing trust as an emergent state suggests that trust can be developed, or even disrupted or broken, by specific events and situations. This conceptualization of trust is the most congruent with a majority of the models and definitions of trust in the literature, and is also the most congruent to the intuitive experience of trust. Therefore, for the purposes of this study, trust will be conceptualized as an emergent attitudinal state that is influenced by initial inputs such as an individual's ethnicity and propensity to trust.

### *Trust as an Emergent Attitudinal State*

The definitions of trust found within models of trust that generally conceptualize trust as an emergent state can be roughly grouped into three perspectives. In the first perspective, the key concept within trust is vulnerability. Mayer and colleagues (1995) define trust as the “willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that party” (p. 712). This definition of trust is by the far the most widely cited and accepted definition, and has served as the foundation for several other models of trust (e.g., Aubert & Kelsey, 2003; Brower, Schoorman, & Tan, 2007; Serva, Fuller, & Mayer, 2005; Williams, 2001). This particular stream of research approaches trust as a willingness to be vulnerable to others. Accordingly, trust is only the willingness to be vulnerable, but not the actual act of taking of placing oneself in a vulnerable position. Known as risk-taking behaviors, the action of making oneself vulnerable is an outcome of trust, rather than trust itself. The Mayer and colleagues (1995) model of trust also strongly asserts that trust and distrust are not distinct constructs, but are opposite ends of the same continuum. Therefore, distrust represents the lack of or absence of trust.

In the second perspective, trust is conceptualized as the expectancy of positive outcomes based on the expected actions of another party in an interaction based on uncertainty (Bhattacharya, Devinney, & Pillutla, 1998). This perspective is very similar to the first, but frames the attitude in a more positive way by describing it as expectations or confidence toward the trustee instead of a willingness to be vulnerable. Both perspectives suggest that trust leads to risk-taking behaviors, but each approaches it in a different way. Other similar definitions of trust include “confident positive expectations regarding another’s conduct” (Lewicki, McAllister, &

Bies, 1998) and “the confidence an individual has in a partner’s willingness to be responsive to a person’s needs, even when they conflict with the partner’s own preferences” (Rempel, Ross, & Holmes, 2001, p. 58). This perspective also generally considers trust and distrust to be opposite ends of one continuum.

Finally, other models of trust have conceptualized trust as a combination of the previous two perspectives, specifically, as a “psychological state comprising the intention to accept vulnerability based upon... expectations of the intentions or behavior of another” (Rousseau, Sitkin, Burt, & Camerer, 1998, p. 395). This definition includes both the concepts of vulnerability and positive expectations, combining both positively- and negatively-valenced terms in one definition. Due to the integrated nature of this definition, it has also been widely cited (e.g., Burke et al., 2007; Lau & Liden, 2008; Weber, Malhotra, & Murnighan, 2001). The common factor across all of these definitions is the assumption that trust and distrust are not distinct constructs, but are opposite ends of one continuum. Restated, trust is the presence of a positive attitude, while distrust is simply the absence of trust. One particular stream of trust literature has directly opposed this view, and suggested that trust and distrust are unique and separate constructs and can coexist simultaneously. This argument will be described in detail in the following section.

### *Trust versus Distrust*

As previously mentioned, one of the most accepted and cited definitions of trust is “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will performance a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer et al., 1995, p. 712). This definition focuses on the concept of vulnerability, which implies that there is a risk being taken when working with

others. Based on this widely accepted model, trust and distrust are conceptualized as opposite ends of the same continuum. Given that trust is defined as the willingness to take a risk, distrust then means that an individual would be unwilling to take any risks. This model implies that a complete lack of trust is the same as distrust. These authors recently revisited their original model and discussed the movement toward a two-factor model of trust, and concluded that they felt there was not enough credible evidence to support the idea that trust and distrust are conceptually different (Schoorman, Mayer, & Davis, 2007).

Lewicki and colleagues (1998) conversely argue that trust and distrust are separate dimensions, and can exist simultaneously within a relationship. They define trust as “confident positive expectations regarding another’s conduct” and distrust as “confident negative expectations regarding another’s conduct” (p. 439). Based on these definitions, the absence of trust (i.e., the lack of confident positive expectations) is not synonymous with distrust, and therefore they cannot be opposite ends of the same continuum. Their main argument for conceptualizing trust and distrust separately is because both constructs exist, and therefore can be studied, in any relationship simultaneously. This model is based on the concept of multidimensionality, and is designed to acknowledge the fact that, psychologically, positive and negative emotions are not the same as ambivalence. In other words, feeling strong distrust towards another individual is not the same as feeling no trust (i.e., ambivalence) towards them.

Support for the separation of positive-valent and negative-valent attitudes can be found in several other research arenas. For example, the positive and negative affectivity research has repeatedly found that while positive and negative affectivity are highly correlated, both constructs uniquely contribute to prediction of various outcome variables (Thoresen, Kaplan, Barsky, Warren, & Chermont, 2003). Similarly, research has supported the conceptual

distinction between optimism and pessimism as highly related, yet separate, traits (Stallings, Dunham, Gatz, & Bengtson, 1997). This theoretical perspective suggests that trust research may gain from studying trust and distrust as separate, yet related, constructs in order to truly understand the antecedents, processes, and outcomes related to each construct.

The Lewicki and colleagues (1998) definition of trust and distrust also deviates from the Mayer and colleagues (1995) model of trust in that it defines trust as positive or negative expectations rather than a willingness to take risks. This perspective rests on the assumption that interpersonal relationships are multifaceted and complex, and that people relate to each other in different ways. In other words, it is misleading to say that trust is whether or not a person is willing to take risks, because that question depends on what the risks are regarding. A trustor could have both confident positive and negative expectations regarding different aspects of another's conduct, and thus be willing to take a risk in one context but not in another. For example, a parent may trust a teenage babysitter to watch their children for a few hours, but may distrust them to file their taxes simultaneously.

To the best of my knowledge, there has been no research directly examining the potential distinctions between trust and distrust as distinct attitudinal emergent states in a collaborative context. However, the theory behind the conceptualization of trust and distrust as separate and distinct constructs is compelling and consistent with other streams of literature. Thus, one of the primary goals of the current research is to empirically examine the distinction between trust and distrust and whether or not these constructs are differentially predictive of collaborative outcomes. Accordingly, I conceptualize trust and distrust as two separate attitudinal variables that are correlated, but not opposite ends of the same continuum.

### *Propensity to Trust*

Propensity to trust is an individual difference variable that describes the baseline level of trust an individual is willing to extend to those with whom they interact (Burke et al., 2007). Trust propensity was a significant predictor of trust even when ability, benevolence, and integrity were controlled for (Colquitt, Scott, & LePine, 2007). Across 10 studies and 1514 participants, propensity to trust was found to correlate .27 with trust. Mayer and colleagues (1995) theorize that propensity to trust would influence how much trust a person has for a person prior to data on that particular party being available, and that cultures differ on their propensity to trust. They specifically propose that the higher a trustor's propensity to trust, the higher the trust for a trustee prior to availability of information about the trustee. This supports the idea that propensity to trust will have a significant influence on trust in collaborations between individuals with no prior knowledge of each other. Given the short-term, immediate action nature of the dyads in this study, it is expected that propensity to trust will play a critical role in determining subsequent trust and distrust levels since participants will have almost no prior knowledge on which to base their trust for a trustee. However, I also suggest that propensity to trust will not be the only predictor of trust attitudes and that surface-level differences in ethnicity will also influence trust attitudes.

### Collaboration

The literature examining collaborative work efforts is vast, and spans multiple disciplines. Management, education, medical, military, and even anthropology researchers have all delved into some form of collaboration research. Several theories and models of collaboration have even been developed in various disciplines. While this vast amount of research looking at collaboration seems promising for the scientific community, there is one fatal flaw crossing all



arenas: the lack of a unified, comprehensive definition of collaboration. A huge portion of the literature examining collaboration, empirical and theoretical alike, completely fails to define the term (e.g., Leinonen, Jarvela, & Hakkinen, 2005; Kelly, Schaan, & Joncas, 2002; McLaughlin & Pointe, 1997) while another sizable portion uses some version of a vague dictionary definition such as “jointly working with others.” This lack of a clear definition leaves the reader to guess as to how collaboration is distinct from any and all other interactions involving more than one entity such as teamwork, cooperation, and even competition.

While the term collaboration is intuitively understood by most, this is not sufficient for research purposes. If collaboration research is to prove meaningful, it is critical that the phenomenon of interest is clearly defined. Otherwise, the meaning of collaboration in one study could be drastically different from the meaning of collaboration in another, making seemingly complementary results unrelated. Henneman, Lee, and Cohen (1995) state:

The lack of clarity has resulted in the term 'collaboration' being used in a variety of inappropriate ways in both research and practice settings. For example, it is often considered synonymous with other modes of interaction such as cooperation or compromise. Unfortunately, confusion over the meaning of collaboration has hindered its usefulness as a variable in studies which attempt to evaluate its effectiveness." p 104

Therefore, the current research is based on a recently developed integrative, multidisciplinary definition of collaboration (Bedwell, Wildman, DiazGranados, Salazar, Kramer, & Salas, under review). Bedwell and colleagues (under review) define collaboration as *an evolving macro process whereby two or more entities reciprocally engage in problem-solving activities to achieve mutually desired goals*. This definition provides a concrete understanding of collaboration as a behavioral process while still remaining broad enough to explain a variety of

interpersonal work situations to which this research can be generalized. In this particular study, collaboration is represented as the joint decision-making of a short-term student dyad. This collaborative situation could be considered to be very similar to the phenomenon of teamwork, since a team can be defined as “two or more individuals with specified roles interacting adaptively, interdependently, and dynamically toward a common and valued goal” (Salas et al., 2005, p. 562) and within the present task the two individuals must work together adaptively and dynamically toward a shared goal. However, unlike a formally defined team, in this more broadly defined collaborative situation, the two individuals do not have pre-specified roles and do not necessarily have to work interdependently. Instead, they have the choice to work interdependently. It is important to note that regardless of whether or not the study dyads are conceptualized as teams, the process of reciprocal problem-solving is, by definition, collaboration. Therefore, the current study is aimed at examining the extent to which ethnic diversity, perceived deep-level similarity, and trust relate to how much the participants engage in reciprocal problem-solving to achieve mutually desired goals.

### CHAPTER THREE: HYPOTHESIZED RELATIONSHIPS

In the current study, the relationships between objective ethnic similarity, perceived deep-level similarity, trust, distrust, propensity to trust, collaboration, and performance on a complex decision-making task are examined. Figure 1 presents a summary of the hypothesized relationships. As mentioned previously, ethnicity is considered to be one outwardly salient component of individual culture, and therefore, ethnic similarity is the cultural variable manipulated in this model. Ethnicity is suggested to influence trust and distrust by impacting an individual's perceptions of deep-level similarity, as suggested by impression formation, relational demography, similarity-attraction paradigm, and social identity theories. The model also examines the influence of propensity to trust, an individual difference variable, on trust and distrust and the relationship between actual and perceived similarity. Trust and distrust, operationalized as negatively related yet distinct attitudinal constructs based on the theory of Lewicki and colleagues (1998), influence the process of collaboration and overall performance separately, and therefore corresponding sub-hypotheses are made for trust and distrust throughout. Rather than restating this rationale repeatedly, it is assumed from this point onward. Each of the hypothesized relationships is described in further detail in the following sections.

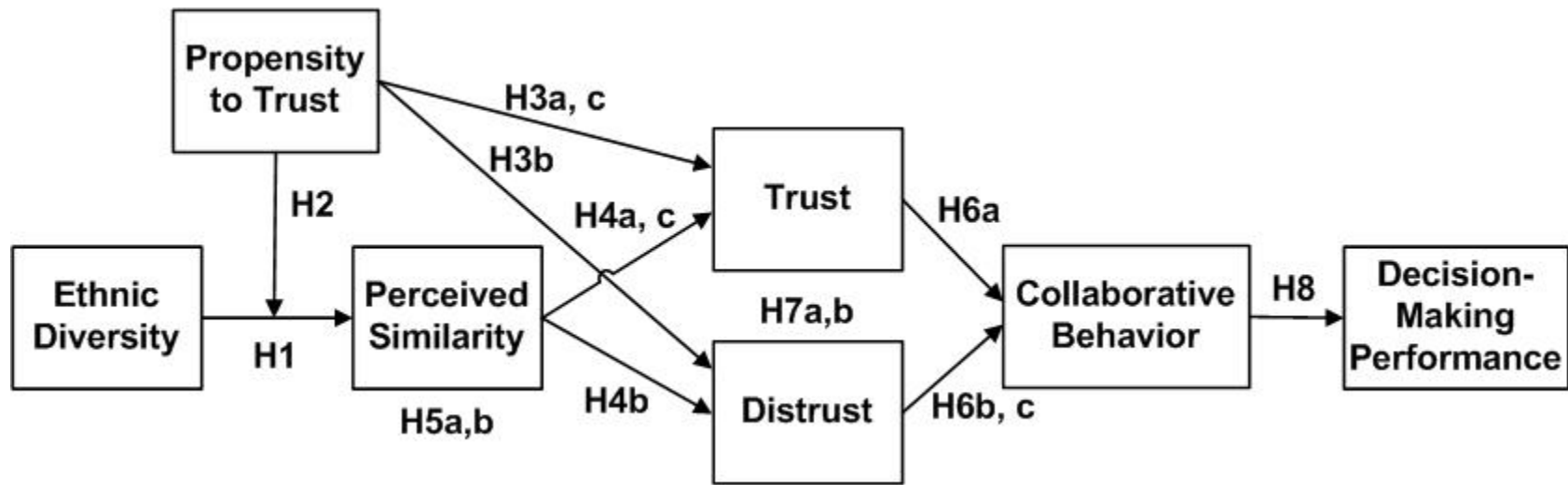


Figure 1. Hypothesized Relationships between Study Variables

## Objective Ethnic Similarity

As has been suggested by Hung and colleagues (2004), when an individual does not have the cognitive resources or motivation necessary to seek information with which to form trust attitudes, they will rely on peripheral cues instead. Peripheral cues include any and all cues that are outwardly salient at the immediate beginning of a team's development (Milliken & Martins, 1996). In general, the only cues that will be immediately salient between individuals first meeting one another in the given study are observable traits such as race, ethnicity, age, or gender. As mentioned in the literature review, similarity in demographic traits between individuals leads to an assumption about similarity in values, beliefs, and attitudes (Tsui et al., 2002) and having this belief about the other's values leads to a sense of predictability and comfort. In short-term temporary collaborations with no prior history, ethnicity will be one of the most salient differences that individuals will use when making assessments regarding others. Therefore, a positive relationship between ethnic similarity and perceived deep-level similarity is expected. Specifically, because ethnic composition of the dyads will be manipulated into cross-ethnicity and same-ethnicity conditions, the following directional finding is hypothesized:

*Hypothesis 1: Cross-ethnicity dyads will report lower levels of perceived deep-level similarity than same-ethnicity dyads.*

## Propensity to Trust

Individuals differ in their general propensity to trust others. In essence, perceived similarity can be conceptualized as a factor of perceived trustworthiness in that individuals perceived to be more similar to oneself will also be perceived as more trustworthy (Brewer, 1979). I further suggest that individuals, when forming trust and distrust attitudes, will be influenced by confirmation bias (Oswald & Grosjean, 2004) when receiving and interpreting

peripheral cues such as ethnicity. Specifically, individuals with a low propensity to trust will be predisposed toward feelings of low trust toward a trustee, and therefore will be more receptive to peripheral cues that confirm that lack of trust. In other words, they will be actively looking for cues that distinguish the trustee from themselves, and will be more likely to interpret differences in demographic traits into perceptions of dissimilarity. Since individuals with a low propensity to trust are naturally more suspicious of others, they will be more likely to look for traits that will confirm their suspicions. Conversely, individuals with a high propensity to trust, who are naturally more trusting and accepting of others, will be more likely to overlook peripheral cues such as ethnic differences that suggest an individual is different from themselves and to ignore demographic differences when making a judgment regarding perceived similarity. Thus, I hypothesize:

*Hypothesis 2: Propensity to trust will moderate the relationship between objective ethnic diversity and perceived deep-level similarity, such that when propensity to trust is low, the relationship between objective ethnic diversity and perceived deep-level similarity will be stronger than when propensity to trust is high.*

It is also expected that propensity to trust will have a direct relationship with trust and distrust attitudes, along with the just described moderating relationship. Gill, Boies, Finegan, and McNally (2005) found that propensity to trust correlated with an individual's intention to trust when the trustworthiness of the other person was ambiguous. This finding supports the idea that propensity to trust will have a significant direct influence on trust in collaborations between individuals with no prior knowledge of each other, as this situation would result in ambiguous levels of perceived trustworthiness during the initial meeting stage. Given the short-term, immediate nature of the task in the current study, it is expected that propensity to trust will play a

critical role in determining subsequent trust levels since participants will have almost no prior knowledge on which to base their trust for a trustee. Additionally, because I conceptualize trust and distrust as conceptually separate yet negatively related concepts, I expect that propensity to trust will be positively related to trust and negatively related to distrust.

Furthermore, according to the attitude theory of positive and negative activation (e.g., Thoresen et al., 2003; Watson, Wiese, Vaidya, & Tellegen, 1999), attitude constructs differ in terms of their valence or hedonic tone. Some attitudes, such as job satisfaction or happiness, are considered positively valenced while others, such as paranoia or stress, are considered negatively valenced. These various attitudes will activate completely different physiological and emotional systems in individuals depending on whether they are positively or negatively toned. Additionally, this theory contends that constructs that match in affectivity should be more closely related than constructs that are affectively mismatched. Trust and propensity to trust could be considered to be positively valenced attitudes while distrust represents a negatively valenced attitude. Therefore, I hypothesize:

*Hypothesis 3a: Propensity to trust will be positively related to trust in short-term ad hoc collaboration.*

*Hypothesis 3b: Propensity to trust will be negatively related to distrust in short-term ad hoc collaboration.*

*Hypothesis 3c: Propensity to trust will be more strongly related to trust than to distrust in short-term ad hoc collaboration.*

#### Perceived Similarity and Trust

Social identity and social categorization theories suggest that if individuals perceive others as similar to themselves, this similarity is associated with a set of predetermined

assumptions and a sense of predictability and comfort. Research has consistently found that perceived similarity increased liking between supervisors and their subordinates (e.g., Tsui & O'Reilly, 1989; Wayne & Liden, 1995). Intuitively, liking is a very similar concept attitudinally to trust. Therefore, perceived similarity is expected to positively influence trust and negatively influence distrust between collaborating partners. Trust is conceptualized as a positive affective state that would be highly related to interpersonal comfort and predictability. Individuals will be more likely to assume that their partner has similar values and beliefs to themselves if they perceive themselves to be racially similar, and this perceived similarity in terms of values leads to an increased sense of interpersonal comfort and trust. Simply stated, individuals are more likely to trust others perceived to be similar to themselves (Brewer, 1979; Brewer & Kramer, 1985; Kramer & Brewer, 1984). In the same logic, individuals will be less likely to distrust others perceived to be similar to themselves. Also, following the positive and negative activation logic delineated in the previous hypothesis, we expect that perceived similarity, as a positively valenced attitudinal construct will be more strongly related to other positively valenced constructs. In other words, I hypothesize that:

*Hypothesis 4a: Perceived similarity will be positively related to trust in short-term ad hoc collaboration.*

*Hypothesis 4b: Perceived similarity will be negatively related to distrust in short-term ad hoc collaboration.*

*Hypothesis 4c: Perceived similarity will be more strongly related to trust than to distrust in short-term ad hoc collaboration.*

According to the Hung and colleagues (2004) theory of trust development, when a trustor has very little opportunity to gather information regarding a trustee, the trustor will rely heavily



on peripheral cues (e.g., ethnicity) when making the decision to trust. This is due to the fact that the trustor has no other cues or information on which to base the decision to trust. Relational demography extends this concept by proposing that similarity in peripheral cues will lead to an assumption about deep-level similarities. In this study, objective ethnic similarity should have a significant impact on the formation of trust attitudes. I further posit that perceived deep-level similarity is the mechanism through which peripheral cues such as gender, ethnicity, and age influence trust. This assumption is based on the various theories of diversity such as relational demography, similarity-attraction paradigm, and social categorization theory. Restated, similarity in terms of ethnicity will impact trust by influencing the perceptions of deep-level similarity held by the involved parties. Therefore, I hypothesize the following:

*Hypothesis 5a: Perceived deep-level similarity will mediate the relationship between objective race diversity and trust.*

*Hypothesis 5b: Perceived deep-level similarity will mediate the relationship between actual race diversity and distrust.*

### Trust and Collaborative Behavior

Across a variety of research, trust generally has been empirically related to desirable performance outcomes such as knowledge sharing, citizenship behaviors, and task performance (Colquitt et al., 2007; Dirks & Ferrin, 2002). I posit that trust is especially critical to collaborative efforts because the nature of collaboration rests so heavily on interaction and knowledge sharing between the collaborating parties. Research has demonstrated that trust increases people's willingness to engage in cooperative and sociable behaviors with others (Kramer, 1999). More specifically, trust "lubricates" the collaborative processes by making the interpersonal interaction more positive and sociable. In other words, if there is a high trust

between the collaborating parties, they will engage in more open and reciprocal behavior with them. Since I defined collaboration as reciprocal problem-solving aimed toward a mutual goal, this suggests that dyads with high levels of trust will engage in more collaborative behavior. Conversely, if there is low trust within the dyad, each party may attempt to solve the problem more individually and in a less collaborative, reciprocal manner. Therefore, I hypothesize:

*Hypothesis 6a: Trust will be positively related to collaborative behavior.*

*Hypothesis 6b: Distrust will be negatively related to collaborative behavior.*

One of the purposes of this empirical investigation is to examine the predictive ability of distrust as a separate construct above and beyond trust. Following the reasoning set out by Lewicki and colleagues (1998), I expect that since distrust is conceptually distinct from trust, and theoretically could exist simultaneously to trust, that it will be a unique predictor of collaboration. In other words, distrust is a negatively-valenced attitude, whereas trust is a positively-valenced attitude.

*Hypothesis 6c: Distrust will predict unique variance in collaborative behavior beyond trust.*

#### Perceived Similarity and Collaborative Behavior

I have already described how similarity-attraction paradigm, relational demography, and social categorization theories support the notion that individuals will trust others that are similar to themselves. In other words, the rationale linking perceived similarity and trust is already established. I also posit that perceived similarity will be positively related to collaborative behavior, and that trust will be the mediating mechanism in this relationship. Social psychology research on in-group and out-group favoritism has indeed shown that individuals will act more altruistically toward members of their in-group than toward members of an out-group, even when

the categorization seems arbitrary (Tajfel, 1970; 1982). In essence, people considered similar to oneself would be considered as part of the in-group based on the perception of shared values and beliefs, whereas people considered dissimilar to oneself would be categorized as out-group members. This suggests that perceived deep-level similarity should be positively related to collaborative behavior. I further suggest that trust is the mediating psychological mechanism that causes perceived similarity to be related to collaborative behavior, based on the expected relationship between trust and collaboration. In other words, individuals will act more collaboratively toward one another if they perceive themselves as similar because this similarity leads them to trust one another, which then leads them to behave more collaboratively. Furthermore, the theory of reasoned action (Ajzen & Fishbein, 1980) supports the idea that a person's behavioral intentions, and behavior, will depend on a person's attitudes.

*Hypothesis 7a: Trust will mediate the relationship between perceived similarity and collaborative behavior.*

*Hypothesis 7b: Distrust will mediate the relationship between perceived similarity and collaborative behavior.*

#### Collaborative Behavior and Decision-Making Performance

Finally, I posit that collaborative behavior will be positively related to overall performance on the decision-making task. Dyads engaging in collaborative behavior are more likely to share information with one another and to consider each other's suggestions while performing the task. More specifically, the decision-making task in the current study requires the collaborating parties to jointly make and implement decisions over time using a variety of guiding information. Increased collaboration behavior (i.e., communication, coordination) should result in more accurate decision-making with the dyad. Research examining processes that can

be considered to represent collaboration in teams has found that process positively predicts team performance across a variety of contexts (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008) supporting the notion that collaborative behavior will be positively related to performance.

*Hypothesis 8: Collaborative behavior will be positively related to overall performance.*

## CHAPTER FOUR: METHODS

### Participants

Participants were 122 male and 92 female undergraduate students enrolled in psychology classes at the University of Central Florida. Their ages ranged from 18 to 37 ( $M = 19.01$ ;  $SD = 2.133$ ). In regards to ethnicity, 169 of the participants self-identified as Caucasian, 6 as Black, 7 as Asian, 1 as Pacific Islander, 13 as Hispanic, 7 as “other”, and 11 did not respond to the self-identified ethnicity question in our pre-study survey. The participants were randomly assigned to work in a same-ethnicity or different-ethnicity dyad based on the ethnicity identified in their pre-screen responses in the online research recruiting system, resulting in a final sample size of 107 dyads. Of these dyads, 58 were same-ethnicity and 49 were different-ethnicity. Same-ethnicity dyads consisted of two self-identified Caucasian participants, while different-ethnicity dyads consisted of one Caucasian participant and one non-Caucasian participant (i.e., Hispanic, American Indian, Black, Pacific Islander, etc). All dyads were matched on gender. There were no significant effects of gender on the relationships reported here however, so all dyads were pooled into a single sample.

### Design and Procedure

Participants were recruited using the university web-based research system and were compensated with extra credit points as approved by the university. Participants first filled out a demographics survey along with the propensity to trust questionnaire and several other individual difference measures in a separate, online survey. After completing this survey, participants were given the opportunity to sign up for the laboratory-based portion of the experiment. Individuals signed up for timeslots which were already assigned into one of two conditions based on race: same-ethnicity or cross-ethnicity dyads. Because of the limited

diversity within our sample and the nature of the compositional manipulation, Caucasian participants were equally likely to sign up for a same-ethnicity or a different-ethnicity condition, but all non-Caucasian participants were included in the different-ethnicity conditions. The in-person experimental sessions generally took just under two hours to complete. The task used in the study was the computer-based political strategy simulation known as Democracy 2.

Upon arrival, participants walked through a short text-based training module explaining the basic game play elements of Democracy 2. After completing training, the dyads worked together on a short practice round that served to familiarize them with the game and each other. Participants then filled out a survey before beginning a full game of Democracy 2, which was limited to a total of one hour of game play. In order to allow levels of collaboration to occur naturally, no specific instructions were given to the dyads other than to “work together” to achieve the goals. This allowed the participants to naturally engage in whatever level of collaboration they chose. Forcing a particular form of collaboration on the dyads could potentially restrict the variation in collaboration behaviors. Participants filled out a final survey before concluding the experiment and being debriefed.

*Task.* Democracy 2 is a game-based political strategy simulation. The game’s computational structure is based on the concept of a neural network. The players assume the role of two governmental officials of a fictional country and collaborate to make decisions such as increasing or decreasing taxes in order to solve societal problems such as gang violence or homelessness. The primary goal of the game is to improve the welfare of your nation while also maintaining enough support to be re-elected at the end of your term. This particular testbed was chosen because it provides a novel collaborative task that is relatively easy to learn and perform, making it suitable for a student sample. However, it also simulates the cognitive processes of

strategy formulation and decision-making in a politically-oriented context, making it very applicable for potential research in the arena of strategic military planning and overseas governmental interactions. In this particular study, the participants were given control of a fictional country that has numerous issues to address including a large national debt, mob problems, and a burden on the medical system caused by a contagious disease. The participants were required to collaboratively address these issues while simultaneously trying to ensure their re-election at the end of the term.

### Measures

*Ethnic diversity.* Objective ethnic diversity of the dyads was coded as a dichotomous variable in order to enable comparison across groups: Same-ethnicity = 1, cross-ethnicity = 2. Ethnicity pairing was quasi-randomly assigned in that participants signed up for timeslots with no knowledge of the conditions.

*Propensity to trust.* Propensity to trust will be measured using the generalized trust scale from the Couch, Adams, & Jones (1996) trust inventory. This scale was designed to assess trust as a basic personality trait, or one's orientation toward people in general. The Cronbach's alpha for this scale was .91. Sample items include "I tend to be accepting of others" and "only a fool would trust most people."

*Perceived deep-level similarity.* Several measures of perceived similarity will be taken after the participants have met, but before they engage in the experimental task. Because I am also interested in perceived deep-level similarity, the items assess similarity in terms of values and beliefs. Several items taken from Ensher & Murphy (1997), which were adapted to apply to this particular experimental situation. The Cronbach's alpha for this scale was .78. Example items include "How similar are you and your partner in regards to how you see things?" and

“How similar are you and your partner in terms of your outlook, perspective and values?” These items were combined with an adapted version of the deep-level work style similarity scale from Zellhmer-Bruhn, Maloney, Bhappu, and Salvador (2008). An example item is “my partner and I share a similar work ethic.” See Appendix J for the full scale.

*Trust and distrust.* Because no existing validated measure of trust appropriately assesses initial trust in a partner, it was necessary to create a unique measure for the purposes of this study. Therefore, items that assess both trust and distrust as based on the theory described by Lewicki and colleagues (1998) were written and partially validated prior to use (Wildman, Fiore, Burke, & Salas, 2009). In particular, these items are intended to measure initial levels of trust and distrust prior to any interaction with the trustee. The Cronbach’s alpha for these scales were .92 and .93, respectively. An example item for trust is “I have faith that my partner will perform their role with our mutual interest in mind” while an example item for distrust is “I fear that my partner will not perform their role with our mutual interest in mind.” These two items demonstrate one conceptual difference between the attitudes of trust and distrust – namely, that trust is characterized by faith while distrust is characterized by fear.

*Collaborative behavior.* Several of the dimensions from the Marks, Mathieu, and Zaccaro (2001) team process measure that represent aspects of the collaborative process were combined to serve as the measure of collaborative behavior. Specifically, because collaboration is defined as being dynamic and evolving, monitoring progress toward goals and resource monitoring were included. In other words, as the simulation progressed and the conditions surrounding the problem changed, successful collaborative dyads should have kept track of their progress and their resources. Because collaboration is described as a behavioral process of reciprocal interaction, team monitoring/backup and coordination were included to assess the extent to



which the dyads were acting reciprocally and working together to solve the problem. The interpersonal process of motivating and confidence was also included in order to capture the “shared” part of collaboration. In other words, I describe collaboration as being aimed at some shared goal. Therefore, effective collaboration should demonstrate high levels of motivation and encouragement between the involved parties. The Cronbach’s alpha for this scale was .95. Sample items include “To what extent does our team actively work to smoothly integrate our work efforts?” and “To what extent does our team actively work to assist each other when help is needed?”

*Performance.* Performance was measured using several objective indicators of performance pulled from the Democracy 2 simulation: final popularity score (out of 100 percent) and final national debt (in dollars). The overall performance score was calculated as a weighted combination of the final popularity scores and final debt scores. The dollar amount of debt was converted into a decimal that represented the percentage of the maximum level of debt that was achieved across all teams. The final popularity score for each dyad was then multiplied by this decimal value, resulting in higher scores for dyads that achieved higher popularity and low debt, and lower scores for dyads that achieved low popularity and high debt. This resulted in a distribution of final performance scores that was normal.

*Control variables.* In order to control for as much extraneous variance as possible, a variety of individual difference variables were measured during the online pre-survey. Specifically, age, gender, prior gaming experience, video game self-efficacy, collective orientation (Driskell, Salas, & Hughes, 2009), ethnic identification, acculturation (Stephenson, 2000), basic empathy (Jolliffe & Farrington, 2005), social dominance (Pratto, Sidanius, Stallworth, & Malle, 1994), familiarity with the other participant, and prior cross-ethnic

experiences were all measured and examined as potential control variables. See Appendices for the full scales for all measures. Out of these scales, only age, social dominance, and familiarity of the other participant were significant covariates and were included in several analyses.

## CHAPTER FIVE: RESULTS

### Data Analysis

SPSS 16.0 for Windows was used to test all study hypotheses. All continuous study variables were aggregated to the dyad level by taking the average of the members' scores. It has been suggested that this form of aggregation is most appropriate when team members can easily compensate for one another on task contributions (LePine et al., 1997). Given that in the Democracy 2 task the participants were sitting side-by-side with access to the same set of information and therefore had ample opportunity to compensate for one another's contributions, this was chosen as the most appropriate aggregation method.

To test the predicted relationships, several analytical procedures were utilized. First, correlations were calculated between all measured variables to check that relationships were significant and in the hypothesized direction. All linear hypothesized relationships between continuous variables (hypotheses 3a, 3b, 4a, 4b, 6a, and 6b) were tested using simple regression. Hypothesis 1 was tested using a one-way analysis of covariance (ANCOVA) in order to control for potential confounds when examining the differences in perceived deep-level similarity across experimental ethnicity conditions. Adjusted mean scores for the two groups were used to assess if the findings were in the predicted direction. The interaction term was calculated and used in regression to test for the moderating effect of propensity to trust on the relationship between objective ethnic similarity and perceived deep-level similarity in hypothesis 2. Hypotheses 3c and 4c were tested using chi-square comparison tests. Hierarchical regression was used to examine the predictive power of distrust on collaboration above and beyond trust in Hypothesis 6c.

Bootstrapping techniques as suggested by Preacher & Hayes (2004; 2008) were used to test for mediation in hypotheses 5a, 5b, 7a, and 7b. Bootstrapping is superior to the Baron and Kenny (1986) approach for testing mediation for several reasons. First, it does not impose the assumption of normality of the sampling distribution, which is an assumption that is often violated in small samples and can lead to issues with power and Type I errors. Bootstrapping also has a potential to test a single multiple mediation model rather than testing multiple separate mediation models, increasing the power of the test and allowing for the relative magnitude of indirect effects to be directly compared. It can also be applied to small samples with more confidence, and provides confidence intervals regarding the magnitude of indirect effects, making it a more descriptive method of analysis as well. The results of all analyses using the aggregated data are presented in the following section.

### Hypothesis Results

Pearson product-moment correlation results and descriptive statistics for all study variables are reported in Table 1. Hypothesis 1 stated that cross-ethnicity dyads would report lower levels of perceived deep-level similarity than same-ethnicity dyads. Three covariates were found to have significant correlations with either ethnic diversity or perceived deep-level similarity: age, familiarity between participants, and prior cross-ethnicity experience. A one-way analysis of covariance (ANCOVA) was conducted to compare perceived deep-level similarity across the two experimental ethnicity conditions while controlling for these three variables. The independent variable, objective ethnic diversity, was manipulated compositionally into two levels: same and different ethnicity. The dependent variable was a continuous variable of self-reported perceived similarity, and the covariates were continuous self-report variables. A preliminary analysis evaluating the homogeneity-of-slopes assumption indicated that age did not

significantly interact with objective ethnic diversity,  $F(1, 99) = .25$ ,  $MSE = 2.41$ ,  $p = .62$ , partial  $\eta^2 = .01$  and familiarity did not significantly interact with objective ethnic diversity,  $F(1, 99) = 1.66$ ,  $MSE = 15.76$ ,  $p = .20$ , partial  $\eta^2 = .02$ . However, ethnic experience did significantly interact with the diversity manipulation to predict perceived deep-level similarity,  $F(1, 101) = .230$ ,  $MSE = 2.26$ ,  $p = .63$ , and could not be used as a covariate in the analysis. Therefore, familiarity and age were retained in the final ANCOVA, but ethnic experience was not. The ANCOVA was significant,  $F(1, 103) = 14.24$ ,  $MSE = 141.43$ ,  $p = .000$ , partial  $\eta^2 = .12$ . The strength of the relationship between objective ethnic diversity and perceived deep-level similarity was moderate as assessed by partial  $\eta^2$ , with objective ethnic diversity accounting for 12% of the variance in perceived deep-level similarity, holding constant the level of familiarity between participants and age.

Table 1. Summary of Intercorrelations, Means, and Standard Deviations for Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Ethnic Diversity	--										
2. Propensity to Trust	-.080	<b>.905</b>									
3. Perceived Similarity	.396**	.134	<b>.784</b>								
4. Trust	.130	.225*	.638**	<b>.920</b>							
5. Distrust	-.187	-.219*	-.408**	-.622**	<b>.928</b>						
6. Collaboration	.080	.139	.319**	.379**	-.281**	<b>.954</b>					
7. Performance	-.113	.110	.020	.159	-.191	.386**	--				
8. Familiarity <sup>c</sup>	.156	.063	.284**	.083	-.003	.083	-.250**	--			
9. Social Dominance <sup>c</sup>	-.084	.359**	.018	-.185	.247*	-.045	.024	.117	--		
10. Acculturation <sup>c</sup>	.034	.537**	-.187	-.105	.201*	-.092	-.027	-.088	.391**	<b>.912</b>	
11. Age <sup>c</sup>	.155	-.002	-.327**	-.184	.084	-.101	.084	-.103	-.275**	.157	--
<i>M</i>	1.54	69.28	34.76	2.60	21.13	90.42	.393	1.19	35.34	92.36	18.99
<i>SD</i>	.50	13.70	3.65	3.86	5.43	10.33	.103	.745	11.29	16.45	1.45

Note. N = 107 dyads. Cronbach's alpha reliability coefficient is presented in the diagonal. <sup>c</sup>=control

\* p < .05, two-tailed    \*\* p < .01, two-tailed

The mean scores on perceived deep-level similarity adjusted for level of familiarity were as expected across the two ethnic diversity conditions. Participants in the different-ethnicity condition reported lower levels of perceived deep-level similarity ( $M = 33.49$ ) than participants in the same-ethnicity condition ( $M = 35.85$ ). It should be noted that the Levene statistic for homogeneity of variances indicated that the variances of the dependent variable were not equal among groups,  $F(1,105) = 6.692, p = .011$ . However, an independent sample t-test was also conducted to ensure that this relationship is trustworthy when equal variances are not assumed, and the t-test where equal variances are not assumed was also significant,  $t(105) = 4.326, p = .000$ . Thus, hypothesis 1 was fully supported.

Hypothesis 2 stated that propensity to trust would moderate the relationship between ethnic diversity and perceived similarity. In order to test this relationship, the interaction term between propensity to trust and ethnic diversity was calculated and put into a regression equation predicting perceived similarity along with the two main effects. The results of this analysis demonstrated that while the total model accounted for a significant amount of variance in perceived similarity (Table 2), the interaction between propensity to trust and objective ethnic diversity did not account for significant variance in perceived similarity,  $\beta = .18, t(3, 103) = .344, p = .732$ . Therefore, hypothesis 2 was not supported.

Table 2. Regression of Perceived Similarity on Propensity to Trust, Ethnic Diversity, and their Interaction

Predictor	<i>B</i>	<i>SE B</i>	$\beta$	95% CI
Propensity to Trust	.002	.080	.008	[-.15, .16]
Ethnic Diversity	-3.97	3.39	-.550	[-10.68, 2.75]
PT*Ethnic Diversity	.020	.050	.190	[-.08, .11]
R <sup>2</sup>	.14**			
F for change in R <sup>2</sup>	6.962**			

Note. N = 107 dyads.

\*  $p < .05$ , two-tailed    \*\*  $p < .01$ , two-tailed



Hypotheses 3a and 3b stated that propensity to trust would be positively related to trust and negatively related to distrust, respectively. Simple linear regression (Table 3) indicated that propensity to trust was a significant positive predictor of trust,  $R^2 = .05$ ,  $\beta = .225$ ,  $t(1, 105) = 2.371$ ,  $p = .020$ . None of the measured control variables were significantly correlated with trust, so no controls were included in this regression. Social dominance and acculturation were found to be correlated with distrust, however, and therefore were included in the regression predicting distrust with propensity to trust in order to increase the power of the test. Acculturation was found to not be a significant predictor of perceived deep-level similarity when included with social dominance, however, and was therefore dropped from the final analysis. The final multiple regression (Table 4) indicated that social dominance was a significant covariate when included as a predictor,  $\beta = .37$ ,  $t(1, 105) = 3.90$ ,  $p = .000$ , and propensity to trust was a significant negative predictor of distrust,  $R^2$  change = .11,  $\beta = -.35$ ,  $t(1, 105) = -3.69$ ,  $p = .000$  when controlling for the effect of social dominance. Therefore, hypothesis 3a and 3b were both supported.

Hypothesis 3c stated that propensity to trust would be more strongly related to trust than to distrust. In order to test if propensity to trust was more strongly related to trust than distrust, the differences between the correlations was tested using a chi-square test. Pearson correlations (one-tailed) indicated that propensity to trust was significantly positively related to trust ( $r = .225$ ,  $p = .01$ ) and significantly negatively related to distrust ( $r = -.219$ ,  $p = .012$ ). The chi-square test indicated that the correlations were not significantly different from each other,  $\chi^2 = .002$ ,  $p = .964$ . Thus, hypothesis 3c was not supported.

Table 3. Regression Analyses Predicting Trust from Propensity to Trust

Variable	<i>B</i>	<i>SE B</i>	$\beta$	95% CI
Propensity to Trust	.064	.027	.225	[.010, .117]
$R^2$		.051*		
F for change in $R^2$		5.623*		

N = 107 dyads.

\*  $p < .05$ , two-tailed

Table 4. Hierarchical Regression Analyses Predicting Distrust from Social Dominance and Propensity to Trust

Variable	Model 1				Model 2			
	<i>B</i>	<i>SE B</i>	$\beta$	95% CI	<i>B</i>	<i>SE B</i>	$\beta$	95% CI
Social Dominance	.119	.045	.247	[.028, .209]	.180	.046	.374	[.088, .271]
Propensity to Trust					-.140	.038	-.353	[-.215, -.065]
R <sup>2</sup>		.061*				.169**		
F for change in R <sup>2</sup>		6.803*				13.597**		

N = 107 dyads.

\*  $p < .05$ , two-tailed    \*\*  $p < .01$ , two-tailed

Hypotheses 4a and 4b stated that perceived similarity would be positively related to trust and negatively related to distrust, respectively. Simple linear regression (Table 5) indicated that perceived deep-level similarity was a significant positive predictor of trust,  $R^2 = .41$ ,  $\beta = .638$ ,  $t(1, 105) = 8.5$ ,  $p = .000$ . Again, because social dominance is a significant predictor of distrust, it was included as a covariate. Results (Table 6) indicate that social dominance is a significant covariate,  $\beta = .254$ ,  $t(1, 105) = 2.96$ ,  $p = .004$ , and perceived deep-level similarity was a significant negative predictor of distrust,  $R^2$  change = .17,  $\beta = -.41$ ,  $t(1, 105) = -4.80$ ,  $p = .000$ , when controlling for social dominance. Pearson correlations (one-tailed) also indicated that perceived deep-level similarity was positively related to trust ( $r = .638$ ,  $p = .000$ ) and negatively related to distrust ( $r = -.408$ ,  $p = .000$ ). Therefore, hypotheses 4a and 4b were supported. In regards to hypothesis 4c, the chi-square test indicated that the absolute value of the correlations for perceived deep-level similarity and trust and distrust, respectively, were significantly different,  $\chi^2 = 5.377$ ,  $p = .02$ , which corresponds with the r-squared values that indicate that propensity to trust accounts for 41% of the variance in trust and only 17% of the variance in distrust after accounting for the variance due to social dominance. Therefore, hypothesis 4c was supported.

Table 5. Regression Analyses Predicting Trust from Perceived Deep-Level Similarity

Variable	<i>B</i>	<i>SE B</i>	$\beta$	95% CI
Perceived DL Similarity	.682	.080	.638	[.523, .841]
R <sup>2</sup>		.408**		
F for change in R <sup>2</sup>		72.248**		

N = 107 dyads.

\*  $p < .05$ , two-tailed

Table 6. Hierarchical Regression Analyses Predicting Distrust From Social Dominance and Perceived Deep-Level Similarity

Variable	Model 1				Model 2			
	<i>B</i>	<i>SE B</i>	$\beta$	95% CI	<i>B</i>	<i>SE B</i>	$\beta$	95% CI
Social Dominance	.119	.045	.247	[.028, .209]	.122	.041	.254	[.040, .204]
Perceived DL Similarity					-.617	.128	-.413	[-.871, -.362]
R <sup>2</sup>		.061*				.231**		
F for change in R <sup>2</sup>		6.803*				23.061**		

N = 107 dyads. DL = deep-level.

\*  $p < .05$ , two-tailed    \*\*  $p < .01$ , two-tailed

Hypothesis 5a stated that perceived deep-level similarity would mediate the relationship between objective ethnic diversity and trust. In order to test this hypothesis, the bootstrapping statistical method suggested by MacKinnon, Krull, and Lockwood (2000) and Preacher and Hayes (2004; 2008) was used (Table 7). More specifically, the SPSS macro for this statistical procedure created by Preacher and Hayes (2004) was used to run all analyses. All results are based on 5,000 bootstrap samples. In order to make the results more easily interpretable, objective ethnic diversity was reverse coded to represent objective ethnic similarity such that lower scores indicated ethnically-diverse dyads and higher scores indicated ethnically-similar dyads. Objective ethnic similarity was entered as the independent variable, trust as the dependent variable, and perceived deep-level similarity as the mediator. Propensity to trust was also included as a covariate since it is a significant predictor of trust. The partial effect of propensity to trust on trust was significant,  $.042, p = .05$ , and was therefore retained as a covariate in the analysis. The total effect of objective ethnic similarity on trust was not significant,  $c = .874, t(107) = 1.18, p = .24$ . The direct effect, however, was approaching significance when perceived deep-level similarity was included as a mediator,  $c' = -1.172, t(107) = -1.89, p = .06$ . The total indirect effect of objective ethnic similarity on trust through perceived deep-level similarity was significant, point estimate = 2.05, with a 95% BCa CI of 1.13 to 3.20 (Figure 2).

Several authors have recently argued that a significant total effect of the independent variable on the dependent variable is not necessary for mediation to occur, as certain patterns of inconsistent mediation can lead to apparently insignificant total effects (see MacKinnon et al., 2000; Shrout & Bolger, 2002). More specifically, MacKinnon and colleagues (2000) contend that when the direct and indirect effects of the independent variable on the dependent variable have opposite signs, it is indicative of a suppression or inconsistent mediation effect. In other

words, the direct and indirect effects of the independent variable can cancel each other out when combined and cause a misleading non-significant total effect. The finding that the effect of objective ethnic similarity was not significant when the mediator was included, but then gets closer to significance when the mediator is included suggests that inconsistent mediation, or suppression, is occurring (MacKinnon, Krull, & Lockwood, 2000). This interpretation is further supported by the fact that the total indirect effect of objective ethnic similarity on trust through perceived deep-level similarity was significant and in the opposite direction of the direct effect. Therefore, this finding suggests that perceived deep-level similarity does partially mediate the relationship between objective ethnic similarity and trust, but that inconsistent mediation or suppression is occurring. Thus, hypothesis 5a was partially supported.



Table 7. Indirect Effect of Objective Ethnic Similarity on Trust through Perceived Deep-Level Similarity

		Bootstrapping					
		Percentile 95% CI		BC 95% CI		BCa 95% CI	
Point	Estimate	Lower	Upper	Lower	Upper	Lower	Upper
Perceived DL							
Similarity	2.05	1.08	3.10	1.17	3.24	1.13	3.20

*Note.* N = 107 dyads. DL = deep-level, BC = bias corrected, BCa = bias corrected and accelerated, 5,000 bootstrap samples

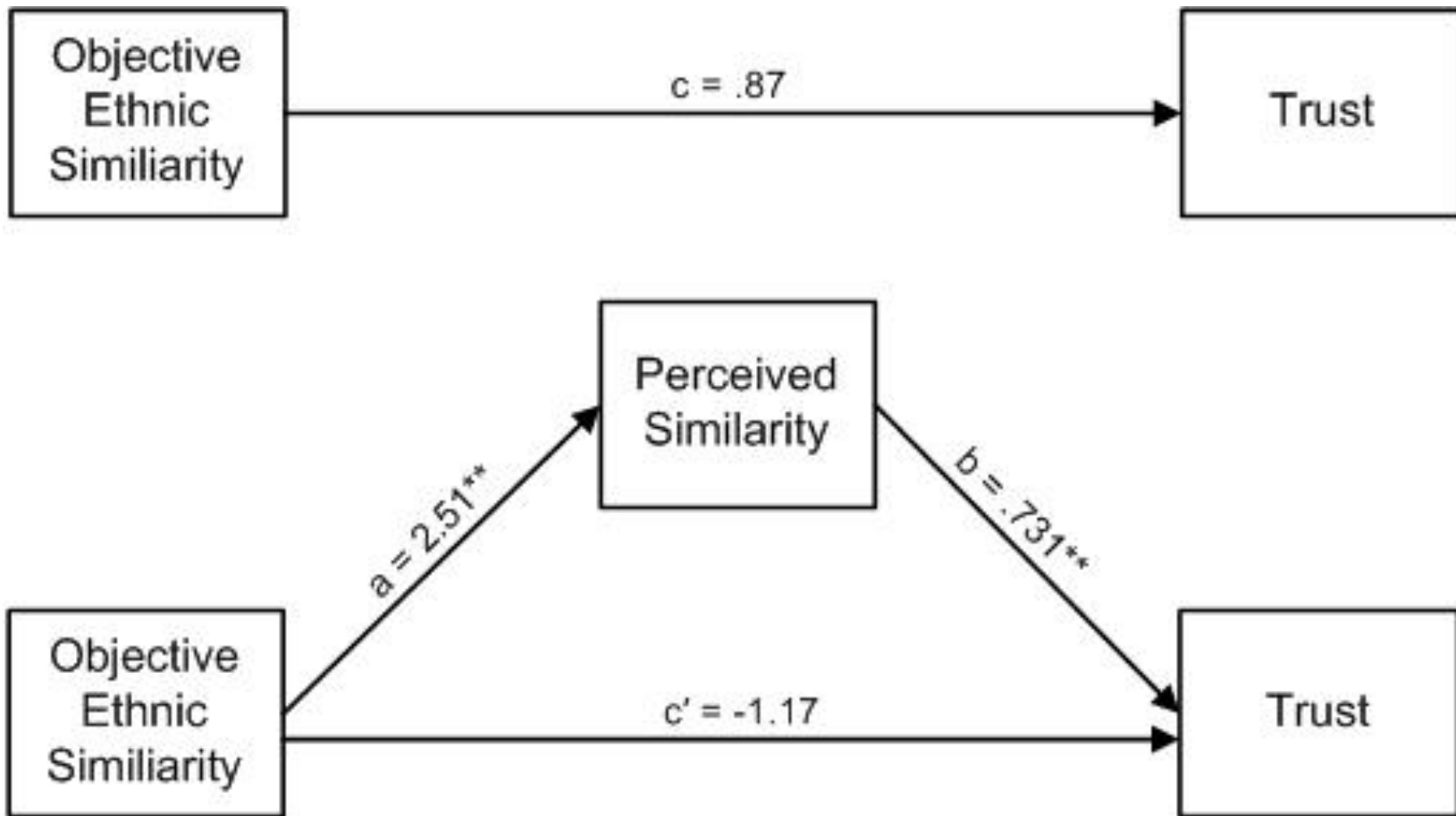


Figure 2. Mediation Model for Direct and Indirect Effects of Objective Ethnic Similarity on Trust

Hypothesis 5b similarly stated that perceived similarity would mediate the relationship between objective ethnic diversity and distrust (Table 8). Objective ethnic diversity was entered as the independent variable and again reverse coded to represent ethnic similarity, distrust as the dependent variable, and perceived deep-level similarity as the mediator. Propensity to trust was again included as a covariate, as well as social dominance since it is significantly related to distrust. The total effect of objective ethnic similarity on distrust while accounting for propensity to trust and social dominance was significant,  $c = -2.08$ ,  $t(107) = -2.17$ ,  $p = .03$ . The direct effect became insignificant when the mediator was included,  $c' = -.57$ ,  $t(107) = -.59$ ,  $p = .55$ , suggesting that the negative effect of objective ethnic similarity on distrust was fully mediated through perceived deep-level similarity. This is further supported by the fact that the total indirect effect of objective ethnic similarity on distrust through perceived deep-level similarity was significant (Figure 3), with a point estimate of  $-1.50$  and a 95% BCa CI of  $-2.81$  to  $-.62$ . Therefore, hypothesis 5a was supported.

Table 8. Indirect Effect of Objective Ethnic Similarity on Distrust through Perceived Deep-Level Similarity

		Bootstrapping					
		Percentile 95% CI		BC 95% CI		BCa 95% CI	
Point	Estimate	Lower	Upper	Lower	Upper	Lower	Upper
Perceived DL							
Similarity	-1.50	-2.83	-.45	-3.08	-.53	-2.81	-.62

*Note.* N = 107 dyads. BC = bias corrected, BCa = bias corrected and accelerated, 5,000 bootstrap samples

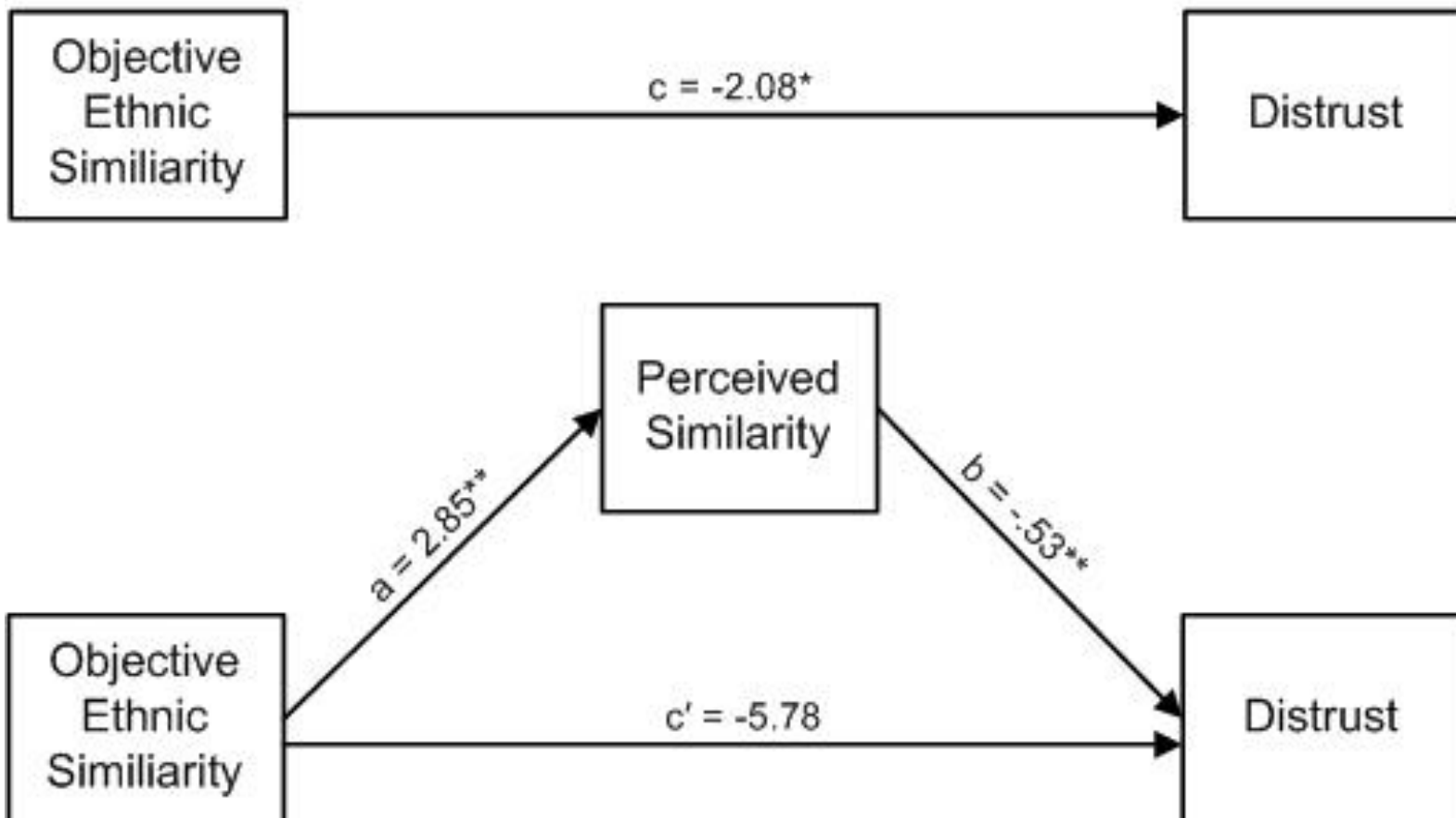


Figure 3. Mediation Model for Direct and Indirect Effects of Objective Ethnic Similarity on Distrust

Hypotheses 6a and 6b stated that trust would be positively related to collaboration, and distrust would be negatively related to collaboration, respectively. Hypothesis 6c further stated that distrust would predict unique variance in collaboration above and beyond the variance explained by trust. To test these hypotheses, multiple regression was conducted to predict collaboration from trust and distrust (Table 9). Collinearity statistics were checked to ensure that the correlation between trust and distrust was not violating any assumption. The tolerance statistic, .613, and VIF, 1.632, indicated that there were no problems with collinearity. The results of the first model indicate that trust accounts for a significant amount of variability in collaboration,  $R^2 = .14$ ,  $F(1, 105) = 17.65$ ,  $p = .000$ . The second model evaluated whether or not distrust predicted above and beyond trust. Results indicate that distrust did not account for significant variance in collaboration beyond trust,  $R^2$  change = .003, partial  $r = .06$ ,  $F(1, 104) = .41$ ,  $p = .526$ . Therefore, hypothesis 6c was not supported.

Table 9. Hierarchical Regression Analyses Predicting Collaboration from Trust and Distrust

Variable	Model 1				Model 2			
	<i>B</i>	<i>SE B</i>	$\beta$	95% CI	<i>B</i>	<i>SE B</i>	$\beta$	95% CI
Trust	1.01	.24	.38	[.53, 1.48]	.89	.31	.33	[.28, 1.50]
Distrust					-.14	.22	-.07	[-.64, .53]
R <sup>2</sup>		.14**				.15*		
F for change in R <sup>2</sup>		17.65**				.41*		

N = 107 dyads.

\*  $p < .05$ , two-tailed    \*\*  $p < .01$ , two-tailed

Hypothesis 7a and 7b stated that trust and distrust would mediate the relationship between perceived similarity and collaboration. Again, the bootstrapping method suggested by Preacher and Hayes (2004; 2008) was used. Collaboration was entered as the dependent variable, perceived deep-level similarity as the independent variable, and trust and distrust were entered simultaneously as mediators in order to test it as a multiple mediator model (Table 10). The total effect of perceived deep-level similarity on collaboration was significant,  $c = .91$ ,  $t(107) = 3.45$ ,  $p = .001$ , indicating that the independent variable is related to the dependent variable. The direct effect was insignificant when the combined mediators were included,  $c' = .36$ ,  $t(107) = 1.09$ ,  $p = .28$  while the indirect effect through the combined proposed mediators was significant, point estimate = .54, with a 95% BCa CI of .16 to .98. The individual indirect effects through trust, point estimate = .46,  $p = .07$ , 95% BCa CI = .01 to .94, and distrust, point estimate = .08,  $p = .14$ , 95% BCa CI = -.16 to .39, were not significant, indicating that neither construct was a significant mediator when their unique variance was considered alone, but that when shared variance between them was considered, they did mediate the relationship as indicated by the significant total indirect effect. While this means that hypotheses 7a and 7b were not supported individually, the findings do indicate that trust and distrust fully mediate the relationship between perceived deep-level similarity and collaboration when considered together (Figure 4).



Table 10. Mediation of the Effect of Perceived Deep-Level Similarity on Collaboration through Trust and Distrust

	Products of			Bootstrapping					
	Coefficients			Percentile 95% CI		BC 95% CI		BCa 95% CI	
	Point Estimate	SE	Z	Lower	Upper	Lower	Upper	Lower	Upper
Indirect Effects									
Trust	.46	.25	1.83	-.01	.93	-.01	.96	.01	.94
Distrust	.08	.13	.62	-.22	.35	-.19	.37	-.16	.39
TOTAL	.54	.22	2.46	.11	.92	.15	.97	.16	.98
Contrasts									
Trust vs. distrust	.38	.34	1.11	-.26	1.07	-.25	1.09	-.29	1.02

*Note.* N = 107 dyads. BC = bias corrected, BCa = bias corrected and accelerated, 5,000 bootstrap samples

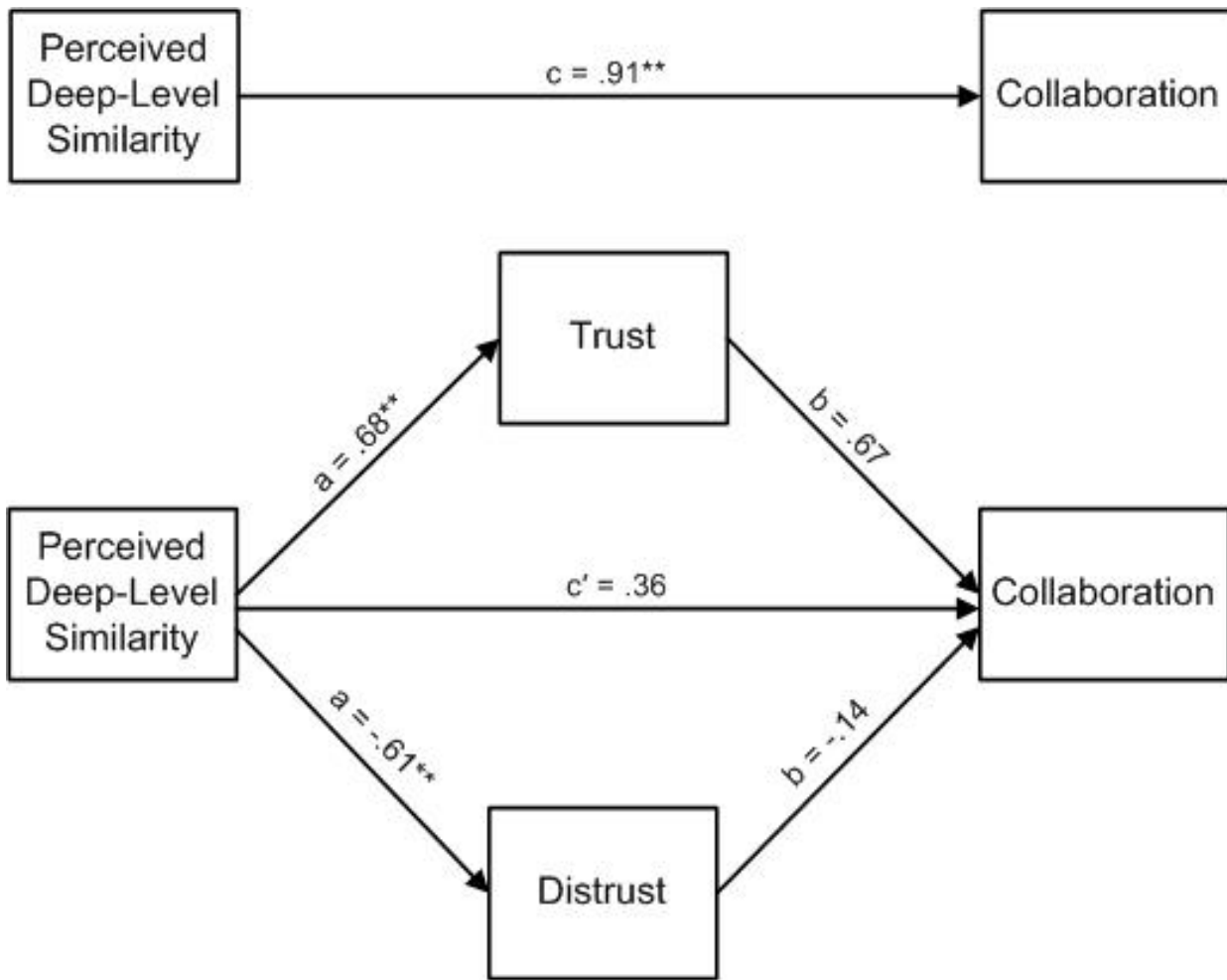


Figure 4. Multiple Mediation Model for Direct and Indirect Effects of Perceived Deep-Level Similarity on Collaboration

Finally, hypothesis 8 stated that collaboration would be positively related to overall performance on the decision-making simulation. Familiarity was included as a covariate since it is significantly correlated with performance. Multiple regression (Table 11) indicated that familiarity is a significant covariate,  $\beta = .01$ ,  $t(1, 103) = -3.27$ ,  $p = .001$ , and collaboration does account for a significant amount of the variance in performance,  $R^2$  change = .17,  $\beta = .41$ ,  $t(1, 103) = 4.71$ ,  $p = .000$ , when accounting for level of familiarity between participants. Therefore, hypothesis 8 stating that collaboration is related to higher performance on the simulation was supported.

Table 11. Hierarchical Regression Analyses Predicting Performance from Familiarity and Collaboration

Variable	Model 1				Model 2			
	<i>B</i>	<i>SE B</i>	$\beta$	95% CI	<i>B</i>	<i>SE B</i>	$\beta$	95% CI
Familiarity	-.035	.013	-.250	[-.061, -.009]	-.039	.012	-.284	[-.063, -.016]
Collaboration					.004	.001	.409	[.002, .006]
R <sup>2</sup>		.063*				.229**		
F for change in R <sup>2</sup>		6.947*				22.190**		

N = 107 dyads.

\*  $p < .05$ , two-tailed    \*\*  $p < .01$ , two-tailed

## CHAPTER SIX: DISCUSSION

The current laboratory study provided insight on several relationships regarding ethnic diversity, perceived similarity, trust, distrust, and collaboration. First, I found that mixed ethnicity dyads reported lower perceived deep-level similarity than same-ethnicity dyads. This finding supports the notion from relational demography theory (Tsui et al., 2002) that similarity in outwardly observable traits such as ethnicity leads to assumptions regarding similarity in deep-level traits such as beliefs, values, and personality. The two conditions, because they were quasi-randomly assigned, did not have significant differences in any of the potential individual difference control variables I measured, and gender had no significant impact on perceived similarity. Therefore, it seems likely that the differences in the manipulated variable of ethnic diversity are what led to differences in perceived deep-level similarity. This finding suggests that individuals, even when performing together for a very short amount of time, are aware of outwardly observable differences in ethnicity, and that these differences translate into assumptions of differences in values and work styles.

Second, propensity to trust was found to be a positive predictor of trust and a negative predictor of distrust, suggesting that in this particular context, an individual's general tendency to trust others does directly influence the formation of their trust and distrust attitudes. Propensity to trust was not more strongly related to trust than to distrust as hypothesized. In retrospect, the lack of support for hypothesis 3c was not surprising due to the fact that the measure of propensity to trust used included several reverse-coded items that were qualitatively more reflective of distrust attitudes than trust attitudes. In other words, the measure was actually tapping into propensities to both trust and distrust, and was actually simultaneously triggering positive activation and negative activation, making it equally related to both trust and distrust.

Contradictorily to the above finding, it was found that perceived deep-level similarity was predictive of both trust and distrust, but was significantly more predictive of trust than distrust. More specifically, perceived deep-level similarity accounted for more than double the amount of variance in trust than it did for distrust. This finding supports Thoresen and colleagues' (2003) belief that positively-valenced constructs are more predictive of other positively-valenced constructs than of negatively-valenced constructs. It further suggests that trust and distrust are separate constructs with varying relationships with their predictors given the differential strength of the relationships between perceived deep-level similarity and trust and distrust, respectively. This particular measure did not include any reverse coded items that could have potentially made the construct both positively and negatively valenced, which complements the suggestion that the previous non-finding could be due to the mixed nature of the propensity to trust measure.

Bootstrapping methods demonstrated that perceived similarity did mediate the relationship between objective ethnic diversity and trust and distrust, respectively. However, the pattern of mediation for trust and distrust were quite different. Interestingly, the total relationship between objective ethnic diversity and trust was non-significant, which appears to have occurred because the direct and indirect effects are in opposite directions, resulting in a null total effect. As described by MacKinnon and colleagues (2000), this pattern of results suggests that inconsistent mediation is occurring. In other words, the direct and indirect effects of objective ethnic diversity on trust have contradicting directions. In this data, it appears that indirect effect is in the hypothesized direction, with higher ethnic similarity leading to higher perceived deep-level similarity and subsequently higher trust. However, the direct effect is surprisingly in the opposite direction – higher ethnic similarity actual leads to lower levels of trust when considered

directly. It is possible that this relationship is an artifact of social desirability. Individuals may be attempting to appear more socially desirable by inflating their reports of trust when they are in mixed ethnicity condition in order to avoid appearing racist. Regardless, the significant indirect effect of ethnic diversity on trust via perceived deep-level similarity combined with the findings from hypothesis one do imply overall that individuals perceive themselves to more similar on deep-level characteristics to ethnically similar others, and that this perceived deep-level similarity results in increased levels of trust.

The pattern of relationships between objective ethnic diversity, perceived deep-level similarity, and distrust looked quite different from those with trust. While the total relationship between objective ethnic similarity and trust was non-significant and the mediation analysis suggested inconsistent mediation, the total relationship between objective ethnic similarity and distrust was significant. Furthermore, the direct effect of objective ethnic similarity on distrust became insignificant when the mediator, perceived deep-level similarity, was included. This pattern of results suggests that traditional full mediation is occurring, and in the hypothesized direction. The fact that objective ethnic diversity had very different indirect impacts on trust and distrust, and that these impacts are mediationally translated in different ways, does support the notion that trust and distrust are related, yet separate, attitudes that must be captured individually if scientists are to truly understand how trust and distrust attitudes are developed.

This study also found that trust was a significant predictor of collaborative behavior, but distrust did not predict unique variance beyond that of trust in this situation. This finding could be interpreted as suggesting that distrust does not account for enough unique variance to warrant being examined as a separate construct. In other words, in this particular study, trust and distrust shared so much variance that distrust did not contribute any unique predictive power. However,

this finding should be interpreted with caution as it could potentially be an artifact of the task type. The task was not very high on interpersonal risk because the two participants were easily able to monitor one another's action and compensate for one another's weaknesses. This likely made distrust an obsolete attitude in this setting. In other words, because there was no risk inherent in the task, there was no real need for participants to distrust one another or for distrust to have a negative impact on collaboration. Therefore, I posit that the results of this study, overall, suggest that trust and distrust are highly related yet conceptually distinct constructs given their differential relationships with their predictors despite the finding that distrust did not provide unique predictive power above trust.

The multiple mediation bootstrap analysis looking at the indirect effects of perceived deep-level similarity on collaboration revealed several interesting patterns. First, it was found that neither trust nor distrust significantly mediated the relationship individually, but that the two variables together did fully mediate the relationship between perceived deep-level similarity and collaboration. This is likely due to the large amount of shared variance between trust and distrust mentioned previously. In other words, neither construct contained enough unique variance in this setting to act as significant mediators alone, but when the shared variance was included, trust and distrust combined did fully account for the relationship between perceived deep-level similarity and collaboration. This finding suggests that trust-related attitudes as a whole are the explanatory mechanism for why people that perceive themselves to be similar to one another act more collaboratively.

Finally, collaborative behavior did predict overall performance on the Democracy 2 simulation after controlling for the impact of familiarity. This suggests that engaging in



behaviors such as coordination, backup behavior, and confidence and motivation building does positively correlate with more effective decision-making.

### Theoretical Implications

The findings of this study suggest several things regarding future theoretical work. First, the finding that objective ethnic similarity causes individuals to perceive similarities in terms of deep-level values, styles, and beliefs suggests that it is critical to measure both objective and perceived similarity if we are to truly understand the influence of cultural diversity on collaboration. It also suggests that it is important to keep objective and perceived similarity conceptually and empirically distinct. In other words, is it not just actual differences in ethnicity or beliefs that influences attitude formation and behavior, but it is also the perception of similarity that is critical to the formation of impressions. Second, the finding of this study that propensity to trust is only one of several predictors of trust and distrust in short-term, ad hoc settings supports the notions set forth by other researchers (e.g., Hung et al., 2004) that when individuals have very little information about others, they will use salient surface-level characteristics such as ethnicity to form assumptions and attitudes. This finding is important to theory because it suggests that appearances do matter, and that while individuals may not be cognitive of these processes, they are indeed forming opinions about others based on a combination of predisposition, surface-level traits, and prior knowledge associated with those traits.

Furthermore, the combined findings of this study suggest that future research should conceptualize and measure trust and distrust separately in order to provide the most predictive results. While our results were somewhat mixed regarding the distinction between trust and distrust in terms of differences in predictors and ability to predict, the bulk of the findings

demonstrate that trust and distrust have different magnitudes of relationships with predictors and function differently as mediators. It appears that trust is better predicted by perceived similarity than distrust, while distrust was found to be significantly correlated with social dominance while trust was not. Both of these findings are consistent with the positive and negative activation theory which states that constructs that are matched in terms of emotional valence will be more strongly related than constructs that are mismatched. Therefore, future research should definitely focus on more closely examining the distinctions between these two attitudinal constructs in terms of antecedents and consequences.

### Practical Implications

Overall, the findings of this study suggest that problems with trust may arise in multicultural situations in which the involved parties are different from each other in terms of ethnicity. The findings regarding propensity to trust suggest that selecting team members with higher propensity to trust may result in teams with higher levels of initial trust, and that this trust may lead to more collaborative behavior and more effective decision-making. While this may or may not be advantageous depending on the context in which the team is operating, it does provide a deeper understand of how initial trust is formed and what predictors are related to initial trust. Additionally, the findings indicate that propensity to trust only explains one portion of the variance in trust, and therefore that there are other variables feeding into the formation of trust attitudes.

Second, this study suggests that individuals in multicultural situations may make assumptions regarding deep-level similarity that translate into lower levels of initial trust and higher levels of initial distrust, which could hinder collaborative behavior between the involved parties. However, it is important to note that it is not actual ethnic diversity that is related to trust

and collaboration in multicultural contexts, but it is perceived deep-level similarity between the involved parties. When perceived deep-level similarity is accounted for, there is actually a negative relationship between objective ethnic diversity and trust and no relationship between objective ethnic diversity and distrust. This suggests that the negative impact of objective ethnic diversity in multicultural situations can actually be completely mitigated if deep-level similarities are emphasized between the involved parties and attention away from differences. Second, the finding that trust and distrust combined fully mediate the relationship between perceived similarity and collaboration suggests that collaborating parties that perceive each other to be dissimilar will have deficits in trust and problems with distrust, and moreover, that this lack of trust will negatively influence their behavior toward one another. In other words, for a team to engage in effective collaboration (e.g., coordination, motivation, backup behavior), they should perceive themselves to be similar and consequently trust one another. It would also imply that teams and team leaders in the field should focus on managing both trust and distrust and the corresponding related behaviors, which require further research to be identified.

#### Study Limitations and Future Research

One limitation of the current study is the use of a student sample. Undergraduate populations, due to the tendency for all individuals to be highly acculturated, are not the best representation of cultural or ethnic heterogeneity. However, this limitation only strengthens my findings since it should theoretically reduce variance in terms of ethnic diversity, which would reduce the power of my analyses. Therefore, my findings are actually conservative based on this assumption and the effect size of ethnic diversity on perceived deep-level similarity may be even larger in non-student samples with higher levels of ethnic heterogeneity. Future research should

replicate this study in non-student samples in order to see if the relationships hold, become stronger, or change pattern.

A second limitation of this study was the nature of the chosen testbed. The decision-making task, Democracy 2, was a strong example of a collaborative, complex decision-making task. However, due to the nature of the physical location of the participants, it did not have any distributed information, and therefore there was very little risk involved since either of the participants could instantly double check the information being given by the other. Therefore, this particular task was a very weak test of the differential influence of trust and distrust since there really was no impetus for trust, or distrust, to be important. In other words, individuals could not be worried about their partner betraying them or making a mistake if they can instantly see the effects of their partner's actions. However, again, this only means my findings for trust were conservative – trust was a significant predictor in this study despite the fact that the task was not ideal for priming the need for trust. However, this limitation suggests that my lack of findings regarding distrust may be an artifact of the task. In other words, I might be making a type II error regarding distrust, and a more risk-based task may be necessary to truly see the predictive ability of distrust as a construct. Future research should focus on examining trust and distrust within high-risk tasks and in situations where levels of trust and distrust can be directly manipulated.

A third limitation of this study is the relatively small sample size. For the majority of the analyses conducted, the sample size was acceptable. However, the sample size was relatively small for testing a moderation hypothesis, and therefore that finding may be a Type II error caused by a lack of power due to small sample size. Therefore while hypothesis 2 was not supported in this empirical investigation, the implications of this finding should be examined

with caution. Future research should attempt to test this moderating hypothesis with a larger sample size.

Additionally, the majority of the variables in this study were self-report measures. In other words, perceived similarity, trust, distrust, and collaboration were all collected via surveys. It is possible the mono-method bias is a problem in this study. However, a variety of individual difference variables were collected and examined as potential control variables to reduce the possibility of making Type I or Type II errors. Additionally, the primary independent variable was experimentally manipulated and our distal outcome variable was an objective performance score. Therefore, the relationship including these variables should not be affected by mono-method bias. Furthermore, perceived deep-level similarity, trust, and distrust are all psychological mechanisms that can only be captured accurately via self-report.

Collaboration is the only variable measured via self-report that would have been more accurately measured using a behavioral method. In order to reduce the chances that our relationships were not in the correct order, we did measure trust before the task and collaboration after the task to create some level of temporal separation. This should have also reduced the influence of mono-method bias since the measures were filled out at separate times with an hour of task performance in between to serve as a distraction. However, future research should use more objective behaviorally-based measures, such as communication or behavioral coding, to examine collaboration as a reciprocal problem-solving process.

Finally, due to the artificial nature of the laboratory, there was no true consequence of bad performance in this study. The participants were engaging in the task simply to gain extra credit for completing research, and therefore did not have any compelling reason to be motivated toward performing well. However, this limitation again only indicates that the findings are

conservative in that trust still predicted collaboration and collaboration still predicted performance even when the participants had no external motivation to perform in the first place. This suggests that the findings from this study will likely only become stronger when tested in a situation with real consequences for performance.

### Conclusion

The current study represents a first step toward addressing the pressing need to understanding the processes and influences of intercultural collaboration. Specifically, it examined the influence of ethnic diversity on perceived deep-level similarity, trust, distrust, collaboration, and performance in a short-term, complex decision-making context. The findings of the study have several important implications for theory and practice. First, ethnic diversity results in reduced levels of trust and higher levels of distrust via perceptions of deep-level similarity. Therefore, the findings suggest that it is critical to measure both objective and perceived similarity in research if we are to truly understand the influence of cultural diversity on collaboration. Practically, this also suggests that one potential avenue for fostering trust in multicultural situations is to encouraging involved parties to uncover deep-level similarities and de-emphasize assumptions regarding dissimilarities. Finally, this study also suggests that trust-related attitudes as a whole are the explanatory mechanism for why individuals that perceive themselves to be similar to one another act more collaboratively. In other words, improving trust in multicultural contexts should lead to more collaborative behavior.

This study contributes to the trust and collaboration literature in several ways. First, it is the first empirical study to examine collaboration based on a new multi-disciplinary, integrative definition (Bedwell et al., under review). Second, it is one of the first laboratory-based experiments to explore the unique predictive impact of trust and distrust as separate attitudinal

constructs in a collaboration context. Overall, this study represents one of the first attempts to empirically examine the influence of ethnic diversity on trust and the effectiveness of collaboration in an attempt to shed light on the phenomena of intercultural collaboration. The hope is that this study will serve as a foundation for a continuing stream of research examining the mechanisms through which culture influences collaborative behavior and performance.

## APPENDIX A: DEMOGRAPHIC ITEMS



Please answer the questions about yourself and your parents/guardians to the best of your knowledge. If you do not know the answer to the question or the question does not apply to you, please write "N/A" to indicate it is not applicable.

1. What is your sex?  
 Male  
 Female
2. What is your age?  
\_\_\_\_\_
3. What is your race or ethnic background? (check all that apply):  
 White/Caucasian  
 Black/African American  
 Hispanic or Latino  
 Asian  
 Pacific Islander or Native Hawaiian  
 American Indian  
 Alaskan Native  
 Middle Eastern  
 Other: Please Describe\_\_\_\_\_
4. If you chose more than one race or ethnic group in the previous question, which one do you most identify with?  
 White/Caucasian  
 Black/African American  
 Hispanic or Latino  
 Asian  
 Pacific Islander or Native Hawaiian  
 American Indian  
 Alaskan Native  
 Middle Eastern  
 Other: Please Describe\_\_\_\_\_
5. What is your Mother's race or ethnicity?  
 White/Caucasian  
 Black/African American  
 Hispanic or Latino  
 Asian  
 Pacific Islander or Native Hawaiian  
 American Indian  
 Alaskan Native  
 Middle Eastern  
 Other: Please Describe\_\_\_\_\_
6. What is your father's race or ethnicity?  
 White/Caucasian  
 Black/African American  
 Hispanic or Latino  
 Asian  
 Pacific Islander or Native Hawaiian

- American Indian
- Alaskan Native
- Middle Eastern
- Other: Please Describe \_\_\_\_\_

7. Where were you born? (City, State; Country if outside the US)  
\_\_\_\_\_
8. Is there a country other than the country in which you were born that you identify most with?  
\_\_\_\_\_
9. Where was your mother born? (City, State; Country if outside the US)  
\_\_\_\_\_
10. Where was your father born? (City, State; Country if outside the US)  
\_\_\_\_\_
11. Are you fluent in more than one language? If so, which languages, in order of most fluent to least fluent?  
\_\_\_\_\_
12. What language does your mother speak? If she speaks more than one language, list the languages in order of most fluent to least fluent.  
\_\_\_\_\_
13. What language does your father speak? If he speaks more than one language, list the languages in order of most fluent to least fluent.  
\_\_\_\_\_
14. Marital Status:
- Single
  - Married
  - Separated
  - Divorced
  - Widowed
  - Living with Another
  - Domestic Partnership
15. Class:
- Freshman
  - Sophomore
  - Junior
  - Senior
- If Senior – please indicate your year (i.e. 4<sup>th</sup> year, 5<sup>th</sup> year, etc.) \_\_\_\_\_
16. How many credit hours are you enrolled in this semester? \_\_\_\_\_
17. Major: \_\_\_\_\_
18. Minor: \_\_\_\_\_
19. Do you have any other degrees?
- Yes
  - No
- If Yes, please list them here: \_\_\_\_\_
20. What is your employment status?
- Not Employed
  - Self-Employed

- Student  
 Employed Full-Time  
 Employed Part-Time
21. UCF GPA: \_\_\_\_\_
22. SAT Score: \_\_\_\_\_  
 Verbal: \_\_\_\_\_  
 Math: \_\_\_\_\_
23. ACT Score: \_\_\_\_\_
24. Are you the first one in your immediate family to attend college? (Yes/No)
25. What is the highest education level of your mother?
- High School  
 Some College  
 2-year College Degree  
 4-year College Degree  
 Some Graduate School  
 Master's Degree  
 Doctorate (including a Juris Doctorate – law degree)
26. What is the highest education level of your father?
- High School  
 Some College  
 2-year College Degree  
 4-year College Degree  
 Some Graduate School  
 Master's Degree  
 Doctorate (including a JD)
27. How long have you been using the Internet (in years)? \_\_\_\_\_
28. How many hours per day do you spend online? \_\_\_\_\_
29. Do you predominantly use a Mac or a PC? \_\_\_\_\_
30. Have you ever had a head injury with loss of consciousness over 10 minutes? (Yes/No)
31. Do you currently have any limitations, pain, or injuries/disabilities to your dominant hand or arm? (Yes/No)  
 If so, please describe: \_\_\_\_\_
32. Have you ever had a seizure? (Yes/No)
33. Do you have any other diagnosed neurological disorders? (Yes/No)  
 If so, please describe: \_\_\_\_\_
34. Do you currently take any prescribed medications? (Yes/No)  
 If so, please list them here: \_\_\_\_\_
35. Have you had more than 4 drinks in one sitting over the past 24 hours? (Yes/No)
36. Have you taken any illicit drugs or prescriptions not directly prescribed to you in the last 48 hours? (Yes/No)

## APPENDIX B: PRIOR VIDEO GAME SCALE

Please answer the following questions using the following scale:

- 1 = Not at all
- 2 = About once a year
- 3 = About once a month
- 4 = About once a week
- 5 = Everyday

1. The following questions will assess how often you play different types of videogames:
2. Any videogames (e.g., PC-based, Nintendo, Playstation, Wii, arcade)?
3. First-person-perspective videogames, for example: Battlefield 1942, Halo?
4. Simulation-based videogames, for example: Falcon, Microsoft Flight Simulator, Lock On: Modern Air?
5. Online multi-player videogames, for example: EverQuest, World of Warcraft?
6. Action videogames, for example: Grand Theft Auto, NBA, God of War?
7. Command/strategy videogames, for example: Risk, Command and Conquer?
8. Creative development videogames, for example: Sims, Tycoon, Civilization?
9. Puzzle videogames, for example: Minesweeper, Tetris?

## APPENDIX C: PROPENSITY TO TRUST SCALE

Please answer the following questions using the following scale:

- 1 = Strongly Disagree
- 2 = Somewhat Disagree
- 3 = Neither Agree nor Disagree
- 4 = Somewhat Agree
- 5 = Strongly Agree

1. I tend to be accepting of others.
2. My relationships with others are characterized by trust and acceptance.
3. Basically I am a trusting person.
4. It is better to trust people until they prove otherwise than to be suspicious of others until they prove otherwise.
5. I accept others at "face value."
6. Most people are trustworthy.
7. It is better to be suspicious of people you have just met, until you know them better.
8. I make friends easily.
9. Only a fool would trust most people.
10. I find it better to accept others for what they say and what they appear to be.
11. I would admit to being more than a little paranoid about people I meet.
12. I have few difficulties trusting people.
13. Basically, I tend to be distrustful of others.
14. Experience has taught me to be doubtful of others until I know they can be trusted.
15. I have a lot of faith in the people I know.
16. Even during the "bad times," I tend to think that things will work out in the end.
17. I tend to take others at their word
18. When it comes to people I know, I am believing and accepting.
19. I feel I can depend on most people I know.
20. I almost always believe what people tell me.

## APPENDIX D: SOCIAL DOMINANCE ORIENTATION SCALE



To what extent do you have a positive or negative feeling towards the following objects or statements?

- 1 = Very positive
- 2 = Positive
- 3 = Slightly positive
- 4 = Neither positive nor negative
- 5 = Slightly negative
- 6 = Negative
- 7 = Very negative

1. Some groups of people are simply not the equals of others.
2. Some people are just more worthy than others.
3. This country would be better off if we cared less about how equal all people were.
4. Some people are just more deserving than others.
5. It is not a problem if some people have more of a chance in life than others.
6. Some people are just inferior to others.
7. To get ahead in life, it is sometimes necessary to step on others.
8. Increased economic equality.
9. Increased social equality.
10. Equality.
11. If people were treated more equally we would have fewer problems in this country.
12. In an ideal world, all nations would be equal.
13. We should try to treat one another as equals as much as possible. (All humans should be treated equally.)
14. It is important that we treat other countries as equals.

## APPENDIX E: MULTIGROUP ACCULTURATION SCALE

Below are a number of statements that evaluate changes that occur when people interact with others of different cultures or ethnic groups. For questions that refer to “COUNTRY OF ORIGIN” or “NATIVE COUNTRY,” please refer to the country from which your family originally came. If your family is from the United States, your “COUNTRY OF ORIGIN” would be the United States. For questions referring to “NATIVE LANGUAGE,” please refer to the language spoken where your family originally came.

### ***Scale***

- 1 = Completely False
- 2
- 3
- 4 = Completely True
- 5 = N/A

### ***Items***

1. I understand English, but I’m not fluent in English.
2. I am informed about current affairs in the United States.
3. I speak my native language with my friends and acquaintances from my country of origin.
4. I have never learned to speak the language of my native country.
5. I feel totally comfortable with (Anglo or White) American people.
6. I eat traditional foods from my native culture.
7. I have many (Anglo/ White) American acquaintances.
8. I feel comfortable speaking my native language.
9. I am informed about current affairs in my native country.
10. I know how to read and write in my native language.
11. I feel at home in the United States.
12. I attend social functions with people from my native country.
13. I feel accepted by (Anglo / White) Americans.
14. I speak my native language at home.
15. I regularly read magazines of my own ethnic group.
16. I know how to speak my native language.
17. I know how to prepare (Anglo / White) American foods.
18. I am familiar with the history of my native country.
19. I regularly read an American newspaper.
20. I like to listen to music of my ethnic group.
21. I like to speak my native language.
22. I feel comfortable speaking English.
23. I speak English at home.
24. I speak my native language with my spouse or partner.
25. When I pray, I use my native language.
26. I attend social functions with (Anglo / White) American people.
27. I think in my native language.
28. I stay in close contact with family members and relatives in my native country.
29. I am familiar with important people in American history.
30. I think in English.
31. I speak English with my spouse or partner.
32. I like to eat American foods.

## APPENDIX F: COLLECTIVE ORIENTATION SCALE

Working as part of a team can have positive as well as negative aspects. We are interested in how you feel about working in team settings. Below are a number of statements regarding teams. There are no right or wrong answers; however you may agree more or less strongly with each statement.

Please answer the following questions using the following scale:

- 1 = Strongly Disagree
- 2 = Somewhat Disagree
- 3 = Neither Agree nor Disagree
- 4 = Somewhat Agree
- 5 = Strongly Agree

1. When solving a problem, it is very important to make your own decision and stick by it.
2. When I disagree with other team members, I tend to go with my own gut feelings.
3. I find working on team projects to be very satisfying.
4. I would rather take action on my own than to wait around for others' input.
5. I find that it is often more productive to work on my own than with others.
6. I find it easy to negotiate with others who hold a different viewpoint than I hold.
7. When I have a different opinion than another group member, I usually try to stick with my own opinion.
8. I think it is usually better to take the bull by the horns and do something yourself, rather than wait to get input from others.
9. For most tasks, I would rather work alone than as part of a group.
10. I always ask for information from others before making any important decision.
11. I can usually perform better when I work on my own.
12. It is important to stick to your own decisions, even when others around you are trying to get you to change.
13. Teams usually work very effectively.
14. I prefer to complete a task from beginning to end with no assistance from others.
15. When others disagree, it is important to hold one's ground and not give in.

## APPENDIX G: BASIC EMPATHY SCALE

Please answer the following questions using the following scale:

- 1 = Strongly Disagree
- 2 = Somewhat Disagree
- 3 = Neither Agree nor Disagree
- 4 = Somewhat Agree
- 5 = Strongly Agree

1. My friend's emotions don't affect me much.
2. After being with a friend who is sad about something, I usually feel sad.
3. I can understand my friend's happiness when she/he does well at something.
4. I get frightened when I watch characters in a good scary movie.
5. I get caught up in other people's feelings easily.
6. I find it hard to know when my friends are frightened.
7. I don't become sad when I see other people crying.
8. Other people's feelings don't bother me at all.
9. When someone is feeling 'down' I can usually understand how they feel.
10. I can usually figure out when my friends are scared.
11. I often become sad when watching sad things on TV or in films.
12. I can often understand how people are feeling even before they tell me.
13. Seeing a person who has been angered has no effect on my feelings.
14. I can usually figure out when people are cheerful.
15. I tend to feel scared when I am with friends who are afraid.
16. I can usually realize quickly when a friend is angry.
17. I often get swept up in my friend's feelings.
18. My friend's unhappiness doesn't make me feel anything.
19. I am not usually aware of my friend's feelings
20. I have trouble figuring out when my friends are happy.

## APPENDIX H: FAMILIARITY SCALE



Please answer the following questions using the following scale:

1 = Not at all (You've never met them before) → 6 = Very well (you are good friends)

1. How well do you know your partner?

## APPENDIX I: ETHNIC EXPERIENCE SCALE

Please answer the following questions using the following scale:

1 = None

2 = A little

3 = Some

4 = Quite a bit

5 = A lot

1. How much experience have you had interacting with people from other ethnic groups?

APPENDIX J: PERCEIVED DEEP-LEVEL SIMILARITY SCALE

*Please answer the following questions using the following scale:*

- 1 = Very Dissimilar
- 2 = Somewhat Dissimilar
- 3 = Slightly Dissimilar
- 4 = Slightly Similar
- 5 = Somewhat Similar
- 6 = Very Similar

1. How similar are you and your partner in regards to how you understand things?
2. How similar are you and your partner in terms of your values?
3. How similar are you and your partner in terms of how you think about problems?
4. How similar are you and your partner in terms of coming up with a solution to problems?

*Please answer the following questions using the following scale:*

- 1 = Strongly Disagree
- 2 = Somewhat Disagree
- 3 = Neither Agree nor Disagree
- 4 = Somewhat Agree
- 5 = Strongly Agree

1. My partner and I share similar work ethics.
2. My partner and I have similar work habits.
3. My partner and I have similar communication styles.
4. My partner and I have similar interaction styles.
5. My partner and I have similar personalities.
6. My partner and I come from similar cultural backgrounds.
7. My partner and I are from the same country.
8. My partner and I share similar ethnic backgrounds.

APPENDIX K: PERCEIVED DEEP-LEVEL SIMILARITY SCALE

Please answer the following questions using the following scale:  
1 = Not at all → 6 = Very much so

To what extent do you feel:

1. Assured that your partner will make intelligent decisions?
2. Convinced your partner will do what is expected without being asked?
3. Confident in your partner's ability to complete the task?
4. Faith that your partner can do the task at hand?
5. Positive that your partner will try and do what is best for you both?
6. Convinced that you can rely on your partner to try their hardest?
7. Certain that your partner will act in your best interest?
8. Confident that your partner will do as he/she says?
9. A lack of faith in your partner's intentions?
10. Confident that your partner will try to do things that benefit the team?
11. Compelled to keep tabs on your partner to be sure things get done?
12. Doubtful that your partner is able to handle important responsibilities?
13. Afraid that your partner will make a mistake?
14. Compelled to keep a record of your partner's work?
15. Worried that your partner will do something wrong?
16. Afraid that your partner will purposefully do something that isn't helpful?
17. Confident that your partner will do something selfish?
18. Afraid your partner will not do what is best for the team?
19. Suspicious about your partner's reasons behind certain decisions?
20. Worried that your partner will sabotage you?
21. Nervous that your partner will betray you?
22. Cautious about your partner's intentions?

APPENDIX L: COLLABORATIVE BEHAVIOR SCALE



To what extent does our team actively work to...

- 1= Not at all
- 2= Very Little
- 3= To Some Extent
- 4= To a Great Extent
- 5= To a Very Great Extent

#### Monitoring Progress Toward Goals

- 1 Regularly monitor how well we are meeting our team goals?
- 2. Use clearly defined metrics to assess our progress?
- 3. Seek timely feedback from stakeholders (e.g., customers, top management, other organizational units) about how well we are meeting our goals?
- 4. Know whether we are on pace for meeting our goals?
- 5. Let team members know when we have accomplished our goals?

#### Resource and Systems Monitoring

- 1. Monitor and manage our resources (e.g., financial, equipment, etc.)?
- 2. Monitor important aspects of our work environment (e.g., inventories, equipment and process operations, information flows)?
- 3. Monitor events and conditions outside the team that influence our operations?
- 4. Ensure the team has access to the right information to perform well?
- 5. Manage our personnel resources?

#### Team Monitoring and Backup

- 1. Develop standards for acceptable team member performance?
- 2. Balance the workload among our team members?
- 3. Assist each other when help is needed?
- 4. Inform team members if their work does not meet standards?
- 5. Seek to understand each other's strengths and weaknesses?

#### Coordination

- 1. Communicate well with each other?
- 2. Smoothly integrate our work efforts?
- 3. Coordinate our activities with one another?
- 4. Re-establish coordination when things go wrong?
- 5. Have work products ready when others need them?

#### Conflict Management

- 1. Deal with personal conflicts in fair and equitable ways?
- 2. Show respect for one another?
- 3. Maintain group harmony?
- 4. Work hard to minimize dysfunctional conflict among members?
- 5. Encourage healthy debate and exchange of ideas?

### Motivating & Confidence Building

1. Take pride in our accomplishments?
2. Develop confidence in our team's ability to perform well?
3. Encourage each other to perform our very best?
4. Stay motivated, even when things are difficult?
5. Reward performance achievement among team members?

APPENDIX M: UCF IRB HUMAN SUBJECTS PERMISSION LETTER



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
12201 Research Parkway, Suite 501  
Orlando, Florida 32826-3246  
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

## Notice of Exempt Review Status

From: **UCF Institutional Review Board**  
**FWA00000351, Exp. 10/8/11, IRB00001138**

To: **Eduardo Salas and Shawn Burke**

Date: **July 13, 2009**

IRB Number: **SBE-09-06325**

Study Title: **Understanding Performance in Computer-Based Games**

Dear Researcher:

Your research protocol was reviewed by the IRB Chair on 07/08/2009. Per federal regulations, 45 CFR 46.101, your study has been determined to be **minimal risk for human subjects and exempt** from 45 CFR 46 federal regulations and further IRB review or renewal unless you later wish to add the use of identifiers or change the protocol procedures in a way that might increase risk to participants. Before making any changes to your study, call the IRB office to discuss the changes. **A change which incorporates the use of identifiers may mean the study is no longer exempt, thus requiring the submission of a new application to change the classification to expedited if the risk is still minimal.** Please submit the Termination/Final Report form when the study has been completed. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

The category for which exempt status has been determined for this protocol is as follows:

2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures, or the observation of public behavior, so long as confidentiality is maintained.
  - (i) Information obtained is recorded in such a manner that the subject cannot be identified, directly or through identifiers linked to the subject, **and/or**
  - (ii) Subject's responses, if known outside the research would not reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing or employability or reputation.

All data, which may include signed consent form documents, must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Janice Turchin on 07/13/2009 11:27:15 AM EDT

A handwritten signature in black ink that reads 'Janice Turchin'.

IRB Coordinator

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